FINLAND FUTURES RESEARCH CENTRE • UNIVERSITY OF TURKU

COOLEST STUDENT PAPERS AT FINLAND FUTURES RESEARCH CENTRE 2024–2025

Tulevaisuuden tutkimuskeskuksen valittuja opiskelijatöitä 2024–2025

10th EDITION

Hanna-Kaisa Aalto, Hanna Heino, Pasi Keski-Pukkila, Liisa Haapanen, Sari Puustinen, Markus Pöllänen, Morgan Shaw, Katriina Siivonen, Petri Tapio, Amos Taylor, Markku Wilenius & Anne Arvonen (editors)

FFRC eBooks 6/2025

This is the 10th edition of the 'Coolest Student Papers at the FFRC' publication, which has been published since the study year 2015−2016:

2024−2025: http://urn.fi/URN:ISBN:978-952-249-633-1
2023−2024: http://urn.fi/URN:ISBN:978-952-249-618-8
2022−2023: http://urn.fi/URN:ISBN:978-952-249-607-2
2021−2022: http://urn.fi/URN:ISBN:978-952-249-580-8
2020−2021: http://urn.fi/URN:ISBN:978-952-249-561-7
2019−2020: http://urn.fi/URN:ISBN:978-952-249-547-1
2018−2019: http://urn.fi/URN:ISBN:978-952-249-538-9
2017−2018: http://urn.fi/URN:ISBN:978-952-249-507-5
2016−2017: http://urn.fi/URN:NBN:fi-fe2019052116251
2015−2016: http://urn.fi/URN:NBN:fi-fe2019052116272

Cover picture © Suvi Harvisalo, Turun yliopisto/University of Turku

ISBN 978-952-249-633-1
ISSN 1797-1322

UNIVERSITY OF TURKU

FINLAND FUTURES RESEARCH CENTRE

FFA Finland Futures Academy

Finland Futures Research Centre
University of Turku • Turku School of Economics
20014 University of Turku, Finland

Rehtorinpellonkatu 3, 20500 TURKU
Korkeavuorenkatu 25 A 2, 00130 HELSINKI
Hämeenkatu 15 B 11, 33200 TAMPERE

tutu-info@utu.fi
utu.fi/ffrc

TABLE OF CONTENTS

ESIPUHE | FOREWORD

Tulevaisuuden tutkimuskeskus on julkaissut vuodesta 2016 lähtien koosteita ansiokkaista opiskelijoiden opintojensa aikana kirjoittamista esseistä, harjoitustöistä ja muista kirjallisista opintosuoritteista. Haluamme tarjota opiskelijoille oikean julkaisukanavan ja auttaa heitä saamaan saada vaikka sen ensimmäisen julkaisutiedon ansioluetteloon. Aikana, jolloin tieteellisen tiedon arvostus on uhattuna, akateemisen kirjoittamisen taidon osaaminen korostuu. Haluamme edesauttaa opiskelijoitamme mainitun taidon kehittämisessä. Tekoälykin tarvitsee tieteellistä tietoa, jota se kokoaa yhteen ja käsittelee. Toivomme julkaisun toimivan myös tässä tarkoituksessa.

Julkaisumme koostuu tulevaisuudentutkimuksen kansainvälisen maisteriohjelman, Turun yliopiston kestävän kehityksen opintokokonaisuuden (KEKO) ja Tulevaisuudentutkimuksen Verkostoakatemian (TVA) opiskelijoiden kirjoituksista joko suomeksi tai englanniksi, koska opiskelijatyöt on tehty englanniksi maisteriohjelmassa ja suomeksi KEKO- ja TVA-opinnoissa. Aihepiirit ovat moninaisia, kuten ovat opetuksen sisällöt. Opiskelijat ovat itse olleet innokkaasti mukana aiheiden valinnoissa eri kursseilla, mikä osoittaa heidän kiinnostustaan maailman haasteisiin ja tieteen rooliin niiden ratkaisemisessa.

Toivomme tämän julkaisun antavan rohkeutta kirjoittajille edetä akateemisen kirjoittamisen joskus kivisellä polulla ja toimivan esimerkkinä muille opiskelijoille. Toivomme julkaisun tavan ajattelemisen aiheita muille lukijoille ja tiedon käyttäjille olivatpa he tai ne ihmisiä tai koneita.

Ajatuksia herättäviä lukuhetkiä!

• • •

Finland Futures Research Centre has been publishing since 2016 a collection of the most prominent student papers written during their studies. The FFRC aims to provide a genuine publication forum for students and help them achieve their first publication entry. In times when the appreciation of science and scientific knowledge is at risk, the skill of academic writing is more important than ever. We want to help our students develop their writing skills. AI also requires information for processing, and we hope that our publication serves that need as well.

Our publication consists of writings by students from the Master's Program in Futures Studies, Sustainable Development Studies at the University of Turku, and Finland Futures Academy. Since student papers are originally written in either Finnish or English, we publish them in their original language. The papers address multiple questions related to current challenges, similar to those explored in our courses. The students have eagerly participated in choosing the topics for their writings in various courses, demonstrating their interest in global challenges and the role of science in addressing them.

We hope that this publication encourages the authors to continue on the sometimes rocky path of academic writing. We also hope it serves as an example for other students and provides food for thought to readers and users of information, whether they are humans or machines.

We hope this provides an inspiring read!

In Turku 1 December 2025

Juha Kaskinen

Director

FUTU1 Introduction to Futures Studies

FUTU1 Introduction to Futures Studies (4 cr) course begins with the origins and definitions of the field of futures studies and its position in academic disciplines. Key themes such as concepts of time, alternative futures and human agency are dealt with. Students are given information about various perspectives in futures studies, and analytical tools to discuss these critically. An overview of futures studies methods and concepts is provided, and students discuss and try the methods and concepts in classes.

Students produce an individual mind map and conduct a personal horizon scanning task on a chosen topic, and report these in a reflective text. Students are encouraged to create links to their previous studies and work experience and understand how prior knowledge, experience and expertise remain useful and relevant.

The teacher of the course was Professor **Markku Wilenius**.

Milja Jumppanen's study diary is a truly exemplary example of a carefully crafted lecture diary. Milja also raises an interesting question: how will the future differ from the past? Milja thoughtfully reflects on the key themes of the lectures and discussions, drawing some extremely interesting conclusions. A truly excellent diary!

Mian Raheel Kamal's study diary is an excellent example of carefully crafted work that guides the reader to discover the essence of each session. The narrative is highly personal, yet the key factors that define futures studies are clearly highlighted. After reading it, I am left with a strong impression that the writer carefully observed the sessions and identified the essential points.

Dewina Leuschner engages in really interesting discussions about the material presented in class and other material. She clearly highlights the issues she considers most important and is not afraid to put forward her own critical arguments or broader arguments when necessary. Dewina's arguments are a joy to read and follow. At the end, Dewina interestingly highlights a few sharply argued tasks for the future agenda of futures studies.

Pimali Tania Wijeratha's study diary provides a fascinating insight into how someone who is completely new to futures studies begins to familiarize themselves with the fascinating world of our field. Tania approaches her work with care and skillfully guides the reader through her key findings. She also does a great job of highlighting how futures studies is largely about examining different options and paths to the future.

Learning Diary: Introduction to Futures Studies

Milja Jumppainen

Turku School of Economics, University of Turku

Introduction

Considering the studies, upcoming courses and knowledge, it will be helpful that we build understanding of the Futures Studies “piece by piece” and start from the basics. Even though this is an introduction course, and I have familiarized myself with Futures Studies in a few courses already before, there surely will be a lot of concepts and information new for me. As was encouraged in the first week’s readings, it is needed to keep in mind the way of thinking: be openminded about different possible futures. Same applies to the learning of all of this.

According to Roy Amara (1981), there are three premises that characterize the field of futures studies: 1) the future cannot be predicted, 2) the future is not predefined, and 3) we can influence on the future with our choices and actions.

Other basic concepts that characterize the field are the idea of having multiple kinds of futures instead of exact one, the concept of future not existing, and the concept of time (Wilenius 2024b). As the future does not exist, the futures studies can be viewed as the study of the future in the present. Futurists aim to know, what can or could be (the possible), what is likely to be (the probable), and what ought to be (the preferable) in the future. (Bell 1997). As was concluded in the lecture, future is always about perceiving that something is happening and emerging. Therefore, future studies can be considered being really about action, moving and doing something. (Wilenius 2024b)

Overall, my main idea for the Futures Studies have been and is that the field is broad, interconnected and systematic discipline of its nature. Regarding the systematicity and interconnectivity, I watched the recorded presentation of Kaivo-Oja (2018), in which he discussed about the driving forces of change and highlighted the concrete model of the system of 10 change drivers. For me, that model perfectly illustrated and helped me to verbalize my thoughts regarding the complex nature of the futures research as well as the systemic nature of world in general. I believe understanding the latter would be beneficial for many. I feel that the model helped me to structure the entirety of futures studies and helped me to understand the interconnectedness of things even better. Furthermore, it also clarified how the futures studies is involved in everything and how it connects, one way or the other, different systems to each other. Therefore, and because futures studies seem to be so broad and multifaceted, it is quite challenging trying to embrace it all.

Considering the introduction lectures, it was even a bit surprising for me to realize, how philosophical field of study futures studies actually is, even though that was clearly stated in, e.g., Masini (1993). During these studies, we will be diving into many fundamental questions regarding the ways of thinking and making decisions, for example. Related to that, making decisions and cutting some information out are required, when utilizing different methodologies. Moreover, our own experiences and thinking influence on our views. Therefore, when discussing about the probable, possible and preferred futures, I see futurists have a lot of power and responsibility: who actually gets to decide, for example, what the desirable future is?

Reflection of the Themes

Next chapters will discuss about the themes of the course and the discussions conducted on Fridays. The headlines mainly follow the course structure and the weekly topics. The last sub-chapter is dedicated to one of the key concepts of future studies and which has also been discussed during each lecture – time.

Overview of Future Studies

The theme of the second week was to gain an overview of futures studies. As concluded in the lecture, Future Studies is “a systematic way of exploring various alternative that the future may bring, in order to make wise decisions today” (Wilenius 2024b). As was also described in the lecture (Wilenius 2024b) and in the materials (e.g., Kuosa 2011), there can be considered being three particular phases in the evolution of the modern futures studies: 1940s-1950s, 1960s-1970s and from 1980s to present.

It is considered that the modern futures studies was established after the World War II in the 1940s-1950s, driven by the long-term planning and forecasting, influenced by sociology and policy sciences (Kristóf & Nováky 2023). Thus, the first phase in the 1940s-1950s was time of planning and “the need to predict”, quantitative methods, positivism, global trade and financing. (Kuosa 2011; Wilenius 2024b)

The second phase of modern futures thinking was in the 1960s and the 1970s, during which the futures research expanded beyond the U.S. military researchers and became an academic discipline (Kuosa 2011; Kristóf & Nováky 2023). During this time the futures research grew and gained awareness as it addressed global issues, such as economic growth, the threat of nuclear war, and the energy crisis, and envisioned the approaches of plural futures (not just one) and the systemic perspectives (Kuosa 2011).

In the 1980s to the present time, the discipline has developed its institutional presence with numerous publications and academic programs. Various and diverse approaches and methods have been evolved, resulting in the general fragmentation of the field (Kuosa 2011). Moreover, futures thinking has taken a turn becoming more and more as the skill of organizations and individuals. (Wilenius 2024b)

It was interesting to learn about the evolution of the field, especially during which time the human perspective has actually been recognized for the first time. According to Bell (1997), “the most general purpose of futures studies is to maintain or improve the freedom and welfare of humankind –“ and it seems that this idea of the humanistic orientation was first recognized in the mid-1960s (Kuosa 2011).

It is interesting, that even though the research field is rather young, the futures thinking is ancient. Futures thinking has always been a part of our history, early examples having been found in the philosophical speculations, for example (Wilenius 2024b). It seems that we have always had the knowledge and capabilities for future studies and thinking, but just recently we have been able to conceptualize it into research field and studies.

Considering the article of Bell (1997), there was an interesting discussion about the role of predictions in Future Studies. For me, it was a surprise that there is no consensus regarding the definition of prediction among futurists. However, as I read the paper further, it made sense if some scholars don’t want to use the word “prediction” as it may be misleading. Moreover, the concept of prediction (and forecasting) was also mentioned in the second lecture (Wilenius 2024b), in which it was explained that rather than predicting the future, it is more like about projecting, looking at the possible futures and making sense out of these possible futures. Describing the word that way seems reasonable, and I guess defining it like that could possibly be approved even more broadly.

Regarding our discussions during the second week, it is fascinating yet a bit terrifying, how broad and powerful discipline futures studies actually is. Futurists seem to have a lot of power in what information is shared and how, especially when the futures knowledge is always uncertain and contingent by nature. Regarding the Bell’s nine major purposes and considering the power futures studies may possibly have, it is interesting that Bell has not included the risk analysis in the tasks at all. Moreover, many of the tasks seem kind of an action-based which I consider being important, as, according to Rubin (2014), the future can be influenced by individual choices.

Overall, I consider the list of Bell’s being very broad and the nine purposes overlap a great deal with each other and whit other disciplines, too. It seems challenging to explore and study one task without including or reflecting the other, even though it is also most likely impossible for one person or a group to discover

all the tasks. There, I face the same challenge as I have already highlighted before: futures studies, forecasting and scenarios are about making choices and so interconnected, so how to decide, what is the most important task to study and focus, or what should be included in specific forecast or scenario report? We need all of the tasks in a way, so how to make a choice? If I choose one task, how I avoid stating that the other tasks are not irrelevant either, but not just included in my research? If it was not crystal clear before, it certainly is now: this field of research is enormous.

Considering the tasks further and more practically, I consider the importance of the tasks depending on the scale we are considering. On personal and individual level, I feel that the most relevant task on Bell's list is to interpret the past and orientate the present. I think it is crucial for all of us to understand how our history and past experiences effect on our present views and how they may influence on our decisions and actions later. Moreover, I find this important also because our own decisions have an influence on how the future unfolds (e.g., Rubin 2014).

If considering on the wider, national scale, I would say it is truly important to increase the democratic participation of people (number 8). As was mentioned in the text of Bell (1997), the futures studies can be misused for, e.g., fascism, and therefore it is important to strongly focus on the opposite and increase everyone's involvement in designing of the future. However, this may be a challenging task to accomplish or even to approach. This is because I think that would require a great deal of development in our structures regarding the governmental, administration and management, and those are not quick nor easy steps to make.

Trajectories

> *"Perhaps the most commonly understood reason for the use of futures methods is to help identify what you do not know, but need to know, to make more intelligent decisions."*
> *(Kuusi, Cuhls & Steinmuller 2015)*

Other interesting issues that characterize the futures studies are its concepts. The theme of the third week was the trajectories of future studies. The lecture discussed about the great men and women behind the futures studies and its most relevant concepts, such as Flechtheim, Kahn, Jungk, Naisbitt, Toffler, Ansoff, Bell, Masini and Malaska (Wilenius 2024c).

Understanding the background of these people and realizing the time they were living, it seems so self-explanatory that the modern futures studies has invented back then, during the second world war. The desire of Mr. Flechtheim to understand the past and reflect it on the current time to learn and grow provided us the futures studies today. As was stated in the lecture and according to Flechtheim (Wilenius 2024c), the emancipatory mission of the futures studies is to prevent wars, hunger and suffering, fights against deprivation, democratize society and to end the exploitation of nature. I would like to say these missions, and the highlighted key insights, are still very relevant and up to date. Moreover, as Wilenius (2024c) concluded in the lecture that without understanding of where the development actually stems from, we cannot say anything relevant about the future. It is needed to understand the root causes, such as, why we have come on certain place and time in life, and what has brought us into that present state? These kinds of questions are very fundamental, and in my opinion, we all should have more time to stop by these themes. It would help us understand better the person we are today, and where do we want to go next.

Of course, as discussed in the lecture (Wilenius 2024c), reflecting the past is not the only option neither way. Just as Mr. Kahn has said, anyone can learn from the past. In order to be able to make better decisions for and pursuits toward the future, we need to learn from it. By that I feel is meant that first, we must be able to find, recognize and see the smallest signals that may affect the future. And of course, we must also be able to react to those signals. Moreover, to learn from the future requires that we stay humble towards it and won't let our expertise and knowledge blindside us. As Wilenius (2024c) explained during the lecture, we know what has happened in the past (learned from the past), and therefore we also think

we know what will happen in the future. This narrows our views and is not the whole story, obviously, as there may come some events and drivers that we haven't experienced yet. This is where we need to be able to recognize the small, even weak, signals, which I mentioned earlier.

Furthermore, even though you would be able to learn from the past, the past will never be repeated exactly the same way and thus the future will be always different. The "old ways" won't work in new circumstances as the complexity of the situation is different anyway, so learning only from the past and thus repeating the old ways will not be the only solution. Even though we know it theoretically, our fears may prevent us from acting and choosing differently. Jumping or reaching out "in the other" (Wilenius 2024c) may feel terrifying. Fortunately, that was not the case of Nelson Mandela as his example is truly inspiring (Wilenius 2024c). It must have faced a great resistance, yet it also must have required a lot of courage to act and choose differently from public opinion. I found the example not only inspiring but also greatly circulating back to the mission of Flechtheim mentioned earlier. Mandela wanted to prevent further conflicts, so he learned both, from the past and the future, and saw the future "in the other".

As we went through the different eras and futurists and ended up discussing about Pentti Malaska (Wilenius 2024c), I could not help but connect the dots and realize, once again, the systematic nature of this discipline. I noticed that the idea of "learn from the future" also applies to Malaska's founding of model of social development (Malaska 1999): our society would not have progressed the way we have progressed now, if we had done things the same way as earlier (i.e., how we had gotten used to do them). Moreover, I found Malaska's 'needs' (Wilenius 2024c; Malaska 1999) being a bit similar to Maslow's hierarchy of needs. Perhaps 'need' is one of our main or primary motivations that drive us forward, makes us aim higher and push us to develop? For example, as mentioned in the lecture, during every 'event', such as war or globalization, there is a struggle and aim to find a better society. In the end, isn't there 'a need', some inner motivation, behind that struggle or aim?

This topic of finding a better society continued nice way in our discussion session. According to Bell (1997), one purpose of futures studies is improving human wellbeing and life sustaining capacities, which is why we discussed that it is hard to argue that a singular future prediction is better than imagining alternative ones. Furthermore, even though we want to find a better society, not all alternative futures can be imagined equal – it depends on the power of the individuals involved and how it is translated into action. On the other hand, we tried to think in which circumstances predicting singular future could be useful. We considered it useful in individual goal setting as it would help to line up all resources in support of that. Another example was Authoritarian countries as we thought they probably prefer setting up one future only. Related to that, democratization and pluralism of futures were few themes of which Gidley (2017) was considering.

We ended up discussing about how largely politics and politicians and their views influence on the planning of alternative futures and how some alternative futures may be excluded if the views don't fit into the beliefs of certain party. Generating political will and agreement around alternative futures is crucial, if the society wants to truly create and build a better society. To build a better society for each of its members requires, that everyone is able to tell their opinions, thus the societies need to increase their democratic participation, as mentioned in Bell's tasks.

Multiple futures

Predicting and forecasting have been two main themes that have been considered throughout all the lectures (e.g., Andersson 2018; Bell 1997; Gidley 2017). We have already discussed about those during our Friday discussion sessions and considered, e.g., why futures studies is critical towards them, what kind of weaknesses there may be associated with forecasting and predictive methods as well as how does imagining alternative futures differ from predicting singular one.

Forecasting and predicting are closely related to the concept of multiple futures, which was the topic of our fourth week of lectures. I feel the lecture on Tuesday worked well in orientating and challenging our thinking

for the workshops on Friday. We considered scenarios that serve as “predictions” of multiple futures. I like the idea of scenarios as on the one hand, they need to be logical and well-grounded narratives, even though on the other hand, they need to differ from each other and challenge the “traditional” descriptions of the future (Wilenius 2024d). I have an experience from building scenarios, and I must say, I have truly enjoyed the process every time. As someone who prefers sensible reasoning and yet still enjoys arts, it is fascinating and intriguing that scenarios are based on the facts about current environment and the outcome and images of the future still leave you room for creativity.

During Friday, we created short PESTEV analyses for the chosen topic. First, we considered the global and local changes that we expect to take place in the coming ten years and later we discussed the things we expect remaining the same. I was familiar with PESTEV analysis before and have utilized it in many cases already. New part for me was considering more carefully the aspects that are expected to remain the same. I can just imagine this is one of the key questions for leaders and which separate visionary leaders from others. By that, I don’t mean that some things would stay the same forever, since that obviously is not the case (e.g., Malaska cited in Wilenius & Pouru (2017). What I mean is, that as everything is going to change in a longer term anyway, visionary leaders need to be the ones who understand, when and on what intensity it is needed to focus on specific aspect at certain time. Perhaps the hybrid map of VESTEG x Pace introduced in the blog (Government Office for Science 2023) could be one useful tool there?

As I read the chapter of Futures thinking and visionary management by Wilenius & Pouru (2017), I could not help but compare the management of my current employer with the qualities and elements of visionary management described in the chapter. I guess that instead of only aiming to make quick fixes and making profit fast, the management of many organizations should be bold enough to look further into the future. Naturally though, if visionary management was easy, every manager would be a visionary.

Critical and alternative perspectives

The theme of final week of the course was critical and alternative futures. This is an interesting topic because finding such alternative future paths that are out of our knowing, is challenging to recognize. As quoted by Donald Rumsfeld in the lecture (Wilenius, 2024e), there are things we do not know we don’t know.

During our Friday discussion, we assessed that it is important to keep critical, yet open, mindset towards futures, for example. We considered that critical approach keeps us from being too smug, and thus it pushes us to envision and strive for a better future. We accept that there are things or occurring events that may not be visible for us yet, and therefore we must stay humble with our thoughts and conclusions: we don’t know everything. As we discussed on the Friday lecture, critical futures thinking enable us to identify our basic assumptions, explore diverse scenarios, challenge power structures and, for example, promote ethical responsibility (as in the article of Martin, Jr. & Moore 2020). Being critical and thus by uncovering our basic assumptions, we are able to present more interesting assumptions & alternatives for the futures. This is not possible if we don’t know our basic assumptions. I think that keeping our mind open, yet being critical, will allow us to think more broadly about the development of (alternative) futures.

Discussing Futures Consciousness Test (Ahvenharju, Minkkinen & Lalot 2018) before the AI discussion was a good orientation for the critical futures thinking. We discussed that even though some questions are subjective and they can be interpretated differently, it can be seen as a useful tool for understanding your own basic assumptions, strengths & weaknesses better, as well as understanding different people and their worldviews. The test measures an individual's awareness and orientation towards the future through five dimensions that are essential for critical futures thinking (Ahvenharju et al. 2018). As already considered earlier, being self-aware is crucial ability in developing critical futures thinking skills, because it encourages people to question (basic) assumptions, consider multiple and different future scenarios, and

explore alternative outcomes (e.g., Ahvenharju et al. 2018). Therefore, we concluded that this test can be a helpful tool for self-development and self-reflection as it fosters a deeper understanding of one's own future consciousness.

Moreover, we highlighted that the test can be useful for, not only but among others, young people in the world of fast & constant stimuluses. As the younger people have not yet been "anchored" by the weight of the status quo, it is easier for them to explore and envision different potential futures. They have not constraints or burden about how the things have always been done and therefore it may be easier for them to develop their futures consciousness.

Time perspective

Interesting theme mentioned and highlighted constantly, in each lecture, was the concept of time in futures studies. Therefore, it is no surprise that time, and temporality, are at the core of futures research (e.g., Laakkonen, 2024) and by taking a stand on time, we also take a stand on the future, consciously or unconsciously (Rubin, n.d.). Moreover, even Aristotle had noticed that the change is other name for time (Rubin, n.d.), which can be described that time is linked to change (Wilenius 2024b). However, the concept of time is complex as there are, for example, different perspectives, understandings and rhythms for time (e.g., Wilenius 2024b). Understanding the different perspectives of time (e.g., linear or cyclical), helps to analyze how societies and individuals perceive and plan for the future. Moreover, we understand time differently and we even have different time consciousness, which was highlighted through our Futures Consciousness test results during the last week's discussions.

If considering the historical context of time and evolution of futures studies, understanding the past and present are and have been crucial for making informed predictions about the future. For example, as Flechtheim argued (Wilenius 2024c), we can positively impact on future by understanding the present. This can be viewed concretely in Flechtheim's idea of understanding the past time and reflecting it on the current time (e.g., why and how the world ended up in the war) to develop better times in the future (prevent later wars and other suffering). Therefore, it could be considered that historical trends and patterns provide a foundation for anticipating future developments.

Concept of time was also brought up in the fourth lecture as we studied multiple futures. Future is uncertain and unpredictable, which means that there are possibilities for multiple outcomes (=futures). As have been discussed, the uncertainty can be managed through scenario planning and other tools that help envision multiple possible futures. For example, Dator's model of Four Generic Futures introduced in the lecture four, categorizes future scenarios based on different temporal phases and growth curves (Wilenius 2024d). The model highlights the temporal nature of change and explains the importance of understanding how different futures unfolds over time. Moreover, future studies explore different time scales (short-, medium- and long-term) as well as multiple perspectives of futures (possible, probably, preferred, plausible...), which helps understanding current trends, upcoming developments and distant possibilities (Wilenius 2024b; Wilenius 2024d).

Furthermore, as we have learned, change is systematic and interconnected process and will not happen in a vacuum. Therefore, different developments and advancements may create tensions (but also opportunities) so it is crucial to consider, how different actors and systems interact with each other, or what kind of varying temporal requirements they may have (Laakkonen 2024). As systems develop in an interaction with each other, it is important to understand the key drivers, power structures and other dynamics that enable us to forecast and potentially influence on future developments. Moreover, navigating through multiple developments and the uncertainties of the future, building resilience to adapt changing circumstances as well as envisioning and striving for a better future require that we stay humble yet critical. By daring to challenge the status quo we are able to create more transformative alternatives for the future (Gidley, 2017). Overall, based on our lectures and this discussion in the learning diary, I would like to think that,

among other missions and objectives, the futures studies also aim to create a more comprehensive understanding of how time influences and shapes potential futures.

Conclusions

Considering the content of this course and the articles presented, I would like to think that future studies as its own discipline is (almost) self-evident, as it encourages a comprehensive and integrative approach to anticipate and shape the future. If now recalling Bell's idea (1997) of the purpose of futures studies ("to maintain or improve the freedom and welfare of humankind") and reviewing, how broad, interconnected and systematic discipline future studies really is, it seems easy to articulate the importance of futures studies.

As we have learned, futures studies draw from various fields (e.g., sociology and economics) to create and develop holistic future scenarios, thus integrating broader perspectives than traditional fields. Furthermore, it is quite clear now that the future challenges are complex and interconnected and therefore the solutions must be broader and interdisciplinary. Addressing and foreseeing these kinds of issues require more specialized approach and tools than the traditional fields can provide. Moreover, I would like to think futures studies as proactive discipline that thinks more broadly and longer-term than many traditional fields.

As discussed in the lectures, futures studies aims at identifying, for example, trends, potential opportunities and challenges to prepare for future developments. It could be said that futures studies can help societies becoming more proactive, resilient and better prepared for the future events and uncertainties. I think resilience is one of the themes that may increase its importance in a future and future studies in general, especially if the growing challenges, such as geopolitical instability, climate change, pandemics as well as fragmentation and confrontation in societies, continue their existence. Could it be possible that in a future, for example, scenario planning becomes more mainstream practise in business, government and education, as it can help organizations and individuals navigate through uncertainties?

Moreover, I would like to see the importance of ethical and inclusive approaches taking more space in the future. This is closely related to the task of Bell's list of increasing the democratic participation of people. Having more people from different backgrounds participating the decision-making and building future scenarios, even building future innovations and products, would allow us to create more equal and sustainable developments and widely approved, responsible, decisions. This developmental path would allow us to implement the purpose of future studies by Bell (1997), "to maintain or improve the freedom and welfare of humankind".

References

Ahvenharju, S. Minkkinen, M. & Lalot, F. (2018). The five dimensions of Futures Consciousness. Futures, Volume 104 (2018), pp. 1-13. Available at: https://doi.org/10.1016/j.futures.2018.06.010.

Amara, R. (1981). The Futures Field: How to Tell Good Work from Bad. The Futurist, Communicating the Future. Vol. XV, No 2 April 1981.

Andersson, J. (2018). The future of the world: Futurology, futurists, and the struggle for the post cold war imagination. Oxford University Press.

Bell, W. (1997). Foundations of Futures Studies: Human Science for a New Era. Vol. 1, History, Purposes and Knowledge. Transaction Publishers.

Gidley, J. M. (2017). The Future: A Very Short Introduction. Oxford University Press.

Government Office for Science. (2023). VESTEG x Pace: A Hybrid Framework for Scanning Depths and Horizons. Blog post. Futures, Foresight and Horizon Scanning. 28.6.2023. Referred 7.10.2024. Available at: https://foresightprojects.blog.gov.uk/2023/06/28/vesteg-x-pace-a-hybrid-framework-for-scanning-depths-and-horizons/

Kaivo-Oja, J. (2018). Globaalit megatrendit. Puheenvuoro juhlaseminaarissa 1.2.2018. Tulevaisuuden tutkimuskeskus: Tulevaisuuden verkostoakatemia.

Kuosa, T. (2011). Evolution of futures studies. Futures 43 (2011), pp. 327–336. Available at: doi:10.1016/j.futures.2010.04.001

Kuusi, O., Cuhls, K. & Steinmüller, K. (2015). The futures Map and its quality criteria. Eur J Futures Res 3, 22 (2015). https://doi.org/10.1007/s40309-015-0074-9

Kristóf T, Nováky E. (2023). The Story of Futures Studies: An Interdisciplinary Field Rooted in Social Sciences. Social Sciences. 2023; 12(3):192. https://doi.org/10.3390/socsci12030192

Laakkonen, M-P. (2024). The Notion of Time-Need in Futures Research. Futures of Science (by Veli Virmajoki). Blog post. 21.6.2024. Referred 13.10.2024. Available at: https://blogit.utu.fi/futuresofscience/2024/06/21/the-notion-of-time-need-in-futures-research/

Malaska, P. (1999). A Conceptual Framework for the Autopoietic Transformation of Societies. FUTU-publication 5/99. Futures Research Centre. Turku School of Economics and Business Administration. Turku.

Masini, E. (1993). Why futures studies? Grey Seal Books, London. (chapters 1, 2, 4)

Rubin, A. (2014). Anita Rubin: Tulevaisuuksientutkimus tiedonalana ja tieteellisenä tutkimuksena. Metodix - Metoditietämystä kaikille. Referred 7.10.2024. Available at: https://metodix.fi/2014/12/02/anita-rubin-tulevaisuuksientutkimus-tiedonalana-jatieteellisena-tutkimuksena/

Rubin, A. (n.d.). Aikakäsitys tulevaisuuden tutkimuksessa. TOPI – Tulevaisuudentutkimuksen oppimateriaali. Tulevaisuuden tutkimuskeskus, Turun kauppakorkeakoulu, Turun yliopisto. Referred 13.10.2024. Available at: https://tulevaisuus.fi/perusteet/aikakasitys-tulevaisuuden-tutkimuksessa/

Wilenius, M. (2024a). Introduction to Futures Studies. Session 1. Lecture slides. 3.9.2024. Moodle of University of Turku. Requires login. Available at: https://moodle.utu.fi/mod/folder/view.php?id=1834237

Wilenius, M. (2024b). Introduction to Futures Studies. Session 2. Lecture slides. 17.9.2024. Moodle of University of Turku. Requires login. Available at: https://moodle.utu.fi/mod/folder/view.php?id=1834237

Wilenius, M. (2024c). Introduction to Futures Studies. Session 3. Lecture slides. 24.9.2024. Moodle of University of Turku. Requires login. Available at: https://moodle.utu.fi/mod/folder/view.php?id=1834237

Wilenius, M. (2024d). Introduction to Futures Studies. Session 4. Lecture slides. 1.10.2024. Moodle of University of Turku. Requires login. Available at: https://moodle.utu.fi/mod/folder/view.php?id=1834237

Wilenius, M. (2024e). Introduction to Futures Studies. Session 5. Lecture slides. 8.10.2024. Moodle of University of Turku. Requires login. Available at: https://moodle.utu.fi/mod/folder/view.php?id=1834237

Wilenius, M. & Pouru, L. (2017). Futures thinking and visionary management. In the book of Pouru, L., Wilenius, M., Holstius, K. & Heinonen, S. (2017) Pentti Malaska – Ennalta näkijä, edellä kulkija. Tulevaisuuden tutkimuksen seura. Tulevaisuussarja 8. 296 s. ISBN 978-951-98852-4-7 (sid.), ISBN 978-951-98852-5-4 (pdf), ISSN 1235-0028.

Learning Diary: Introduction to Futures Studies

Mian Raheel Kamal

Turku School of Economics, University of Turku

The course Introduction to Future studies has given me an insight into a interesting field that engages the capability of human beings to shape futures from among a number of possibilities. This learning diary was not easy for me to create, though I did my effort to bring out the thought from the lectures, and then elaborated them as per my understanding. Before starting my master's program, I didn't know much about the Future Studies but, through this course, I did get to know that Future Studies is a structured way to study and find out about the future. If I were to give a second name for this course, I would name it as “Young Futurist Thinkers” reason I call it with this name is because of the Friday session in Miro we had a discussion topic and then we brainstorm our mind in a group discussion.

Week 1: Introductory Lesson on Future Studies

Futures Studies is the investigation of how the future may unfold through various perspectives. Unlike physicists, sociologists, and economists who focus on explaining and understanding the present and past; Futures Studies offers an understanding of what might happen and the possibilities, risks and trends. Different futures are thought of in the field. The futures assume us to an extent. At the heart of Futures Studies are the ideas of the possible, probable, preferred and plausible futures, signifying various levels of certainty and desirability. This framework enables us to explore many possible futures and the implications of decisions for today’s uncertain and changing world.

As a distinct discipline, Futures Studies is necessary. Traditional disciplines also fail to address the interconnectivity of modern future challenges. Disciplines in social sciences, like economics or sociology and in technology, like computer science, focus on the particular. They use statistics to see the present but not the future. Masini (1993) asserts that Futures Studies offers a comprehensive, interdisciplinary avenue to explore alternatives for the future which mainstream disciplines may not offer. Futures Studies equip us to think about the future and use such thinking on variety of things that could impact the future like technological studies, social studies, political studies, environment studies etc. Futures Studies has become indispensable in shaping policy and strategy to tackle essential issues like climate change, technological disruption and social inequality.

People have been thinking about the future for thousands of years. Civilizations such as the Greeks and Egyptians built magnificent structures for future people. They also created ideas that set society on its course. The RAND Corporation and other businesses began introducing the new discipline of Futures Studies after the Second World War, such as the work of Gaston Berger and his hypotheses in the mid-20th century. The field began to become popular in the 60s and 70s when society was dealing with economic crises and tech uncertainty. Over the years, Futures Studies had experienced quite a number of changing phases. From scenario planning back in the 1970s, used by Shell, to the foundation of Finland Futures Research Centre in the 1990s. There is a worldwide distribution of the discipline, where more emphasis is laid on the participatory and inclusive approach towards the future.

The future of Futures Studies lies in its ability to change with the ever-accelerating pace of change and the complication of world issues. As evidence continues to change society with artificial intelligence and biotechnology technologies, Futures Studies will be vital in helping us understand the nature of the ethical and societal challenges, opportunities and risks being presented by these technologies. With climate change, geographical polarities, conflicts, and economic instability on the global level, the topics of futures

studies are gaining a higher significance for finding ways to sustainable development and conflict resolution. At the same time, education must be interdisciplinary and integrate other domains of knowledge such as environmental science, economics, and social justice in order to shape a more holistic and integrated future vision.

During the group discussions in the Friday session our group 4 focused on the relations between technology and societal changes which were displayed in our Miro board. As Hanna our group member put out technological advancements are part of the challenge as well as opportunity in shaping the future. The faster technology is evolving the more significant it is to look ahead taking into account wider impacts to society the economy and the environment. This ties in really well to what Masini says that "the faster the car the further the headlights must go emphasizing the need to anticipate the future in the face of rapid technological progress."

Week 2: Overview to Future Studies

In the course of the second week of Futures Studies, historical evolution of the field, conceptual fundamentals of Futures Studies, we explored the subject in lectures as well as group discussions. The sessions lead me to a greater understanding of the evolution of futures thinking from early scenario planning after the Second World War to a more complex and participatory discipline today. I discovered the contributions that thinkers such as Herman Kahn and Pierre Wack made to contemporary thinking about the future by questioning orthodox assumptions and employing scenario-based approaches for imagining multiple possible futures. These insights helped me to realize that Futures Studies is not only about forecasting, but about envisioning new ways of perceiving change, uncertainty and choice in society.

From Wendell Bell (1997), I got the idea that the core mission of Futures Studies is to increase the freedom and welfare of humankind through the use of prospective thinking. The nine major tasks described by Bell (including the study of possible, probable and preferable futures, the interpretation of the past and integration of knowledge and values for social action) provide a detailed picture of everything that futurists do. Bell advises that Futures Studies central values and mission should be to increase human choice and contribute to an ethical decision-making process in societies about their course. I was inspired by this concept as it does not present the future as something to predict, but as something that we can shape and shape by informed concerted action.

The lecture by Professor Markku Wilenius discussed the development of the field from the basic long-range planning to more complex foresight practices. The importance of shifting from prediction to perception was illustrated by the unthinkable war games of Herman Kahn as well as by Pierre Wack's model approach in Shell. This change signals an increasing awareness that the future cannot be predicted with certainty, but needs to be probed into through various points of view and stories. I have come to realize that foresight, as much as it involves data and rational analysis, is just as important about imagination and flexibility.

I also considered the three central concepts that were introduced in the lecture: time, knowledge of the future, and images of the future. I found the idea of "images of the future" very powerful as Bell (1997) puts it, these are expectations or visions that shape how individuals and societies

act in the present. Our collective imagination (optimistic or pessimistic) has a big effect on the direction of social change. Understanding time as non-linear and culturally diverse (cyclical, spiral, or disruptive) helped me to appreciate that futures thinking has to take account of multiple worldviews and temporalities.

The discussions on the ethical and epistemological bases of Futures Studies brought me to the question of responsibility in future-oriented work. We cannot just imagine what can happen - we must also ask what should happen and why. Futures Studies thus puts together empirical knowledge and moral reflection. Empirical knowledge and moral reflection are thus combined in Futures Studies. This double grounding, is

the fact that foresight is founded on human wellbeing, neither on economic or pure technological interests. The presentations and readings also reminded us that democratic participation is essential to empowering diverse communities to shape their own futures.

In our group work on Friday, Team 1 discussed the need to move futures research from theoretical modeling to practice. One exception we found in Bell's framework was the need to include a clearer "task 10" to translate futures thinking into practical community-based action. As well as predicting what might become, futurists must also help integrate expert knowledge from various sectors and promote public involvement in solutions design. I would strongly concur that what the group proposed was that all specialized knowledge needs to agglomerate and form good decisions and lead to social action which can positively affect everyone.

Week 3: Trajectories to Future Studies

This week I also looked back on how we can apply this knowledge in the modern context. Prior to this course I was not aware of the complexities and different works that take place through Futures Studies. I have come to realize how these methodologies, whether in the form of scenarios, weak signal analyses, future workshops or participatory futures, are being used to shape and inform more sustainable, socially responsible and inclusive futures. By the above we are inspired to think about the possible ways in which these approaches can be worked together in the process of real-world decision making and particularly in the case of public policy and community engagement.

A major theme that was discussed was the development of Futures Studies and the work of some of the major thinkers in the movement such as Robert Jungk, Herman Kahn and Wendell Bell. Each of these pioneers made his contribution in the field in his own style. Kahn's scenario planning was all about, for example, the importance of thinking beyond the short-term future even of unthinkable events such as a nuclear war. This repeated attention to multi-futures simple prediction exposed complexity and creativity that represented to me that there was more complexity thinking needed here in the face of the uncertainty.

As opposed to the one forward projection, this week's readings (especially Jenny Gidley) have helped me to get an understanding of how useful multi-future projection can be. While prediction was a particular focus of Futures Studies in the past, in particular during the Cold War, the field has turned towards different approaches, such as scenario planning and systems thinking. Gidley's discussion of the "urge to predict" stressed the limitations of prediction and the ways in which it fails to do justice to the complexity and the uncertainty of social systems. This conversation dovetailed into our Friday session when we were debating how predicting trends such as climate change or technological improvement can oftentimes be disempowering if framed as flaws giving no choice but to accept, rather than providing a sense of empowerment and a sense of a range of options which can create the future.

The idea of weak signal as identified by Igor Ansoff also became more clear to me. Because we can't see these changes, they can be forecast well ahead of the actual change – before societies, technology or environment have changed completely but still foreshadow the progression in advance. Shaped from practice in traditional forecasting, which assumes a certain future from which to predict, the present East and Forecast method involves the near to the future and the dubious pleasure of uncertainty that might come from it.

The discussions on how Futures Studies can help address the challenges facing our societies today were confronting. A move towards more inclusive, ethical and human-centred futures in the fields was demonstrated in the work of Eleonora Masini. Her attention to ethics, diversity and the influence of women in shaping futures studies are of particular resonance to my belief that a more democratic approach to futures thinking is imperative to creating a more equal and sustainable world in a rapidly changing world.

In addition, I noticed during our Friday group work that the idea that Futures Studies is a tool to improve democratic participation was an important idea. As one of the posters in the Miro board explained, democratic participation in the imaging and design of the future is important because it would ensure that all voices, especially marginalized ones, are taken part in the decision-making process. This is based on the emerging understanding that Futures Studies is a compulsory inclusive field of study, particularly since global problems such as climate change, inequality and political instability require a more collective endeavor to create sustainable futures.

In our group discussion on Friday, we discussed addressing the interspace from which a singular focus on predicting one future to envisioning a plurality of futures. This idea resonated with me because it makes the point that the future is not predetermined it is shaped by the choices that we make today. This is a pluralistic approach that enables more people to be able to be involved in the decision-making process and takes more responsibility for decisions. Futures Studies is not only the science of trends, but above described, below exemplified science, the joint effort of many individuals to conjure up possible, probable, and preferable futures.

In terms of my own view of where the Future Studies field is going, I would say that it is increasingly going more towards the methodological approaches whereby it tries to make societies stronger, and in integrated ways and participative approaches. With growing need for societies to find solutions for global issues such as climate change, political unrest and technological disruption, Futures Studies will play an important role in enabling societies to envision alternative ways and be prepared for the problematic.

Week 4: Multiple Future Studies

This week we pulled away from the traditional notion of the future to engage in the idea that there may be more than one view of what the future looks like. One of the concepts running through the talks this week has been the concept of multiple futures, both in terms of the ambiguous nature of projecting the future and the multiple possible futures that are open to us.

One of the simple messages of this week is that futures studies require us to accommodate ways of thinking beyond linear predictions, and allow for the explicit uncertainty of things as they are not yet finished and remaining to be found. This theme was validated by various

conceptualizations shared in group work and in the literature, particularly those brought up by Pentti Malaska. Malaska recognized the significance of non-linear feedback loops of connections when stating that no human being can forecast the future because even minute alterations made today may have far-reaching consequences tomorrow.

In our group this week we talked about different types of future scenarios. One option said above was extrapolation assuming that the trends seen so far will go on, in the future, however, the limitations of this were clear and apparent. It is also often one view of the future, which is inadequate to imagine the complexity and uncertainty of social change. On the other hand, with the recognition that there are different futures out there, scenario thinking could offer answers to a broader question in terms of the possible scenarios.

Scenarios are neither predictions nor forecasts; they are plausible descriptions of the future - which should be not only plausible, but coherent and internally consistent, and sufficiently differentiated from one another to test assumptions and to produce significant insights. Such knowledge formed the focus of the discussions during the group work where different scenarios of growth, workforce transformation and regional development in the context of the transition to a more sustainable and green economy are analyzed and discussed, in particular in the light of the global transition.

The readings on Pentti Malaska's work added to the contributions further than these ideas were developed, especially the contingency of the future. According to Malaska, the future is not predetermined, but created

from an interaction of the different forces of society, which each pursue an internal logic of their own. This feedback is what causes future developments to be so difficult and stimulating to predict. Mental Reality as discussed by Malaska, stresses the importance of paying attention to what can happen as well as what we (as humans) choose to make happen intentional, non-factual things that influence the future.

Malaska's model for social dynamic, threefold, also resonated to the depth. The civilization of humanity develops by the three sectors: the economic, culture, and political or social; and each one of these sectors is based on the principle actions of solidarity, freedom and equality respectively. These principles shape and shape the progressions of societies, and allow us to explain the transformations we are witnessing today in the world, such as the emergence of the

society of services or the fact that information and creativity are becoming paramount in all aspects of economic and social growth.

In addition, the matrix of futures knowledge by Malaska provided a holistic view of how we may understand futures thinking, via the integration of different disciplines ranging from economics to human potential. This framework is important when faced with a problem such as sustainable development, where we are likely to consider how future generations will balance economic growth against sustainability of their environment.

During our group work on Friday, we worked with different future scenarios with different changes on global and local basis. All participants worked in teams on the possibilities in areas such as regional development, green transition and workforce development. The debate quickly turned into finding not particular vision of the future, but finding a relevant choice between possibilities, taking into account their achievement and strength. For example, disruptions can be technological advances such as electric cars or renewable energy and how can they modify industries and society. We also considered the occurrence of unplanned events such as trends in popular culture of viral sorts, which also have the potential to influence social values and priorities even though this might not be as significant in the long-term.

Week 5: Critical Future Studies

Futures Studies, as an interdisciplinary discipline, allows us to envision possible, probable and preferable futures. It synthesizes various viewpoints in order to understand how the future may develop within the frameworks of trends, systems and human agency. My work-oriented understanding of Futures Studies and the ensuing discussions over the last week have developed as I've had the opportunity to study the ways in which it is different than other traditional disciplines such as sociology. It gives not only important clues about what is to be expected but also elaborate reflections concerning assumptions about power, control, and values.

In the analysis of a POLITICO article about the implications of private companies such as SpaceX for the future of space travel, we talked about the implications of these in our group discussions on Friday. In general, the assumptions of the article about the future are focused on technological progress, privatization of space exploration and increasing difference between rich and poor. From my critical futures perspective, this assumption betrays the hegemonic capitalist

thinking behind future processes. The notion of space evolving into the "playground for companies" was one of the elements that we discussed in the Miro boards as the ancillary form of governance in the future by the rich and private enterprises.

The theme of power dynamics was important in our Friday session discussions. We found a divide between government control and private companies like SpaceX and the future may be shaped into a future when the rich have more control over technological and resource based assets and the poor are left behind. This disparity is a critical point for Futures Studies as we need to ask ourselves whose interests are being prioritized and what sort of future is this going to create. The expanding role of private corporations in

space travel, for example, might further divide existing inequalities between the rich and poor around the world.

Being a sociologist by training, I am particularly interested in Futures Studies' break with disciplines. Futures Studies has not only extrapolated information to project the future, it has opened up analysis to multiple futures, which brings systems thinking, uncertainty and complexity into the methodology. Futures Studies does not recoil at uncertainty and the unknown unknowns and actively seek them, opening up possibilities to futures which may not fit any conditioned past/social world scenario. This can be used to provide a more rounded, more rich appreciation of change in the society.

This week in class, we were focused on something called X Events, which focuses on the increasing number of disruptions that occur in systems that have random triggers to cause great changes. These sorts of accidents are examples of a simple mismatch between the complexity of a system and the complexity of control. X-Events are falling out of the new world's mainstream at an accelerating rate and this needs to be factored into our futures thinking. For example, the development of artificial intelligence and technological advances are possible X-Events that will alter the balance of power in such drastic ways as to represent both opportunity and threat.

A number of tools used in Futures Studies also were introduced in the session discussions on Tuesday, including FIBRES, Itonics and Futures Platforms. These are tools that help visualize and analyze trends, a structured way of exploring the possibilities for the future. These tools go with the critical futures approach that examine current norms and make alternative futures

possible that are not necessarily comfortable or acceptable according to a very mainstream standard.

Conclusion

As I continue my studies, I see great potential for incorporating Futures Studies into my background in sociology. A future thinking is a framework for addressing global problems such as climate change, public health crises and technological inequalities. In my future career, I hope to use Futures Studies to anticipate challenges in the event management industry such as the future of sustainable tourism or the impacts of AI on event planning and management.

In particular, I am excited by the potential of participatory futures methods for use directly in the field of event management, where communities and stakeholders can be involved in imagining and co-creating the future of events. Futures Studies has the potential to help us learn about possible disruptions such as pandemics or technological changes and enable us to develop flexible and resilient strategies for the future.

Futures Studies provides a special perspective to look at the world from, from being predictive to being explorative. By applying critical, participatory and cultural futures design we can question assumptions and make informed decisions which direct us to more inclusive, sustainable and innovative futures. The theory and tools acquired in this course offer unique insights into the complexity of future developments and this therefore makes this subject an essential discipline to face the global challenges.

References

Masini, E. (1993). Why futures studies? Grey Seal Books.

Bell, W. (1997). Foundations of Futures Studies: Human Science for a New Era. Vol.1.Transaction Publishers.

Gidley, J. M. (2017). The Future: A Very Short Introduction. Oxford University Press.

Markku, W. & Pouru, L. (2017). “Future Thinking & Visionary Managment.” Futures Studies Series, edited by Laura Pouru, Markku Wilenius, Karin Holstius, & Sirkka Heinonen, The Finnish Society for Futures Studies, p.137–148.

www.politico.com/newsletters/digital-future-daily/2024/05/30/the-private-space-race-blasts-off-00160738

Learning Diary: A Look into the Futures

Dewina Leuschner

Turku School of Economics, University of Turku

Introduction

The world we live in is a ship sailing through an unknown ocean. Space and time are the length and width of this ocean and make up our past, present and future. There are uncountable directions that we could have sailed to and that lay behind us as lost chances or avoided risks. Every occurrence is something that happens in a certain space at a certain time and that is perceived differently, depending on where on the ship you are located (geographically and socially). However, as we have limited knowledge of the ocean we are sailing in, we have limited influence on where we are going towards. Still, if we have any influence at all and may be able grow that power by studying it, it is worth trying, am I right?

What is Futures Studies?

There are many ways to describe Futures Studies. To me, it depends on the question. If you ask, 'what does Futures Studies do?' I would give you a different answer than if you ask, 'what is Futures Studies good for?'. My first and maybe most important takeaway from this course is that one letter can make all the difference. It is FutureS Studies, not Future Studies. I was aware that the future does not yet exist and that therefore the field is to some extent based on hypothetical contents drawn from insights from the past, present and scenarios. However, I quickly realized that this is only half of the truth. Futures Studies is also a mindset shift. We shift from looking at our situation today and planning ahead from the starting point, to focusing on what is possible, plausible, probable and preferable in the future (based on the "voroscone", adapted and extended from Voros, 2003). From this point in the future, especially of what ought to be, we look back to where we are and try to fill the gap and the process of finding all these potential futures and suggesting ways to fill the gap is what Futures Studies does. Futures Studies, according to Amara (1981) follows three main principles. (1) There is a constant dilemma in Futures Studies between knowledge on the one hand and desire and fear on the other hand, (2) the future is the only space humans can still directly impact and (3) in the present there is not only one future but many possible futures (Amara, 1981). From my perspective, these three principles are the essence of Futures Studies while at the same time they are raising questions that are difficult to answer. Is it possible to take one's own desires and fears out of science and research? Reflecting on this, I think as we have the power to impact the future and the awareness that at this point there are uncountable images of the future, we should not try to separate knowledge and desire and fear. Futures Studies, as any other field of science, will be inherently biased as long as it is carried out by humans. Already the way we ask a question, the emphasis we put on a geographic area or the choice of participants for our study is connected to our personal biases, may they be conscious or unconscious. Following from that, the first principle to me is not so much a dilemma but a warning sign to critically reflect one's own position, background, privileges and status when conducting any kind of research. We, as researchers do not owe the public objectivity, but what we owe them is honesty and integrity, even more when we talk about a field of science that has the potential to change everything we know. A part of that is realizing that desire and fear can be drivers of this specific research area.

In one lecture it was said that Futures Studies means overcoming ignorance and this stuck with me because it puts light on a group that is ignored to often: the inhabitants of tomorrows earth. I think this is the beginning of the answer of what I understand Futures Studies is good for. Another aspect is that in a time of rapid changes, there simply is no time to REact to what happened in the past, but we have to act before

the future becomes the present. In our current time, with technology, globalization and AI on the run, humans have a power that was never seen before. One word, one finger on a button can change the whole planet and impact everything that lives on it. With this great power comes great responsibility, the responsibility to think ahead and especially to think before we act.

Bell (1997) describes nine tasks of Futures Studies namely (1) possible futures, (2) probable futures, (3) images of the future, (4) knowledge foundations of Futures Studies, (5) ethical foundations, (6) interpreting the past and orienteering the present, (7) increasing democratic participation in imagining and designing the future, (8) integrating knowledge and values for social action and (9) communicating and advocating a particular image of the future. Considering that performing all these tasks covers a wide variety of fields and professions, including engineering, social sciences, geography, political sciences and many more, it seems logical that Futures Studies is a very diverse science that serves a lot of purposes and is carried out by a variety of people with different expertise and interests. To me, there is another task of Futures Studies: serving the best interest of all future life on this planet. Therefore, the great variety of disciplines and people is needed because only when we include as many perspectives as possible can we create a tomorrow that allows all future life to benefit from the decisions made today.

With the ‘what?’ and ‘why?’ of Futures Studies covered, it remains to take a glimpse on ‘how?’ Futures Studies tries to accomplish all the above. To me, the basis to this question is to understand that Futures Studies does not deal with fact-based knowledge as we might know it from natural sciences. During the second lecture, we discussed a quote from Pentti Malaska: “The knowledge of the future refers to perceptual knowledge of the contingent, intentional and non-factual phenomena” and that this visionary knowledge is part of an equation that added to known facts results in our knowledge of the future. I think that this is exactly the awareness needed to allow for different images of the future. Vision, according to Bezold et al. (2009) is having a direction and including goals. They say that “vision represents ‘futures of the heart’” (Bezold et al., 2009, p. 4) in a sense that they are more value driven. However, they should still follow some criteria, as they need to be legitimate, shared, express people’s highest aspirations for what they want to create in the world, stretch beyond the limits of current realities, be conceivable and achievable within a specific time frame (Bezold et al., 2009). The idea of using visions in Futures Studies is what stuck with me the most from all the methods, especially when describing them as “futures of the heart” (Bezold et al., 2009, p.4) because the future concerns all of us and while there may not only be a single right answer, there certainly are wrong answers. Therefore, it is deeply connected and driven by values and so ethics need to be included in every step and every aspect of Futures Studies. Bezold et al. (2009) also said that to develop a vision one must check who is part of the vision. In a business context finishing off the list at this point may work but for the societal context of Futures Studies I would add another point: to develop a vision, one must check who is NOT YET part of the vision. Creating groups is creating belonging and exclusion and as there is not a single person on this planet that can truthfully claim to be free of any bias and stereotypes, a future that we are all part of is a future where the vision to get there reflects on that. Besides the visionary component, there are numerous other methods that can be used in Futures Studies to accomplish the above mentioned goals. For example, there are forecasts, which in comparison to predictions describe an educated guess on what is a probable future (Gidley, 2017).

Connecting Sciences – the Discipline of Futures Studies

Most Sciences focus on a certain area. Natural Sciences focus on what the world is made of and what can be done with it, political sciences focus on the governing and ruling systems and economics focuses on the cash flows and different models of exchange. All of that can happen on a broader or narrower scale and all of them sometimes touch upon other fields. They follow the urge to understand what has happened so far, what can be known and what may be possible in the future but mostly limited to their respective fields. However, only all together they make up the knowledge system of our world and not one discipline alone can give all the answers to our questions. The same holds true when it comes to the future. Images

of the future that are holistic enough to be pursued need to include all knowledge bases. During the lectures, we talked about the need for the awareness that we do not yet know everything and how this may be beyond achievable but that on the other hand clear goals energize us, and we therefore need to clarify visions and goals to build up the energy necessary to make that vision come true. Chimamanda Ngozi Adichie talked in a TedTalk in 2009 about the danger of a single story. She explains how just having a single narrative about a place or a country never tells the full story. I have visited New Delhi and lived there for six months so one might say I know quite a lot about the place. Still, the story I tell about Delhi is just a part of a huge puzzle. I can tell the story of a white German girl who got the chance to study in Delhi but I will never be able to also know the story of the old Indian woman who has experienced the events of the independence movements in Delhi. I will also never be able to tell the story of the prince who was allowed to come back only some years ago after the separation of India and Pakistan forced his family to flee the country and leave behind all their belongings. And I will never tell the story of the guy who works extremely hard to just get the minimum amount to make sure his family won't starve. There are as many stories connected to Delhi as there are people connected to the place and no one will ever hold the whole truth. What we see is based on our previous experiences, our biases, the privileges that we have or do not have and the network we are part of. I believe that the same is true for the future and that is one reason why we need Futures Studies. Futures Studies is collecting visions, ideas, narratives and stories from all the different fields about something yet to become a reality. A task as huge as this can never be accomplished by coincidence. And a task as important as preparing our world for what is to come can never be the responsibility of many people already doing great work in their respective fields. It needs a separate field to collect all the images of the future, evaluate them and organize them according to the scale of possible, probable and preferable to then fulfill the second task of Futures Studies: create societal change. During the third lecture, we discussed that Eleonora Masini brought ethics and diversity into the field of Futures Studies and both are needed to create a change that positively impacts as many people as possible. Bell (1997) said that "the futurist qua futurist has a right, if not an obligation, to work for a political and social order within which futures studies can be carried out, within the limits of respect for human dignity and the protection of the rights of human subjects of research." (p. 74). I agree with that, as Futures Studies, like most social sciences cannot be separated from social and political systems or the judgement of those. I consider all the tasks of Futures Studies described by Bell important, however based on what I shared above as what I think are the main reasons for Futures Studies as an independent discipline, collecting stories from all fields of science and creating societal change based on the insights, there are some that stuck with me particularly. First, there are the images of the future that can have an impact on individual behavior and depend on values, knowledge, experience and empowerment (Bell, 1997). When reading about this, I began to question if a lack of images about the future is the reason that often hinders development in our current society. If this is the case, Futures Studies can provide these images, which may be another reason for Futures Studies as an independent and especially growing discipline. Second, there is the combination of knowledge and ethical foundations (Bell, 1997). Most fields of science focus on either of them or just apply them to a rather narrow part of society. I see it as the task of Futures Studies to combine them on a bigger scale and only by that it can be possible to create images that can be describes as desirable from a perspective that is as objective as possible in a sense that it is felt as desirable from the perspective of all life on this planet. Third, the task of interpreting the past and orienteering the present describes the relationship between past, present and future (Bell, 1997). Bell (1997) says that while history does not change, our perception may change with a changing idea of who we are and who we want to be and understanding this relationship seems necessary for futurists when they want to use any historical insights to draw conclusions on potential future developments. On the other hand, according to Gidley (2017) it is also important to understand that history does never fully repeat and therefore poses a threat when limiting the own imagination on the takeaways from the past. I think, finding the balance between those different time horizons is a difficult but important task and understanding what every one of them has to offer to prepare for the future is another task that solely resides in the field of Futures Studies. Lastly, there are the tasks of increasing democratic participation in imagining and designing the future, integrating knowledge and values for social action and communicating and advocating a particular image of the future

(Bell, 1997). These three tasks summarize where all the rest leads to and what is the driving purpose of Futures Studies. Every knowledge, idea and image about the future is worthless if it does not lead to action that either prepares for what is thought of as inevitable or tries to redirect the course to end up in an approximation of a particular image about the future.

While most other sciences bring in the information that regard a specific field, it is the task of futurists to put these information into a bigger picture with the aim to create the best possible future for all life on this planet. Methodically, this can be done in different ways, for example by the categorization in scenario planning, which was introduced during the lecture. This method helps scientists and political leaders to understand whether something has a low or high probability and impact and how to react to those.

The History of Futures Studies

The scientific discipline of Futures Studies is a rather young one compared to many others, considering that evolved in the 20th century largely driven by the second world war and the following period of the cold war (Andersson, 2018). However, I was surprised to learn during the lecture that the future-orientation is inherent to humans since about 2.6 million years ago and began when they started using tools. While it makes sense that tools encouraged planning and therefore some consideration of future events, it puzzles me that it took so many more years until it became an independent scientific discipline. The modern discipline went through some rapid developments and began with a phase of forecast and prediction that was mainly used in the military (Masini, 1993). Especially in the US, the early Futures Studies were based on scientific positivism, the idea that there is an objective real world, and it is possible to know about it (Gidley, 2017). A strength of this early positivistic approach was that it was perceived as objective and neutral when it comes to values (Gidley, 2017). On the other hand, Gidley (2017) states that these strengths directly lead to a problem with this approach which is that trends may look inevitable and so negative trends can have a disempowering effect on the overall society. Personally, as already indicated above, I do not believe in positivism and therefore consider the risks of this approach as greater as any potential strengths. However, considering that values and subjective understandings were not particularly accepted in science at the time, I do understand where the approach to aim for an objective understanding of the future comes from. During the third lecture, we talked about how from the 1960s to the 1980s, the idea of predictions evolved towards an approach of foresights and the emergence of the idea that there are multiple futures to be researched. That included also the rise of scenarios and scenario planning as commonly used scientific methods. We further discussed how scenarios are far from unclear or random guesses about the future but rather describe narratives about the future that are well-grounded, logical, meaningful and distinguishable from each other in a sense that they describe different trends. From the 1990s until today, the development of Futures Studies resulted in more refined methods and Futures Studies being a wider established scientific field. Today, the diverse set of methods includes qualitative and quantitative approaches, as well as mixed methods of all different kinds. This ultimately also led to the establishment of big international projects such as the Millenium project which is a think tank on the challenges of the future and possible developments that determined 15 key global challenges (Home – the Millennium Project, 2024).

The Future of Futures Studies

In this course, as well as in the news, I constantly hear the narrative of a rapidly changing world that holds extreme challenges, which not necessarily follow one after another but may even happen simultaneously. Masini (1993) describes that the fast changes result in the need to shed light on a future that lies further ahead. During the lecture, the statement that the future is about perceiving and acting as nothing ever gets repeated 100% stuck with me and in one discussion session, we talked about how science usually tries to be a separate area from politics. In my opinion these three ideas are connected. The world is changing faster than ever, and we simply cannot know for sure what scenario will happen. However, if we only react after something happened then we constantly live in the past which will be to our great disadvantage. We

need action before the future becomes the present and takes along surprises we are not ready for. With modern technology, globalization, the internet and modern warfare the human impact on the world is bigger than we could have ever imagined. One word or one press of a button can have a terrible impact thousands of kilometers away. However, the impact did not only grow immensely in geographical terms but also in terms of time as actions today can have an impact on many generations to come. With this power do not only come great chances but also a great responsibility to think before we act and to reflect on different perspectives. The futurists of tomorrow need to put an emphasis on these different perspectives, which may pose one of the greatest challenges to the discipline. Furthermore, when it comes to changes that are based on the insights of Futures Studies it needs to be acknowledged that in a globally and inter-sectoral connected world development cannot happen independently. Different countries, regions or cultural groups may have different ideas of how a preferable future looks like and so do different scientific and societal sectors. Lemma and Malaska (1989) describe in their model the relationship between the economic, political and social, and cultural sector in a wheel that is connected to the external environment and includes social, spiritual and material order in between of the sectors. Just as there are differences about the future images based on cultural or geographic background, there are differences between and within those sectors of what the future should look like. Still, all of these images need to be connected if Futures Studies aims to provide images that have the power to create societal change on a broad level and empower people across the globe and across the sectors to start acting.

In conclusion, I think the field of Futures Studies needs to grow in the future as a science in general. To the question of what this should look like I would reply: with a great awareness of the diversity of life on this planet and the needs that are connected to that. Futures Studies, more than any other science, can never be objective and needs to be transparent with its connection to ethical value systems, political systems and global power systems. It needs to undergo critical reflection with every step it takes. Lastly, when talking about the need for visions for the future to create the best possible tomorrow, I think there is a vision needed to create the best possible future of Futures Studies. To me, this vision is understanding the world from as many perspectives as possible and creating and distributing images of a potential future that lead to a more just and equitable world that finally takes the historic responsibilities it piled up. From global north to global south, from rich to poor and from humans to nature.

My Future in Futures Studies

With a bachelor's degree in international business administration and the realization that the economic system as it is right now negatively impacts social equity and the environment, I personally see Futures Studies as a great chance to combine the needs of all three of these sectors and create images that allow for an optimistic perspective. In the years to come, Futures Studies can play an active role in asking both sides to consider parts of societal life that so far they only consider to a very limited extent or in certain niches and help think outside the box. A main guiding question can be where the intersection of what is possible and what is preferable lies. What surprised me in this regard were the insights on creative and visionary management, that from my perspective bring the learnings from the field of Futures Studies into the world of management (Pouru and Wilenius, 2018). While the idea of visions and multiple possible outcomes seem contradicting to classical management models, I think that this style of management holds great chances for the future of businesses. As described by Pouru and Wilenius (2018), it includes a long-term view on the future and a vision that determines todays actions. It is therefore a looking back from a desired point in the future and acting based on that rather than on the current state. This includes the need for a definition of purpose and objective, an understanding of the situation and circumstances, and knowledge about the means and resources (Pouru and Wilenius, 2018). To me, to create a management model that is based even more on Futures Studies and that is even more ready for the challenges of the future, the vision for the respective business needs to include the awareness of the own direct and indirect impact on other sectors. As described above, Futures Studies to me is collecting stories from all different areas, making sense of those and deriving guidelines based on overall preferable images of the future. If

this principle is applied in the management context as well as in all other contexts, I think we took a great step towards acting based on what Futures Studies taught us.

Conclusion

Futures Studies is only half about where our ship sails to tomorrow, in one year, ten years or a hundred years. The other half is about us, those on the ship. It is about the images there are on the future and how we make sense of the limited knowledge we have. What we believe about the future impacts our behavior and therefore in the end the future. We create it as we go. Therefore, it is Futures Studies responsibility to keep an open eye and open mind for the diverse images we are already surrounded by and those we have not yet discovered. When Bell (1997) describes that the most optimistic images stem from knowledge, empowerment and moral values, it proves that we need Futures Studies to navigate ourselves through the storms of the current rapidly changing times. Futures Studies brings together insights from different disciplines and all areas of life and thereby holds together what makes up the world. From my perspective, Futures Studies therefore is the approach to make sense of all the knowledge bases we have and in some sense it is the epistemology to the overall ontology, even though that may be an interpretive one that allows for numerous images. It is important to keep in mind what Masini (1993) describes as the dilemma of possible and desirable futures. Futurists, while never being detached from ethical values and moral judgements, need to have an awareness of the difference between desired futures and expected futures, even though they are closely related. Futures Studies can only reach its fullest potential when it builds bridges between what may be and what ought to be. In conclusion, what I came to understand in the last couple of weeks is that Futures Studies is no precise science, no prediction and certainly no glass ball reading. Futures Studies is approximation. No matter how long we study Futures Studies, if we got it as a minor, master's degree, hold a PhD or have 50 years research experience in the field, we will never know for sure. However, we can prepare for the unknown and thereby have our ship better equipped for the storms to come than it would be without Futures Studies. Because that is the only thing we know for sure: the future will come.

References

Adichie, C.N. (2009) The danger of a single story. https://www.ted.com/talks/chimamanda_ngozi_adichie_the_danger_of_a_single_story?subtitle=en&lng=de (Accessed: October 13, 2024).

Amara (1981) 'The Futures Field: Searching for Definitions and Boundaries,' The Futurist, pp. 25–29.

Andersson, J. (2018) The Future of the World: Futurology, futurists, and the struggle for the post Cold War imagination. Oxford University Press.

Bell, W. (1997) 'Foundations of futures studies: human science for a new era,' History, Purposes and Knowledge, 1, pp. 73–114. https://doi.org/10.5860/choice.35-0599.

Bezold, C. et al. (2009) 'Using Vision in Futures,' Futures Research Methodology, 3.0.

Gidley, J.M. (2017) The Future: A very short introduction, Oxford University Press eBooks. https://doi.org/10.1093/actrade/9780198735281.001.0001.

Home - the Millennium Project (2024). https://www.millennium-project.org/ (Accessed: October 13, 2024).

Lemma, A. and Malaska, P. (eds) (1989) 'Africa beyond famine: a report to the Club of Rome,' Tycooly Publishing. https://doi.org/10.5860/choice.28-1038.

Masini, E. (1993) Why futures studies. Grey Seal Books. http://ci.nii.ac.jp/ncid/BA30349742.

Pouru, L. and Wilenius, M. (2018) 'Futures thinking and visionary management,' in Pentti Malaska - A Visionary and Forerunner. The Finnish Society for Futures Studies, pp. 137–148.

Voros, J. (2003) 'A generic foresight process framework,' Foresight, 5(3), pp. 10–21. https://doi.org/10.1108/14636680310698379.

Learning Diary: Introduction to Futures Studies

Pimali Tania Wijerathna

Turku School of Economics, University of Turku

Introduction

The main purpose of this learning diary is to share my learning experience of the FUTU1 - Introduction to Futures Studies course based on the knowledge I gained through lectures, pair exercises, Friday discussions, and my own observations. If I were true to myself, initially, I didn't have a thorough understanding of what I would be studying for the next two years. When everyone asked about my Master's, they were confused by the term "Futures Studies" as it was unfamiliar to them. If I recall my memory of the Introduction session, I remember that many of us mentioned that we wanted to discover the true meaning of futures studies through this program. At the same time, many of us realized that we had been using the term incorrectly. It's "futures studies", not "future studies". So from that point on, I learned my first lesson: there is not just one future, but many possible futures (Masini, 1993). The below points will be mainly covered in my discussions.

- What are futures studies and their significance as a discipline?
- The history of futures studies and the evolution of futures thinking
- The future of futures studies

Additionally, I will discuss how futures studies can be interesting, beneficial, and applicable to other issues based on my studies and working experiences.

What are Futures Studies and Their Significance?

In this section, I am primarily focusing on the need for futures studies. Before I delve into the importance of futures studies, let's briefly define what futures studies are because we will be exploring them further in this learning diary. I found the most relevant and simple definition for futures studies in Prof. Markku Wilenius's second-week lecture slides: Futures studies provide a systematic approach to exploring various alternative futures, allowing for informed decision-making in the present.

When I initially started learning about the concepts of futures studies, they were quite new to me as I come from a business management background. I wondered why I hadn't thought about these aspects before. At the same time, I realized how glad I am to expand my thinking and view the world as a futurist with a very open mind. While Masini (1993) highlights that futures thinking and futures studies are not only a need but also choices that each person or society has to make in the present, I believe that being aware of the future is a responsibility we all have because the future is a part of our whole life.

Additionally, Masini (1993) has emphasized that the future is the only space in which humans can have an impact. I totally agree with that point because the way we act toward the future today will impact us as well as future generations in the future. Therefore, it is our responsibility to contribute to a better future for both presently living people and the as-yet-voiceless people of future generations including the environment (Bell, 1997).

A 31 years ago, Masini emphasized the importance of teaching futures thinking from an early age, particularly targeting children who experience rapid changes. However, it's questionable whether this idea was put into action. As a writer who specializes in finance, I always stress the need to include financial management in school curriculums, and now I believe futures thinking should also be incorporated.

When it comes to rapid changes, there was an interesting quote by The French future thinker, Gaston Berger, "the faster the car, the further the headlights must go, in order to avoid dangers and pitfalls (Msini, 1993). This quote has been taken into our Friday discussion and there were some interesting thoughts especially related to technological developments. In essence, the speed of change accelerates in various areas of life including technological, social, cultural, educational, and environmental, so it becomes even more crucial to consider future consequences and plan accordingly.

One of the interesting facts Masini (1993) highlighted along with rapid changes: is that changes are interrelated and they interact and influence each other. Let's look into an example. With the technological advancements, there is a huge growth in cryptocurrencies. However, the process of mining cryptocurrencies requires a substantial amount of computational power, which in turn consumes a large amount of energy, resulting in a negative impact on the environment. When it comes to social aspects, cryptocurrency is a great solution for the unbanked populations where traditional (physical) banking infrastructure is limited. This may result in financial empowerment and financial inclusion. However, it may also result in new forms of inequality. For instance, early adopters of Bitcoin, have amassed significant wealth compared to the late movers, leading to significant wealth gaps.

Alternatively, cryptocurrencies have highlighted the need for new interest in financial education, as people must understand how to manage digital wallets, trade cryptocurrencies, and so on. Furthermore, it is also necessary to implement new legal and ethical frameworks to navigate complex questions about regulation, taxation, and the legality of cryptocurrencies as well as other digital assets and their implications. The most important thing is, that these interrelationships will continue to evolve and shape their future impact. So, if we consider the future impact of cryptocurrencies for example, can we solely rely on the economic view or technology? No, we cannot. That is why I think we need to consider alternative futures rather than exploring only one (Dator, 2019, Masini, 1993).

Furthermore, when considering the future, the outcomes can be influenced by different individual choices, as emphasized by Amara in his third premise (Amara, 1981). If we consider the previous example of cryptocurrency usage, certain countries such as China, Pakistan, and Saudi Arabia have already banned Bitcoin usage considering it a threat to their current monetary systems while other countries, like the United States, The United Kingdom, and France have accepted Bitcoin as legal. It's clear that the way countries look at the same issue is varying from each other.

Similarly, Dator (2019) points out that the future images held by individuals and groups are often highly volatile, and are subject to change based on evolving events or perceptions. So, we never know whether China or Pakistan would accept Bitcoin in the future and Saudi Arabia remain the same. This led me to think of another two important aspects emphasized by (Dator, 2019) as follows:

- The process of forecasting alternative futures and envisioning preferred futures is ongoing and constantly changing.
- The goal of any future exercise is to create a guiding vision, not a definitive solution.

Another question that came to mind here is whether the identification of major alternative futures and the envisioning and creation of preferred futures would be sufficient. What are the next steps? To continue the process, Dator (2019) suggests that futures studies need to be integrated into strategic planning activities and, subsequently, administration. Therefore, I will connect my learning experience with Dator's above suggestion in section 3, but for now, let's move on to section 2.

The Evolution of Futures Studies

The purpose of this discussion is to analyze the evolution of futures studies and futures thinking, while also taking tools and methods into account. Modern futures studies emerged shortly after the end of World War II, leading to the development of a diverse range of literature on the subject (Son, 2015). In 1942, Ossip Flechtheim, the founder of modern futures studies, introduced the concept of "Futurology" as a critical and systematic approach to addressing central questions about the future (Kuosa, 2011). One of the key insights highlighted in the lecture slides under him resonated with me is the idea that we can positively influence the future by understanding the present. I have noticed that when discussing the future, we often create a linkage between the past and the future, sometimes overlooking the present. Nevertheless, the present is where our actions occur, shaping the future (Jantsch, 1972, cited in Bell, 1997, p. 87). As Bell (1997) suggests, we can view the present as a transition point, comparing our beliefs about the past, our understanding of the present, and our expectations for the future.

In the 1950s, the first utilitarian dimension, the military dimension, emerged, focusing primarily on developing methods for rational predictions regarding the use of the U.S. military complex, and scenario studies, cross-impact analyses, Delphi studies, and forecasting were the most prominent methodological approaches (Ahvenharju, Minkkinen, and Lalot, 2018). While there are some advantages to forecasting and predictive methods, we also discussed certain limitations during our week three Friday session. Predictive and forecasting models are based on assumptions, which are not always accurate. This introduces a level of uncertainty, and human bias can also affect the outcomes of these predictions. Furthermore, the predictive-empirical approach tends to have a narrow focus and lacks contextual awareness as well as predictions, forecasting, and even superforecasting often rely on the notion of a single future (Gidley, 2017a).

Despite these challenges, we recognized that forecasting can help companies create long-term plans by offering insights into future market trends and business developments. Additionally, we found that even inaccurate or failed predictions can lead to positive results. For instance, a failed prediction may help improve future forecasting practices. In some cases, a negative outcome from a failed prediction could even be beneficial if it proves to be less severe than expected.

Herman Kahn introduced Scenarios which I also applied in my Wicked Challenges program. One of the main benefits I gained from this program was the solid foundation it provided for futures studies, which proved useful in various subjects. Based on collective knowledge, I found that scenarios were useful in identifying different viewpoints and offering alternative possibilities and solutions. Additionally, I was able to use scenarios in game building workshops conducted by senior futures studies students. As a group, we explored various possible scenarios; however, we struggled to create specific roles for the games. In this situation, I believe we unintentionally utilized two methodological approaches, gaming and role-playing, when considering preferable futures (Amara, 1981). Constructing different kinds of future scenarios was one of the key tasks in visionary management as well as in the structural approach to the probable future (Amara, 1981; Pouru et al., 2017).

Since the 1980s, the utilitarian second dimension, the consultancy dimension, has emerged, focusing on consultative and service purposes for organizations and companies. Foresight and forecasting have become the most common methods employed in this context. Following this, the utilitarian policy dimension developed, applying futures studies and foresight to various regional, national, and transnational policy contexts. Regional and national foresight exercises, along with different types of future-oriented knowledge, have been utilized (Ahlqvist and Rhisiart, 2015). I mainly noticed here that futures studies have been applied across various sectors, and the improvement in the usage of methodological tools has been very positive.

In the early 1980s, John Naisbitt developed the concept of "megatrends," which has since been adopted by researchers and various organizations to explore long-term futures across a wide range of regions, industries, and socioeconomic domains (Naughtin et al., 2024). From what I gathered during the lectures,

megatrends have long-term implications on large segments of humanity, including political, economic, social, environmental, or technological and they are different from trends that have limited lifetime and usually impact specific sectors. For example, technification is a mega trend while the rise of artificial intelligence is a trend.

In 1987, Austrian futurist Robert Jungk developed Futures workshops with the purpose of enhancing democratic municipal decision-making in Austrian towns (Lauttamäki, 2014). Initially, these workshops served as a tool for collaborative problem-solving, but in the field of futures studies, they have been utilized to collect and refine information and address complex issues. Additionally, Bell (1997) noted that the future images and policy designs created in these workshops could become a foundation for social action. This could be highly beneficial if the people taking part in the workshop are also responsible for bringing about the desired change (Lauttamäki, 2014).

Then one of the founding fathers of futures studies, Igor Ansoff brought up the concept called weak signals and this is another concept I could relate with the wicked challenges course. Based on collective knowledge, weak signals refer to early indicators that may signify a potential change or new direction for development. For example, virtual reality could be considered a weak signal that may represent an alternative mode of travel in the future. Weak signals serve as practical tools in visionary management and are a central concept in future consciousness (Ahvenharju, Minkkinen, and Lalot, 2018; Pouru et al., 2017).

Wendell Bell proposed nine purposes for futures studies, primarily focusing on possible and probable futures. He emphasized that the aim of futures studies is to invent, evaluate, and suggest possible and probable futures, while also assisting individuals in considering their options to make informed decisions about the kind of future they desire (Bell, 1997).

The possible future conceives and describes possible paths to see what might happen whereas the probable examines particular paths in detail to identify what is likely to happen (Amara, 1981; Bell, 1997). Usually, the probable futurists are value-driven while possible futurists are analytically driven by largely using qualitative and exploratory methods (Amara, 1981). When it comes to the possible future one key factor Bell highlighted was futurist task is to study possibilities for the future, no matter how unrecognized or improbable they may be (Bell, 1997). Therefore, it is a huge responsibility of futurists to present any useful ideas even if they initially appear ridiculous (Dator, 2019).

Later, Eleonora Masini challenged the field of futures studies to rethink its foundations, emphasizing the importance of ethics and diversity (Masini, 1993). I believe Masini's concept aligns with Bell's ethical foundations of futures studies, which are rooted in the futurist objective of exploring preferable futures. Notably, Bell has underscored that a deep concern for the freedom and welfare of future generations is one of the most significant purposes of futures studies (Bell, 1997). However, during our discussion on the second week's Friday session, we identified that every purpose listed by Bell is interconnected, making it challenging to determine the most relevant task. Consequently, addressing all these tasks can be demanding, as they vary depending on the situation or issue at hand. Additionally, we collectively recognized that anticipating future problems, analyzing risks, and considering aspects such as technology and sustainability could be added as the tenth purpose of futures studies.

From my perspective, I believe increasing democratic participation in imaging and designing the future also plays a significant role in futures studies. When addressing global issues, one of the biggest challenges we face is how to generalize findings while considering everyone on the planet. For instance, during our week five discussion, our group analyzed the future of transportation using PESTEV analysis. However, the transportation systems in my country differ significantly from those in European countries. For example, in Sri Lanka, owning a car is often seen as a status symbol, yet it is quite expensive. For some individuals, the desire to own a car stems from the poor quality of public transportation available. In contrast, in Finland, many people prefer to use public transportation over private cars.

As futurists, if we only consider certain groups in our analyses, we risk disadvantaging others. Therefore, I believe that pluralizing the future allows everyone to envision and create alternative futures while accounting for different geographical contexts (Gidley, 2017a). According to the week three Friday discussion, we identified that imagining alternative futures opens up more possibilities and diverse visions of what lies ahead. This perspective prepares us to adapt to various outcomes while focusing on a single future can lead to distress when faced with unforeseen events. Additionally, we learned that imagining alternative futures is more impactful for societal change because it fosters creativity, challenges assumptions, and prepares us for various possibilities.

The participatory approach is a significant aspect of post-positivism that promotes empowerment and transformation through engagement and active participation (Gidley, 2017b). This approach could be very beneficial in enhancing the involvement of the younger generation, who tend to prefer collaborative and engaging processes in futures studies. This approach also allows participants to take ownership of their preferred futures. However, one of the main weaknesses of this approach is its lack of consideration for relevant empirical research. We can address this issue by incorporating the integral future perspective, which utilizes mixed methods (Gidley, 2017b).

During our discussion on week five's Friday session, we identified that both critical and cultural futures play significant roles in analyzing recent issues, especially in relation to the role of AI engineers in using community-based system dynamics (CBSD), as discussed in the Harvard Business Review (Martin and Moore, 2020). Interestingly, Google has acknowledged that computer scientists need to enhance their understanding of the social contexts in which these technologies are developed and deployed. This emphasizes the importance of a human-centered view, a participatory approach, and a pluralistic perspective.

As a group, we also concluded that it's essential to consider a cultural approach that fosters creativity and encourages engagement with diverse perspectives (Gidley, 2017b). One particularly notable point I discovered as a female futurist was that this cultural perspective opens up possibilities for feminist and youth futures (Gidley, 2017b). However, Gunnarsson-Östling (2011) pointed out that futures studies often depict women as passive victims rather than as active participants shaping the future (Gunnarsson-Östling, 2011, as cited in Ahlqvist and Rhisiart, 2015, p. 96).

However, since the emergence of emancipatory dimensions in futures studies, I believe that the gaps between genders are narrowing. Returning to the previous example, we identified the importance of encouraging critical approaches in futures studies to prevent individuals from acting without considering the broader impacts of their actions. Interestingly, a critical approach helps uncover harmful biases and power dynamics while allowing us to focus on potential futures instead of merely predicting what will happen.

The initiative that Google has undertaken to consider social impacts when designing its technologies is highly appreciated; however, we feel they are still overlooking one important aspect: the environmental impact. Another significant question that arose was whether they have taken any concrete actions to implement these considerations in reality, especially since the review was published four years ago.

Overall, it is evident that the role of futurists has shifted from strict forecasting to exploring socio-economic scenarios, becoming less scientific (Ahlqvist and Rhisiart, 2015). Also, during the discussion, we realized that futurists' roles have become more open to various methods of prediction, thanks to the abundance of resources available today.

Most importantly, they no longer hold the same level of authority as before, and their responsibilities have become increasingly demanding.

Futures Studies from a More Practical Perspective

The purpose of this section is to analyze a practical example from a visionary management perspective, as well as to assess my current position as a futurist. One of the most notable examples of visionary management I can cite is my current CEO. When I started working as a ghostwriter two years ago, the company primarily used Google Docs along with their platform. However, with the emergence of AI, they introduced their own writing platform in place of Google Docs, along with a custom AI-writing Chabot.

They maintained open communication with the staff to assess the company's current resources and develop a vision for its long-term future (Pouru et al., 2017). Rather than viewing AI as an obstacle to growth, they employed visionary decision-making to explore alternative futures. For instance, they created distinct project categories for customers who prefer using AI and for those who do not. Recently, they introduced a new niche focused on humanizing AI content through the use of human writers and editors. Initially, I was surprised by this development, but it ultimately underscored the power of visionary thinking.

I have also observed their unwavering positivity in any situation. According to Bell (1997), leaders with a positive, optimistic vision of the future tend to believe in progress, while those with a pessimistic outlook often base their views on ignorance. Additionally, Professor Igor Ansoff emphasized that organizations often miss opportunities and fail to respond effectively to threats due to their ignorance of environmental changes.

As both a writer and an entrepreneur, I find myself engaged with both possible and preferable future scenarios. When it comes to possible future, I always try to look at the world in unconventional ways and when it comes to preferable I feel that I have a critical interest in issues such as environmental, climate change, women's rights, and other wicked challenges. I must say this interest has notably increased since I began this program. Also, I have noticed that Amara has included writers as characteristics in both possible and preferable (Amara, 1981). However, regarding the future consciousness test, I found that I scored low in terms of time perspective and agency belief. This raises the question for me: do I genuinely possess the potential for a preferable future, or do my answers depend on the context in which I took the test?

Moreover, I believe that a test is often too brief to fully capture one's thoughts about the future. Nevertheless, future consciousness tests can be valuable for gauging how people perceive the future, particularly during futures workshops.

Conclusion

Through this program, I realized that futures thinking and futures studies are more important than ever for our planet. Expanding our future-oriented mindset is essential not only for our own benefit but also for the improvement of everyone. However, I also came to understand that ideas, including visions of the future, cannot change the world on their own. Their effectiveness relies on our genuine willingness to transform them into action and our ability to do so (Miles 1978, cited in Bell, 1997).

Disclaimer: I have used Grammarly to correct and enhance certain texts included in this learning diary.

List of References

Ahlqvist, T. and Rhisiart, M. (2015). Emerging pathways for critical futures research: Changing contexts and impacts of social theory. Futures, 71, pp.91–104. doi: https://doi.org/10.1016/j.futures.2015.07.012.

Ahvenharju, S., Minkkinen, M. and Lalot, F. (2018). The five dimensions of Futures Consciousness. Futures, [online] 104, pp.1–13. doi: https://doi.org/10.1016/j.futures.2018.06.010.

Amara, R. (1981). The Future Field: Searching for Definitions and Boundaries. The Futurist. Feb.

Bajpai, P. (2024). Countries Where Bitcoin Is Legal & Illegal (DISH, OTSK). [online] Investopedia. Available at: https://www.investopedia.com/articles/forex/041515/countries-where-bitcoin-legal-illegal.asp.

Bell, W. (1997). The Purposes of Futures Studies. In: Foundations of Futures Studies: Human Science for a New Era. Vol. 1, History, Purposes and Knowledge. Transaction Publishers, pp.73–97.

Dator, J. (2019). Chapter 1 What Futures Studies Is, and Is Not. In: What Futures Studies Is, and Is Not. Springer International Publishing.

Gidley, J.M. (2017a). Chapter 2 - The Future Multiplied. In: The Future: A Very Short Introduction. Oxford University Press.

Gidley, J.M. (2017b). Chapter 3 - The evolving scholarship of Future Studies. In: The Future: A Very Short Introduction. Oxford University Press.

Kuosa, T. (2011). Practising Strategic Foresight in Government. [online] Available at: https://www.jstor.org/stable/pdf/resrep05909.8.pdf.

Lauttamäki, V. (2014). Practical Guide For Facilitating A Futures Workshop. Finland Futures Research Centre, Turku School Of Economics. Available at: https://www.utu.fi/sites/default/files/public:/media/file/Ville-Lauttamaki_futures-workshops.pdf.

Martin, D. and Moore, A. (2020). AI Engineers Need to Think Beyond Engineering. [online] Harvard Business Review. Available at: https://hbr.org/2020/10/ai-engineers-need-to-think-beyond-engineering.

Masini, E.B. (1993). Why futures studies? Grey. In: Why Think about the Future Today? Principles and Concepts. London: Grey Seal, pp.1–14.

Naughtin, C.K., Schleiger, E., Bratanova, A., Terhorst, A. and Hajkowicz, S. (2024). Forty years in the making: A systematic review of the megatrends literature. Futures, 157, pp.103329–103329. doi: https://doi.org/10.1016/j.futures.2024.103329.

Pouru, L., Wilenius, M., Holstius, K. and Heinonen, S. (2017). Pentti Malaska | A Visionary and Forerunner. The Finnish Society for Futures Studies.

Son, H. (2015). The history of Western futures studies: An exploration of the intellectual traditions and three-phase periodization. Futures, 66, pp.120–137. doi: https://doi.org/10.1016/j.futures.2014.12.013.

FUTU2 Systems and Complexity Thinking

Systems and Complexity Thinking (4 cr) course introduces theory and methods for understanding systems as conceptual and analytical tools in Futures Studies. An overview is given of varied types of systems, from technical to sociocultural, and the different types of systems approaches most suitable for working with them. Tools for mapping and describing systems are introduced. Important aspects of complex systems, including self-organisation, emergence, anticipation, and unpredictability are considered in light of their implications for futures research.

The teacher of the course was Professor **Markku Wilenius** accompanied by **Peter Paul Gerbrands**.

Noora Heiskanen uses the systematic approach she learned in the course to analyze digital transformation. She does this elegantly and reflectively, trying to understand how transformation is not a linear process but a highly complex one, the pace of which is determined by various interaction loops. Making good use of the possibilities offered by graphical representation, Noora succeeds in clarifying the fundamental challenges and advantages of systems thinking.

In her essay, **Anne Jackson** takes as her starting point an examination of disability and its future from a systemic perspective. She correctly sees systems thinking as an opportunity to empower people with disabilities to create futures they have not seen before and to break free from rigid classifications. Anne's essay is a fine example of how systems thinking can offer a fresh perspective on the prospects of any field or sector.

In this brilliant essay, **Zainab Yasin** begins by describing the differences between linear and systems thinking, and then turns her attention to the growing loneliness of the elderly. In her analysis, she demonstrates in a highly interesting way how stereotypes and simplifications prevent us from considering the long-term consequences. Zainab challenges us to realize that expanding our awareness toward the future requires the mature use of human resources.

Systemic View on Digital Transformation within Organizations through Human Lenses

Noora Heiskanen

Turku School of Economics, University of Turku

Introduction

This essay takes a systemic view on how advanced new technologies drive digital transformation within organizations. In short, digital transformation refers to the integration of digital technologies that have the ability to change organizations' core structures, processes, or even values and value propositions. Examples of technologies that can drive digital transformation in organizations include technologies such as the internet of things (IoT) or artificial intelligence (AI). (Verhoef et al., 2021; Vial, 2019; Wessel et al., 2021.) All in all, the process of digital transformation offers fruitful grounds for a systemic view as it entails multifaceted interactions between different actors and elements. It can be called a sociotechnical system, which is based on dynamics between people, structures, and technologies. Therefore, a systemic perspective allows for a deeper understanding of how different elements of change influence each other. When applying systems thinking to the matter of digital transformation, we are required to consider digital transformation as anything other than a linear process.

I chose this topic because I wanted to explore digital transformation in my thesis in administrative sciences, and I've studied knowledge management as my minor. I had already investigated systematic factors of digital transformation last year, but this year's course inspired me to look into it from a new perspective: people, which led to an all-encompassing re-evaluation of the topic. This means that in this essay, I will particularly reflect on how systematic elements related to individuals and their interactions with others operate within the system of digital transformation. Moreover, since this year took a more learning-focused approach, I decided to include some personal reflection within the analysis of this essay.

Next, I will move on to introducing the process of digital transformation and then recognizing its systematic elements while tying them to theoretical conceptualizations offered during the course. In this essay, I do not focus on one specific organization as the elements of digital transformation can stay the same from one organization to another, and I wanted to focus on the matter from a more semantic level. Moreover, it may be beneficial to ignore specific details of a certain organization since it might give room for deeper theoretical reflections.

The Systematic Elements of Digital Transformation

The crucial elements that create the system of digital transformation consist of different departments of the organization, users of technology, value propositions, and the technology itself. In addition, there are several environmental and external factors that affect the process. Next, I will shed light on how each of these elements affects the digital transformation and the integration of new technologies, after which I will analyze different systematic elements surrounding them in more depth.

In practice, digital transformation begins with recognizing the need for transformation. External drivers such as advancements in digital technologies, evolving consumer behaviors, and increased competition often act as the catalyst for change. For example, artificial intelligence has paved the way for itself in multiple fields and organizations as its possibilities in value creation have become more realized. Next, the organization needs to determine these external forces' impact on the organization and the industry it operates in and establish a clear vision and strategy for digital transformation. For this to happen, there must be efficient coordination and knowledge sharing between the organization's IT and strategic management. It

is crucial to understand all challenges and opportunities that new technology has the potential to offer. It is also IT management's task to go through a thorough assessment of the current state of technology infrastructure and other factors that might play a part in the integration of new technology, such as the current skills of employees, so that deployment of the new technology can proceed smoothly. This requires cross-functional collaboration in the form of communication between different departments and individuals within the organization. The management departments also must take into consideration the possible regulations that might affect the integration of the new technology. Moreover, the plans prompt budgeting and resource allocation, which consists of building a picture of possible costs of acquiring and maintaining the new technology. All of this contributes to building an implementation plan for an integration process. (Verhoef et al., 2021; Vial, 2019; Wessel et al., 2021)

These aforementioned steps help us to build a picture of the digital transformation process, but perhaps even more important parts of it come in the form of monitoring and measuring results with key performance indicators (KPIs). Different metrics help organizations gather insights into the impact of digital transformation and enable them to create continuous feedback loops to redefine their strategies. However, digital transformation may also be seen as an iterative process that outright requires continuous learning and adaptation. This is due to both the sheer transformative nature of digital transformation and the way organizations are increasingly required to stay vigilant to technological advancements, regulatory changes, and changing dynamics. (Verhoef et al., 2021; Vial, 2019; Wessel et al., 2021)

Furthermore, the users of the new technology play a part in the transformation through the aforementioned communication, as well as the potential resistance to change. The introduction of new transformative technology changes the strategy and, therefore, also creates new value propositions for both customers and the employees of the organization. Resistance to change is used to describe the hesitation, opposition, or reluctance that individuals or groups within an organization may exhibit when confronted with new systems, processes, or transformations. This reaction arises when employees or stakeholders feel that the change poses a risk to their existing roles, established routines, skills, or the organization's norms. Such resistance can appear in different ways, including outright refusal, lack of engagement, or subtle actions that may hinder the success of the change effort. (Verhoef et al., 2021; Vial, 2019; Wessel et al., 2021; Selart & Lines, 2013; Ködding et al., 2023.; Brandtner & Mates, 2021.)

After all of this has happened, the organization has undergone structural changes that have been born out of this system's continuous communicational and defining elements. The structural changes often encompass the whole organization and redefine people's and departments' responsibilities but also might affect the organization's values and identity. As the organization continues to use the new technology, this system and its processes continue to function and further develop the organization's practices and culture. (Verhoef et al., 2021; Vial, 2019; Wessel et al., 2021)

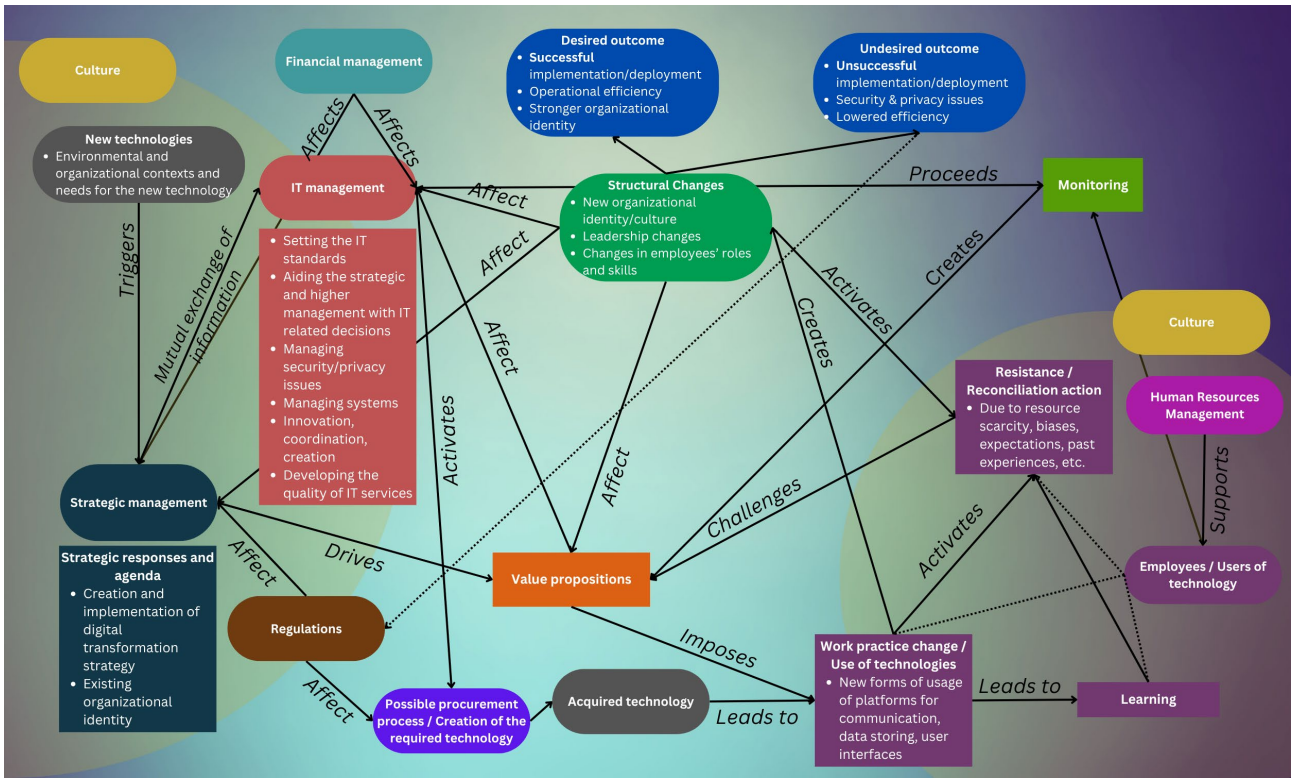


Figure 1. *System diagram of digital transformation (created based on Vial 2019 and Wessel et al. 2021).*

Analysis on Systematic Elements of Digital Transformation through Human Lenses

In this section, I will construe and analyze systematic elements that can be distinguished in the process of digital transformation and their linkages to theoretical conceptualizations of human behavior in systems. In general, as the process of deploying new advanced technologies goes beyond simple adoption of a technology, it manifests as complex restructuring processes that affect the whole organizational structure and culture. Therefore, organizations in the context of digital transformation can be conceptualized as complex systems that consist of transformation driven by emergence, interactions of multiple actors, and different trajectories that work in different temporal dimensions. This can, for example, be seen in how the system includes both external and internal, and concrete and abstract interactions. It is important to understand how external players affect the system or act as a part of it. (Wilenius & Gerbrands, 2024.) In this conceptualization of the digital transformation (Figure 1), I attempted to take into account also the external influences, such as the surrounding culture and regulations. This, I believe, adds to the more comprehensive understanding of digital transformation and its systems. On top of that, the systematic view on digital transformation considers how the process is ever developing but also always linked to the past. For example, all the past technological infrastructure and existing skills all affect the outcome of the transformation.

Another systematic element of digital transformation is its interconnectedness, as several elements influence each other in various ways back and forth. It is impossible to smoothly integrate new technology as a part of the organization without cooperation between different actors. These actors can be distinguished as the different departments, users, and external drivers, such as culture or even the outcomes of certain processes, such as the procurement of the new technology. This highlights the interactive, communicational nature of the system and the change process. As outlined in the slides of the second lecture by Peter Paul Gerbrands (2024), the fields of intervention principles evolve from simple action-reaction to complicated idea-result and finally into complex intention-impact and living principle-consequences. This is also visible in digital transformation. As previously discussed, the process of the transformation moves from linear intelligence and modes of self-interest towards assimilating and accepting innovation for common

interests, which later leads to transformation and, lastly, into metamorphosis, in which the collective consciousness as a whole has changed. I found this framework to highlight especially the shift from self-focused approaches to more collective and systemic thinking. It could be perhaps said that digital transformation has the capability to not only change an organization's delegation of tasks and value propositions but also its employees on a deeper cognitive level.

The system of digital transformation also includes different feedback mechanisms, as presented before. These feedback mechanisms are present in an organization's monitoring process, but also in new technology users' feedback or even resistance towards the new technology. Moreover, the value propositions are greatly affected by different feedback loops that are born in the interaction between different departments, such as IT and strategic management. For example, there is often monitoring on how well reality has aligned with strategic plans. Feedback and propositions are also processed between these departments and the financial department to ensure sustainable budgeting. Feedback loops could even be seen as a crucial part of making sure the digital transformation happens smoothly and leads to desired outcomes. Furthermore, continuous learning that is involved in the utilization of new technology feeds different feedback loops. Continuous learning is crucial because the new technologies that trigger digital transformation might be something never seen before. (Verhoef et al., 2021; Vial, 2019; Wessel et al., 2021.)

To assess feedback loops as not only another sign of the systematic nature of digital transformation, I decided to integrate elements from the system diagram of digital transformation into Gerbrands' (2024) graph (Figure 2). I felt this offered me personally a practical and more tangible take on the information fields present in digital transformation and prompted me to reflect on the difference between consciousness and intelligence, the orientations towards the future and the past. I believe these facets of systemic elements are especially visible when it comes to regulations and resistance to change. Regulations are linked to the so-called world of the other because they are most of the time externally imposed codes of conduct, whereas resistance to change stems from individuals' hesitancy to delve into change due to their attachments to the past.

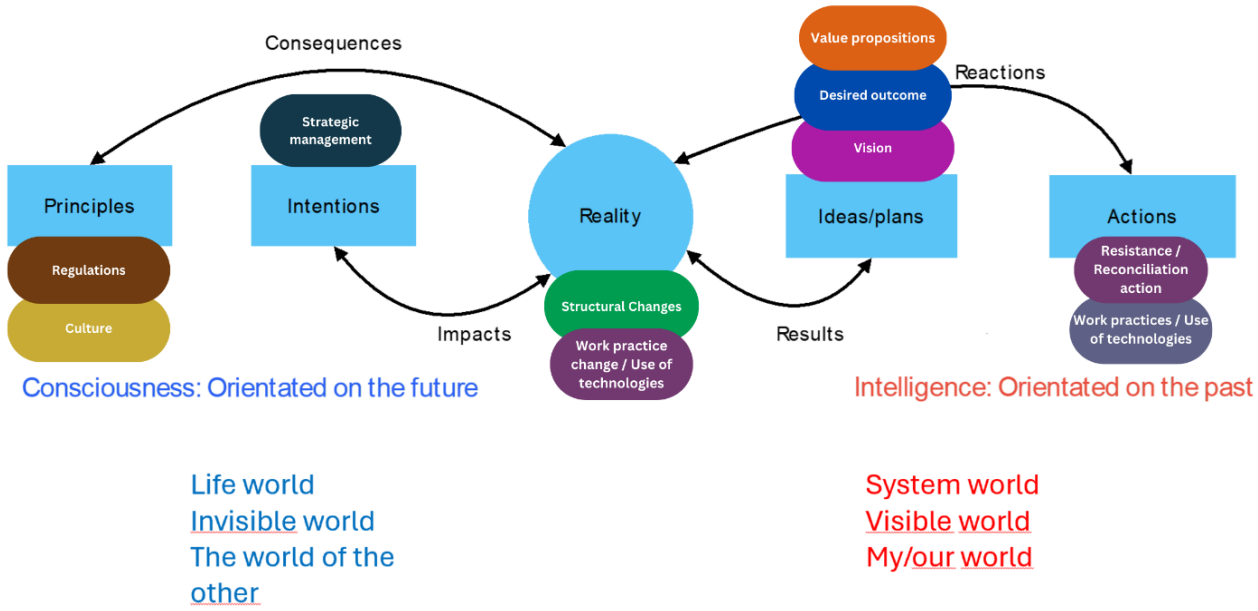


Figure 2. *Elements of digital transformation in feedback loops (created based on Gerbrands, 2024)*

The role of communication is also evident in how the system of digital transformation communicates its needs and therefore feeds the feedback loops, as long as people are capable of consciously processing the information. For example, issues in strategic management could impact value propositions in a way that'd affect users of the technology, which in turn could lead to unfavorable results for the transformation, such as unsuccessful implementation of the new technology. There are numerous ways to rationalize and approach the implementation of new technologies within an organization, and the issues arising in the process, but in the end, the lectures pointed out the importance of "taking things as they are". I felt this complemented my previous understanding of change management and reminded me of the importance of observing. There are many ways the changes and issues in systems can be rationalized. In other words, one should not only rely on performance indicators but also take into account the other ways problems may take shape. (Gerbrands, 2024.)

Another systematic element in digital transformation is how organizational culture affects the transformation. It is important to note, though, that the changes in organizational culture are also an inevitable result of digital transformation. The existing culture can affect how the organization handles its value propositions or fosters things such as innovation and strategic approaches. For example, some organizations value adaptability and flexibility, which may give them an advantage when going through digital transformation. Some organizational cultures are also more accustomed to possible risks or have an active culture of knowledge sharing among peers. This could also be encountered by observing both people and the environment. Since the vision, value propositions, and strategic objectives are new and under change, all fields of intervention principles should be considered. Intervention approach in all fields was outlined to include focusing on the other, the outside world, by being open to gathering insights and impulses, working without premeditated structure, seeing what the process is trying to express, and sensing wholeness by perceiving the contribution of different activities to the system. By enforcing these principles, the less tangible cultural factors that affect digital transformation may be more easily grasped and responded to. (Chekhov, 1993.)

Another common element of systems is the difficulty in determining, based on the system model, whether an organization's transformation will lead to the desired outcome, given that outcomes result from complex and multilayered interactions and existing conditions. Systems can be unpredictable in their nature, which is also true for digital transformation on a fundamental level, despite all the existing resources of an organization. It could be said that digital transformation is challenging and complex in any circumstances due to it requiring systematic lenses and establishing coordination between different actors, not to mention possible emergent phenomena that might affect the change. This can be approached through so-called human lenses by directing attention to the resistance to change, since uncertainty has been recognized as one of the leading drivers of it. (Selart & Lines, 2013; Ködding et al., 2023.) I believe that the aforementioned observational approach would help project managers to pay attention and make sense of systemic factors and elements that contribute to the resistance to change and thus add to the usual repertoire of tools to encounter it.

Conclusions

This essay examined digital transformation through a systemic perspective, highlighting the interconnected relationships between people, organizational structures, and technologies. Rather than being a straightforward or linear process, digital transformation is a complex system in which feedback loops, strategic decisions, and continuous learning play a role. Advanced technologies, such as artificial intelligence and IoT, often act as triggers for transformation, but the outcomes are shaped by internal collaboration, external factors like regulations, and existing organizational conditions. Viewing digital transformation as a sociotechnical system reveals that its success relies not only on technological adoption but also on human interactions and environmental influences, making the process iterative and constantly evolving.

One of the most significant insights this essay proposed was the role of feedback mechanisms in helping organizations assess their progress, adapt to challenges, and refine their strategies. Effective communication, ongoing learning, and addressing resistance to change are crucial for successful digital transformation. Resistance often stems from fear of uncertainty or disruption to established practices. This resistance also highlights the human dimension of transformation. It requires leaders to look beyond performance indicators and instead observe and respond to "hidden" challenges that may not be immediately evident. The ability to detect and manage these subtle dynamics ensures a smoother and more sustainable transformation process.

Additionally, this essay underscores the dual role of organizational culture in digital transformation. On one hand, a culture that embraces flexibility, innovation, and knowledge sharing provides a foundation for managing transformation successfully. On the other hand, cultural changes are an inevitable consequence of digital transformation, since organizations redefine their value propositions and adjust their operational and strategic goals. These cultural shifts contribute to an organization's evolving identity, which must be met with an approach that aims to make sense of the evolving system through holistic perceiving of its elements, since digital transformation can lead to fundamental changes in stakeholders' minds in the form of changed values and sense-making patterns.

In conclusion, digital transformation is an ongoing, multidimensional process that requires a systemic understanding of how technology, strategy, and people interact. Success in this area depends on the organization's ability to embrace feedback, foster open communication, and adapt to both anticipated and unexpected challenges. By taking a systemic and holistic approach to digital transformation, organizations can better manage its complexities and achieve sustainable change. This perspective highlights the importance of balancing technology with human elements that ultimately drive transformation forward.

References

Brandtner, P. & Mates, M. (2021). Artificial Intelligence in Strategic Foresight – Current Practices and Future Application Potentials: Current Practices and Future Application Potentials. 75–81. 10.1145/3481127.3481177.

Chekhov, M. (1993). On the Technique of Acting. Australia: HarperCollins Publishers, 48.

Gerbrands, P. (2024). Systems and Complexity Thinking. [PowerPoint slides]. FUTU2 Systems and Complexity Thinking. University of Turku.

Ködding, P. Ellermann, K., Koldewey, C. & Dumitrescu, R. (2023). Scenario-based foresight in the age of digitalization and artificial intelligence – Identification and analysis of existing use cases. Procedia CIRP, 119, 740–745. https://doi.org/10.1016/j.procir.2023.01.015

Lines, R. & Selart, M. (2013). Participation and organizational commitment during change: From utopist to realist perspectives. https://doi.org/10.2139/ssrn.2397139

Verhoef, P. Broekhuizen, T. Bart, Y. Bhattacharya, A. Dong, J. Fabian, N. & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. Journal of Business Research. 122. 10.1016/j.jbusres.2019.09.022.

Vial, G. (2019). Understanding Digital Transformation: A Review and a Research Agenda. The Journal of Strategic Information Systems, 28, 118–144. https://doi.org/10.1016/j.jsis.2019.01.003

Wessel, L. Baiyere, A. Ologeanu-Taddei, R. Cha, J. & Blegind Jensen, T. (2020). Unpacking the Difference Between Digital Transformation and IT-Enabled Organizational Transformation. Journal of the Association for Information Systems. 22. 10.17705/1jais.00655.

Wilenius, M. & Gerbrands, P. (2024). Systems and Complexity Thinking. Introduction. [pdf-slides]. FUTU2 Systems and Complexity Thinking. University of Turku.

AI Disclosure

AI was used in the writing of this essay to ask clarifying questions, translate, and format sentences.

Systemic View of Disability – From the Angle of Organisations and Work

Anne Jackson

Turku School of Economics, University of Turku

Introduction

This essay considers the disability through the lens of systems theory, seeing disability as a social phenomenon connected to various structures presented by society. Here, systems theory offers a framework for understanding the complexity of the interplay between individuals with disabilities, work and organisations, and wider societal systems. This perspective examining disability, organisations and work focuses on interconnections, various feedback loops as well as adaptability.

Michailakis (2003: 223) proposes that there are various systems at work as people become 'disabled' through other, external (=non-disabled) people's observations. These include a medical system, which considers for instance various malfunctions, impairments and treatment propositions; an economic system, which foregrounds a lack of economic resources – either as regards disabled people or societies and organisations dealing with them; a labour market system, which deals with questions of work or inability to engage in gainful activity, perceived or real; a legal system, which centres on a lack of rights/duties for disabled people; a rehabilitation system, which considers issues of support and correction of functional incapacities; an education system, which takes up issues of learning difficulties and education; and even a system of art, which highlights (non-)aesthetic issues of a body that is considered defective or ugly. Through these systems, someone is rendered as 'disabled'. However, as an understanding of disability as a social concept brought into existence through various interlinked systems, it is also possible to conceive other systems that would bring up a different picture of disability.

The key basis for thinking here has been applied from soft systems theory (Checkland 1985: 760ff), focused on learning and change. The system related to disability is a type of social system related to the social concept and understanding of disability, and whilst there is no externally guided and particular goal as there would be have been in the more traditional view of 'hard' systems theory (ibid., 757–759), one could still say that the systems view of disability is linked to the emergence, strengthening and further honing up of the concept of equality and equitability in society (see de Haan 2006: 293–294). Hence, the systemic iterations in relation to disability produce societal learning that allows further and deeper equality to emerge. In this essay, this system is considered in connection with the right to work – a difficult societal right to balance as no market economy can simply allocate work to all its citizens. Nevertheless, for the related system of work to operate as effectively as possible, all factions of society should be able to participate in it, and the operation of the system should be both needs and merits based as well as equitable. This essay looks in particular at how the systems view of disability can be linked to the world of work and the position of disabled people thereby improved as we walk towards the future.

It is to be noted that there are many types and kinds of disability, starting from notions of how such conditions have arisen (e.g. through birth, through a work accident, etc.) and how they affect a person (e.g. their senses, their appearance or behaviour, the way their brain works, etc.); and how such conditions, or indeed the people, might then be viewed by society. There is also the question of intersectionality (Crenshaw 1989) – when the same person is affected by multiple issues that could provoke discrimination, such as issues related to gender, ethnicity or religion in addition to disability (that is, there are yet other systems of perceived 'Otherness' in which the person participates; see Zevallos 2011). This essay aims not to work through such 'categorisations'. Whilst the canter through the notion of disability therefore by necessity

needs to be a quick one, the journey covered in this essay charts the concept of disability from a wider and more interconnected perspective.

On Disability

Disability and the Right to Work

The right to work is a fundamental right and a human right recognised in many international legal frameworks. These emphasise equal opportunities, accessibility, as well as the removal of barriers preventing persons with disabilities from fully taking part in working life. It is important to note that the right to work connects to various other fundamental or human rights, such as participation in society or being included in it, economic rights as well as the overall dignity belonging to all people.

The key legal bases for a right to work also for those with disabilities first and foremost include the United Nations (UN) Universal Declaration of Human Rights (UDHR), whereby Article 23 takes up the right to work, free choice of employment, as well as favourable conditions of work for all individuals. The UN International Covenant on Economic, Social and Cultural Rights (ICESCR), in its Article 6, highlights the fundamental right to work, stressing various types of technical and vocational guidance as well as training programmes, also useful for disadvantaged groups, such as those with disabilities. Importantly, there is also the UN Convention on the Rights of Persons with Disabilities (CRPD), the Article 27 of which focuses on the right of persons with disabilities to work on an equal footing with others. The Article prohibits any discrimination in recruitment, promotion, and workplace conditions; protects employment rights and safe, healthy working conditions; and promotes employment opportunities for disabled people in the public and private sectors.

There are also other agreements, such as the International Labour Organization (ILO) Convention No. 159 regarding Vocational Rehabilitation and Employment (Disabled Persons), which focuses on equal access to vocational training and employment, and Recommendation No. 168 giving guidelines for inclusive employment policies. In the EU, the European Social Charter and other regional instruments also concern the employment rights for persons with disabilities. Moreover, global soft law and governance initiatives such as the UN Sustainable Development Goals (SDG 8: Decent Work and Economic Growth) have taken on aspects of protection of disability-inclusive employment, given that through that SDG, economic development is planned to be achieved through work available to all. Given all these, it is clear that work for disabled people is societally regarded as an important matter – but also an issue requiring protection: the rights of disabled people are not always respected.

Barriers regarding the Right to Work as Experienced by Disabled People

Whilst there are legal protections, disabled people also encounter major barriers in view of their right to work. There are attitudinal barriers, such as negative misconceptions, stereotypes and other biases, for instance related to the productivity of disabled people. There can be legislation which does not help the legal subjects that a law is in principle designed to help; this too will then need addressing. Moreover, there are physical and environmental barriers – inaccessible organisations who do not take up sufficient reasonable accommodations e.g. in view of technology or flexible work arrangements.

National policies and laws do not necessarily protect disabled peoples' right to work, help their access to studies leading to work, or prepare disabled people to look for work and prepare themselves for evolving job markets, in sufficient amounts or with practical enough detail. This is then also linked to economic barriers, which come to the fore e.g. in insufficient support to employers; or in insufficient information to employers about support already available (that is, incentives for companies to hire and provide reasonable accommodation for those with disabilities); or the overrepresentation of disabled people in low-paying jobs

or non-salary-paying rehabilitation type of work, which does not always provide much incentive for taking up work. (See Oliver 2013.)

Benefits of a Social View of Disability

For overcoming these issues, anti-discrimination legislation and the enforcement of such legislation are paramount. One arena where improvements are sorely desired and missed is indeed the area of organisations and work, whereby qualifying for work, accessibility into organisations, reasonable accommodations, as well as access to flexible work measures and to other support (e.g. assistive technologies or support provided by another employee) can be important issues for disabled people.

Awareness campaigns, capacity building, information sharing and other social incentives to employers have improved matters, but both employers and those assisting disabled people to join the labour market (e.g. social workers) may still require training on disabled people's rights and the societal measures to be taken. For instance, knowledge on inclusive technologies available or on innovations financed by the state is still limited. Moreover, as social problems are often tried to be tackled through the individual, medicalised approach to disability – organising help for particular people, based on their particular situation, at a particular point in time – finding solutions to complex questions such as those emerging from the system of disabled people and work can be difficult (Oliver 2013: 1025). Tackling such issues as social questions would require considering them on a larger scale, throughout the lives of disabled people, and starting to tackle the issue of access to work early; for instance, whether a disabled person can take up work on a labour market will be dependent for example on the support that they received in their early childhood, and how those choices are 'earmarked' or regarded in later life. For instance, if receiving more intense support and an individualised study plan then by definition excludes a disabled person from a particular route in education, this may mean they will have more difficulties in achieving gainful employment in the future.

Systems Approach

Systemic Approach to Disability

Here, we come to the systemic approach to disability, which focuses on understanding disability as a dynamic interaction between individuals and their various broader environments, as opposed to basing on impairments or medical conditions. The perspective links to the social model of disability, which in turn sees for instance attitudes in society as key contributors to the challenges that people with disabilities encounter in society, and considers their feedback to the system as both systemic barriers but also in some conditions as enablers, with a key to achieving something new as the system turns through more and more iterations. (See Michailakis 2003 and Checkland 1985.)

When taking a systemic approach to disability, one can consider the phenomenon holistically. Seen from this angle, disability is not just an individual characteristic but a type of whole whereby various personal, societal and environmental factors meet. This gets one out of a mere medicalised way of looking at matters. With this in mind, then also interventions to help people having disabilities should take into account various environments – physical, social, economic, and cultural. For instance, a disabled person's ability to work will not be affected merely through their own skills, abilities and personal traits, but also through various environmental, community-related, organisational and societal factors. In a sense, in this 'wholeness', disability is an interaction between the individual and any barriers that they encounter on various different levels and in multiple different guises.

More than just a diffused whole, though, disability can be seen as an interconnected nexus or network. As disability is looked at as a system, one can pay attention to its various linked parts encompassing individuals, families, organisations and states; all connected to each other. If one changes something in one part

or level of the system, this affects other parts of the entire systemic whole. Furthermore, the system of disability links to other systems through phenomena such as inclusion; there, the various systems involving healthcare, education, employment and societal and community-related systems meet and take turns to achieve things. All these systems can then flexibly interact and respond to the changing needs of the various parts of the system – persons with disabilities, families, organisations such as employees, societal institutions and various other stakeholders.

As the system keeps running its course, there will be more enduring mechanisms for how feedback from the participants to the nexus and information from other systems are looped back and gathered. There are then possibilities for systems to create something new, as they operate – and in the case of disability, the creation of equitability and inclusivity can occur as systemic barriers are removed, step by step and through each turn of the system. This then enables fuller societal participation and coming together of the various systemic elements.

The different components creating the pulsating nexus therefore first of all encompass the individual, which links to a plethora of disabled persons' skills, abilities and experiences, and can be supported through personalised interventions and accommodations, education and technologies. In the context of a disabled person's work, the interventions could cover the use of assistive technologies, skill-building programmes and specifically organised support provided by a co-worker. Linked to the individual comes the family and close community component, which then highlights the power and significance of families in supporting disabled people as well as the importance of the local communities, which can be a veritable positive force if they accept and support diversity.

On top of these, we have the institutional or organisational component, which is the key level emphasising inclusion and accessibility – to organisations, workplaces and other entities. Interventions to help the employment of disabled people could involve for instance inclusive hiring practices, workplace accessibility, and anti-discrimination policies. It is important to note that organisational culture plays a significant role in integrating employees with disabilities, reducing stigma, and fostering collaboration – and to a great extent, organisational culture can be influenced, supported and, if necessary, challenged by the leadership of the organisation. The leaders have therefore a significant effect on how the organisation relates to disabled people and their possibilities of entering the organisation as employees, and remaining plus progressing there. On top of this, there is the societal level – the venue of societal attitudes but also of policies, legal frameworks (e.g. anti-discrimination laws, quotas for hiring disabled people, positive discrimination) and cultural tendencies in society. The attitudes prevalent in society can either ease or hinder the inclusion of disabled workers in the workplace.

Ultimately, there is the global level – perhaps difficult to consider as a 'component' – which for instance houses the key legislation discussed at the start of this essay (e.g. the UN Convention on the Rights of Persons with Disabilities (CRPD), which highlights the right to work and the elimination of barriers for disabled people from working life) and then acts as the basis for systemic change as it promotes disability-related rights on a global scale. Granted, change can start on any level of the system, but arguably there are major changes at hand only when legal and attitudinal trends are started off and established globally. Granted, for instance multinational organisations must consider their attitude to globalisation and policy-making. As for instance Ikea tried to align its advertising with local regulations and cultural attitudes in Saudi Arabia and therefore 'lost' women from its catalogue, this was seen as a definite let-down of Ikea's, and in a sense, the whole Western society's values (see Dumetz 2020). It was not acceptable to 'lose' women from the Ikea catalogue for locally felt religious sensitivities and cultural values. One could perhaps note that not too many companies are making disabled people visible in their advertising. Is it ethically right to 'lose' such people in this manner?

It is important to see the different parts of the system as interdependent. For instance, families affect individuals, and organisations with their different policies, measures and dynamics affect them too. Societies are in turn affecting organisations' policies (e.g. hiring practices) and thus also their workplace culture as

well as productivity requirements, which then reflect back upon what is required of individuals. On the other hand, individuals have a say in what kind of societies we build. There are numerous feedback loops through which different parts of the system can affect each other; for instance, positive feedback can push organisations and individual operate in certain ways, whereas negative feedback might push them in a different direction. (For different parts and the functioning of systems, see e.g. Checkland 1985.)

Which directions are then good depends very much on the underlying goals and values guiding the system and pushing its components to particular positions in the nexus covering the whole. As already alluded, the hard systems theory approach considered that there would basically always be externally determined goals that would be guiding systems, whereas the soft systems approach does not presume this but focuses on the inherent ability of the participants to the system, and thereby also the system itself, to learn from what has happened, through which the system can correct itself over time (see Checkland 1985). As disability as a social phenomenon cannot really be completely steered by external forces or decision-makers (especially within a market economy, with an independently operating labour market), it is presumed here that the learning will propel the system forward. Nevertheless, it is clear that there are also ethical approaches which will guide in which direction the individuals, families, organisations etc. will travel; here, important values in view of disability comprise e.g. accessibility and equity. These guide the entire systems-based view on disability as it moves towards deeper levels of self-determination and fairness, covering not only equitability of opportunity but also equitability related to end results.

How It Might Work: Case Disability, Education and Work

How could one then apply the systemic approach to disability in view of the right to work – which also goes for disabled people? For instance, through considering work and work-related phenomena on all the systemic levels. For instance, education can be seen as a cross-cutting force, and that is taken as an example below.

On the individual systems level, there are individual choices to be made. If supported, even disabled people's dreams related to work via getting appropriate education can be brave and reflective of the individuals' genuine career dreams, rather than just what might have traditionally been seen as 'appropriate' for disabled persons to aim for (e.g. choosing a musical profession for which one has talent, vs. going for the easier option of for instance becoming a cleaner). Families and communities come into the system, too, as their support would be important for the coming together of such dreams. On the institutional level, then – for instance, in schools – care can be taken to support the pupils' dreams. For example, the pupil may need some individualisation of their curriculum, but the school could also listen to the pupil's specific wishes and also push them to go higher so that there would be no 'settling' for an easier option that could harm the person in the long run. On the societal level of the system, it is then important to ensure that there indeed are genuine opportunities and choices available as regards the schooling of disabled persons. There need to be relevant laws supporting reasonable adjustments in education and also assurance that, after the education has been completed, there will be possibilities for suitable workplace accommodations. The baseline is that the legislation needs to ensure both equal opportunities and sometimes even positive discrimination for disabled people. On the global level, such legislation is devised as international conventions continue to be honed and ratified.

In practice, there will need to be various parts of the system working together, especially in the later years of the educational system as the disabled student is getting ready to face the world of work. The 'part-nexus' making all of this real can involve collaborations between schools, city disability services, vocational training institutes, employment offices, universities and employers alike. Moreover, even if societal and systemic conceptions related to education and the world of work are chiefly not medicalised matters, there will need to be institutions considering disabled people's healthcare needs in relation to their work-related needs also. On the societal level of the system, also other issues related to education and transitioning to work will matter. These are for instance in the area of urban planning (accessibility of roads, buildings,

transport), housing (sufficient inclusive and adapted housing is available in the regions where work is available) and policy cum advocacy (potential disability quotas in employment; state subsidies for assistive devices to be used in study, internships and work; and sufficient enforcement mechanisms for disability rights laws).

Benefits and Challenges related to a Systemic Approach to Disability – and Finding Solutions

The key benefit of the social approach of disability is that it empowers individuals: an individual is not a medical problem but someone with potential, who has been created or 'disabled' by society (see Michailakis 2003: 212). Systemic thinking, as per above, enables people with disabilities to consider new solutions, which then enable them to participate fully in society and promotes both independence and self-determination. Here, key issues range from current international disability-related conventions to how we tend to interpret law and policy today and what kind of ideas and patterns for societal development, labour market workings and ethical models we hold. A systemic approach promotes social cohesion through all parts of the system integrally linking to each other and affecting each other, and this cohesion can then create a sense of societal belonging as well as mutual respect throughout society. Economically, too, the approach makes sense, as it releases the potential of disabled persons towards contributing to the labour market and economy. If more people are able to join the workforce, this lowers the national costs related to the phenomenon of exclusion, for instance in the form of lowered unemployment and perhaps even disability benefits and incapacity pensions, as well as potentially also healthcare expenses.

All of this makes society more resilient and adaptable, as systems working towards inclusion, non-discrimination and right to work are then capable of being flexible in view of the multi-faceted needs of the society of today and tomorrow. An additional benefit is simply taking a fresh approach to disability – experiencing the joy of seeing things differently. There is no need to limit oneself and seeing oneself as a mere diagnosis – individuals are not the same as the labels that their illnesses or disabilities – labels that are supposed to ease classification of conditions in medical registers and pharmacy systems. Indeed, everyone benefits as thinking is adjusted and all members of society, in a sense, give themselves and each other the 'permission' to be more, see more and expect more. (See Michailakis 2003 and Oliver 2013.)

Naturally, progressing towards a new way of thinking will have its challenges. There will still be the barriers of attitudes to overcome, related to older but persistent stigma, biases and misconceptions, inflexible and unsuitable policies, and even discrimination; as well as physical barriers linked to e.g. inaccessibility of workspaces and lack of adaptive tools at work. There can also be gaps between disability agencies and work organisations, as well as inter-agency gaps in service, given that various systemic layers and components, and thus also educational institutions, partnering organisations, and the word of work are linked and interdependent. There could be e.g. disconnects between education in comprehensive school and vocational training – how support to disabled students is organised on their pathway through education and towards employment, and whether for instance employers are happy to consider disabled candidates for work (as they legally should). Such issues need to be resolved between stakeholders in order that fruitful collaboration can be organised. The solution can be seen as being a social and systemic one. The issues and challenges will need to be worked upon through continued education and advocacy – especially on and from the societal level of the system with policy-related and legal capabilities, but also on other levels of the system. For instance, there are still issues in the recognition and support of so-called hidden disabilities (Kulkarni 2022), and this can be considered by the legislator as well as by employers and organisations across the country. Feedback received (for instance via audits, or on the other hand through anonymous surveys or even via research interviews, depending on the case) can help e.g. employers to plan forward. There also needs to be understanding and support for the fact that many disabled people need to work part-time or in other flexible arrangements, and this should be allowed.

Moreover, any system can work better if sufficient resources are allocated to it. Limited resources can, on the other hand, hinder the achievement of inclusive systems, and the situation needs to be tackled through stronger enforcement of disability legislation and careful monitoring systems. Organisations can perceive accommodations made for disabled people as costly, and this situation should be aided by a careful exegesis (e.g. by early education support staff) of how organisations could apply for funding for changes to be made as a disabled person is hired. This then prepares the organisation for societal change. Through suitable targeting of resources, it is then possible to use the assistive technologies that are needed and invest into, say, digital devices and integrate relevant technological support (e.g. assistive technology) into the system to improve accessibility where such devices and services are needed. To overcome these challenges, it may not be enough for national systems to be operating in silos. Countries can learn from each other – either directly (bilaterally, multilaterally etc.) or via international organisations – as regards best practice in legislation, policy, educational systems and support services for work (cf. for instance the International Labour Organization ILO's Global Business and Disability Network – a collaborative platform where companies can share best practices e.g. on disability inclusion within business systems; see ILO n.d.).

Naturally, companies can and need to do this too: there has for instance been Microsoft's Inclusive Hiring Program, which has used systems thinking for change, to achieve targeted pathways used by individuals with autism. These have concentrated on e.g. autistic applicants' unique skills while at the same time adapting the interview processes and team structures so as to accommodate a talented individual (who nevertheless needs particular type of support and care) in the workplace. (Barnett 2018; Mentra 2024.) In this manner, systemic change can be promoted locally, regionally, nationally and globally. Indeed, countries should ideally be aiming to strengthen their policies and seeing to their implementation in view of and for the help of disabled people – and not only within their homelands, but for instance in e.g. developing countries still in the process of carving a longer-term path towards democracy.

It is important to note that few changes could be totally cost-neutral for societies or companies within them. As such, societies or pioneer companies promoting a systemic view of disability may also need clear ways of communication on the benefits of systemic transformation, and certain organisational capacities will need constructing (Ahlqvist et al. 2012). Many research projects have, however, shown that a diverse workforce is good for a company and may promote various beneficial organisational traits, such as an enhanced ability to innovate, and indeed create communities with more psychological safety (Green et al. 2002; Hewlett 2013; Kitterman 2024) To get there, in the words of Ahlqvist et al. (2012: 821), it may be worth companies' developing 'two systemic capacities: partial structural openness enabling flexibility in organisation and an anticipatory culture that builds on an anticipatory agency, that is, a proactive participatory approach that leads to action'. However, diversity by itself is insufficient; there also needs to be a system of learning in place (Ely et al. 2020) – that is, learning that was already emphasised by Checkland in his discussion of soft systems theory forty years previously, as already mentioned (see Checkland 1985).

In the case of making use of and developing a systemic approach of disability, the above approach might involve for instance a company leadership-led development of attitudes ('cognitive schemes' of foresight and change; see Dufva and Ahlqvist 2015) towards disabled people, highlighted and disseminated through internal marketing (the 'agents' of foresight and change; see Dufva and Ahlqvist 2015), thus enabling 'anticipatory agency' to operate within the organisation and make the changes required. The development of anonymous recruitment systems and systems of reasonable adjustment ('strategic objects' of foresight and change; see Dufva and Ahlqvist 2015) can then ensue, creating an anticipatory working culture ('memory objects and metaphors'; see Dufva and Ahlqvist 2015) ready for the contribution of those disabled. Actively working with city/community disability services and employment agencies ('mediating events' of foresight and change; see Dufva and Ahlqvist 2015) can then put into action what has been anticipated. The practical measures needed in preparing this type of new, welcoming agency may require the use of 'fields of foresight, impact assessment and simulation modelling' (Auvinen et al. 2015: 97) so that every department and other instance is aware of what is required. The 'societal embedding' (ibid.) is then

achieved through the iteration of the system – and also through the related legal and policy work completed within society.

Discussion and Concluding Remarks

The systemic approach to disability offers one particular window to consider the phenomenon of disability. Similarly to the social concept of disability, this systems view on disability provides a non-medicalised framework for creating inclusive societies where individual people are appreciated and respected as themselves, and where people with disabilities can thrive. In a sense, the move from a medicalised view of disability to a systemic and social/societal view of disability will certainly involve certain trade-offs (see Jagustović et al. 2019), as emphasis on diagnoses and benefits is gradually moved towards an emphasis of appreciation of uniqueness whereby also non-traditional contributions to society by disabled people, perhaps through part-time and supported work or other contributions, are recognised and celebrated. This seems to be one of the only routes through which ableism – disability prejudice (see Nario-Redmond 2020) – can be tackled in working life, through everyone's unique part that they play in society being noted and encouraged.

The unfolding of a systemic view of disability can be done in various ways and is affected by various factors. As Lundvall (1998: 407) put it, '[l]earning involves four institutional components: the time horizon of the agents, the role of trust, the actual mix of rationality, and the way authority is expressed.' As legislation for instance differs from country to country and so do policies and traditions, it is likely that the systemic view of disability also takes different amounts of time as the iterations of the system turn and learning is completed. Nevertheless, participants to the system – such as policy-makers – can learn from other systems as they play out in other countries or contexts and then apply the learning completed to the optimising or precipitation of the system in their own jurisdictions.

The systems view of disability addresses various interconnected barriers attached to the different parts of the system and also highlight linkages with other systems. As the approach provides a fresh angle to societal issues, it can enhance collaboration across all levels of society. In the context of right to work, the systems approach can help us fix our gazes to the goals offered by international conventions and fundamental law and creatively find new solutions for ensuring those rights, for instance in supporting education leading towards being part of the workforce. The benefits to everyone in society abound – the disabled people can feel good about their achievement and improve their financial situation, and increasing participation to work also helps society in general. As the systems view of disability operates, the difference it makes can be considered as a transition in attitudes and practice that can be cemented in updated policy (see Frantzeskaki and de Haan 2009) – and sometimes changes in policy can also strengthen further changes in attitudes on a journey towards more equality. Indeed, it is possible that if the systems view is taken, policy-making will have a solid base not based in short-term thinking or crises (cf. Fusso 2012: 816), but is going in synchronisation together with changes in attitudes in society.

As such, the systemic approach to disability promotes equity, dignity, and the achievement of rights for people with disabilities. By making use of systems theory, organisations, societies, and even communities and individuals can start to address the multifaceted challenges of disability and work, and ensure the environments that pupils and students encounter enable disabled people to thrive, contribute meaningfully, and achieve equity in the workforce. Whilst this will be no simple system that will somehow 'automatically' work in the same way everywhere, without traps or surprises (Meadows 2009: 166ff), it does in any case provide a framework which offers more equitability and fairness in societal discourses on disability, and indeed more hope for our societies. And in the future, leveraging more technology (such as AI tools for predictive analytics and automation) can be important for creating sustainability and inclusion in the world of work connected to disability. This could make the 'turns' in the systems operate faster and overall, render the systemic and social approaches to disability easier to comprehend, accept and apply by all relevant

stakeholders. Funtowicz and Ravets (1994: 579) have pointed out that 'human civilization, unlike an ordinary complex system, is constantly transforming itself, in a process involving loss and forgetting as well as conservation and change'. Change is possible also in the area of systemic view of disability – but we then also have to accept the transformation involved and be prepared to forget those views, attitudes and approaches that are not useful in view of the overall process.

The basis of success of the systemic approach to disability ultimately will lie in the strengthening of international agreements and monitoring systems in order to make sure there is the same fashion in applying United Nations conventions and other international legislation thoroughly and fairly everywhere through constant development of national law and regulation, as well as of soft law and societal attitudes. This is then about working towards disability rights' genuinely coming to the fore, also in the context of the right to work and inclusive workplaces, for a better future for all.

Bibliography

Official Sources

European Social Charter (ESC). European Treaty Series - No. 163. Strasbourg, 3.V.1996. Council of Europe. Available at: https://rm.coe.int/168007cf93, accessed 30/12/2024.

International Labour Organization (ILO) Convention No. 159 regarding Vocational Rehabilitation and Employment (Disabled Persons), 1983, and its accompanying Recommendation No. 168 Available at: https://www.ilo.org/publications/ilo-vocational-rehabilitation-and-employment-disabled-persons-convention-no, accessed 30/12/2024.

International Labour Organization (ILO) Global Business and Disability Network (n.d.) (PDF download) https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiqiMDm7dWKAxV9Ix-AIHVRUODMQFnoECC0QAQ&url=https%3A%2F%2Fwww.ilo.org%2Fmedia%2F438051%2Fdownload&usg=AOvVaw18ARwzxwop-SaB5aWBodzO&opi=89978449, accessed 30/12/2024.

United Nations (UN) Convention on the Rights of Persons with Disabilities (CRPD) A/RES/61/106, 13 December 2006. Available at: https://social.desa.un.org/issues/disability/crpd/convention-on-the-rights-of-persons-with-disabilities-crpd, accessed 30/12/2024.

United Nations (UN) International Covenant on Economic, Social and Cultural Rights (ICESCR), General Assembly resolution 2200A (XXI), 16 December 1966. Available at: https://www.ohchr.org/sites/default/files/cescr.pdf, accessed 30/12/2024.

United Nations (UN) Universal Declaration of Human Rights (UDHR), UN General Assembly, 10 December 1948. Available at: https://www.ohchr.org/en/human-rights/universal-declaration/translations/english, accessed 30/12/2024.

United Nations (UN) Sustainable Development Goals (SDG 8: Decent Work and Economic Growth). Available at: https://www.un.org/sustainabledevelopment/economic-growth/, accessed 30/12/2024.

Books, Articles and Web Sources

Ahlqvist, T., Halonen, M., Eerola, A., Kivisaari, S., Kohl, J., Koivisto, R., Myllyoja, J. and Wessberg, N. (2012) Systemic transformation, anticipatory culture, and knowledge spaces: Constructing organisational capacities in roadmapping projects at VTT Technical Research Centre of Finland. Technology Analysis & Strategic Management 24(8), September 2012, 821–841.

Auvinen, H., Ruutu, S., Tuominen, A., Ahlqvist, T., Oksanen, J. (2015) Process supporting strategic decision-making in systemic transitions. Technological Forecasting & Social Change 94 (2015), 97–114.

Barnett, N. (2018) Individuals with Autism can bring untapped talent to every business. Microsoft Accessibility Blog. Available at: https://blogs.microsoft.com/accessibility/autismawareness2018/, accessed 30/12/2024.

Checkland, P. (1985) From Optimizing to Learning: A Development of Systems Thinking for the 1990s. Journal of the Operational Research Society 36(9), April 1985, 757–767.

Crenshaw, K. (1989) Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory, and Antiracist Politics. University of Chicago Legal Forum 1, 139–167.

de Haan, J. (2006) How emergence arises. Ecological Complexity 3 (2006), 293–301.

Dufva, M., Ahlqvist, T. (2015) Elements in the construction of future-orientation: A systems view of foresight. Futures 73, October 2015, 112–125.

Dumetz, J., Zanolini, V. and Morgan, C. (2020) Too Much Culturally Aware? When Intercultural Reconciliation Fails in Business: The Case of IKEA in Saudi Arabia (Sept 2020). WIBF (Würzburg International Business Forum) International Business Conference 2020. Available at SSRN: https://ssrn.com/abstract=3843618, accessed 30/12/2024.

Ely, R. J. and Thomas, D. A. (2020) Getting Serious About Diversity: Enough Already with the Business Case. Harvard Business Review 11, November–December 2020.

Frantzeskaki, N. and de Haan, H. (2009) Transitions: Two steps from theory to policy. Futures 41 (2009), 593–606.

Funtowicz, S. and Ravetz, J. R. (1994) Emergent Complex Systems. Futures 26(6), 1994, 568–582.

Fusso, N. (2012) A systems thinking review for solving short-termism. Management Research Review 36(8), 805–822.

Green, K., Lopez, M., Wysocki, A., Kepner, K., Farnsworth, D. and Clark, J. L. (2002) Diversity in the workplace: Benefits, challenges, and the required managerial tools. UF/IFAS Extension 1–3, 2002.

Hewlett, S. A., Marshall, M. and Sherbin, L. (2013) How Diversity Can Drive Innovation. Harvard Business Review 12, December 2013.

Jagustović, R., Zougmoré, R. B., Kessler, A., Ritsema, C. J., Keesstra, S., Reynolds, M. (2019) Contribution of systems thinking and complex adaptive system attributes to sustainable food production: Example from a climate-smart village. Agricultural Systems 171, May 2019, 65–75.

Kitterman, T. (2024) Ally Financial Shares No. 1 Factor to Improve Psychological Safety in the Workplace. Great Places to Work, Blog, 08 January 2024. Available at: https://www.greatplacetowork.com/resources/blog/improve-psychological-safety-ally-financial, accessed 30/12/2024.

Kulkarni, M. (2022) Hiding but hoping to be found: Workplace disclosure dilemmas of individuals with hidden disabilities. Equality, Diversity and Inclusion: An International Journal 41(3), 2022, 491–507.

Lundvall, B.-Å. (1998) Why Study National Systems and National Styles of Innovation? Technology Analysis & Strategic Management 10(4), 1998, 407–421.

Meadows, D. H. (2009) Thinking in Systems: A Primer. Edited by Diana Wright. London and Sterling VA: Earthscan.

Mentra (2024) Why Every Neurodivergent Should Want to Work at Microsoft: A Leader in Inclusive Hiring. Available at: https://www.mentra.com/post/why-every-neurodivergent-should-want-to-work-at-microsoft-a-leader-in-inclusive-hiring, accessed 30/12/2024.

Michailakis, D. (2003) The Systems Theory Concept of Disability: One is not born a disabled person, one is observed to be one. Disability & Society 18(2), 209–229.

Nario-Redmond M. R. (2020) Ableism: The Causes and Consequences of Disability Prejudice. Hoboken, NJ: John Wiley & Sons.

Oliver, M. (2013) The social model of disability: thirty years on. Disability & Society 28(7), 1024–1026.

Zevallos, Z. (2011) What is Otherness? The Other Sociologist. Available at: https://othersociologist.com/otherness-resources/, accessed 30/12/2024.

Elevating Conscious Thinking beyond Conventional Intelligence: A Journey from Juvenility to Maturity

Zainab Yasin

Turku School of Economics, University of Turku

Introduction

She didn't invite me to her party; she doesn't like me.

I wonder if she is stressed out or occupied because she forgot to invite me on her party. How would it impact our friendship in a longer run?

These two statements capture the essence of systems thinking and contemplate the salient difference between linear thinking and systems thinking. In this paper, I have associated linear thinking with juvenile behavior, and systems thinking with mature behavior. The following explanation provides the rationale behind this. Linear thinking often reflects a scapegoat attitude, premature judgment, and one-dimensional approach towards problem-solving – similar to how an immature person would react to a situation. The outcome in such thinking is predicable – limiting alternative ways to the future interpretation. Meanwhile, systems thinking resonates holistic and introspective approach to a challenge, taking into consideration the root causes as well as the patterns of communication prior to presenting a judgment – similar to the mature conduct of affairs. Moreover, the latter thinking steps beyond intelligence into the consciousness realm, which emphasizes on contributing to the system while remaining within the system and not treating it as an outsider. In simpler terms, it adds to the prevailing conception of "my world" and extends to include the notion of "other's world". And much like a mature outlook, it focuses on 'what lies ahead?'.

I illustrate the step-by-step workflow of my analysis using a case study centered at increasing loneliness among elderly people in Finland. The daunting challenge of isolation among elderly people is interpreted vis-à-vis four feedback loops models comprising of both, intelligence – plans and actions, and consciousness – principles and intention, and their interaction with reality. The paper also brings to light the consequences of our current actions and future patterns. In order to delve into the future world and undergo a systemic transition, it is crucial to address root causes, identify patterns, analyze unpredictability, and explore various variables that affect this particular segment of the society. Additionally, it requires a profound analysis across nuanced levels including shifts in policies and wide-held practices.

Feedback Loop Model: Making Connections with the Future

Loneliness – the word which might seem lightweight but holds a profound depth. It is not a choice rather a subjective and complex state where people perceive an inconsistency between desired and actual social connections. Loneliness is a prevalent issue in Finland and transcends the geographical boundaries. According to one research, one in five Finns, and one in three elderly people experience loneliness (Cross, 2021). The issue of loneliness has been related to adverse health outcomes – both mental and physical – encompassing cognitive decline, chronic illnesses, and even mortality (Dahlberg, et al., 2022).

The figure 1. analyses loneliness among older population vis-à-vis feedback loop model.

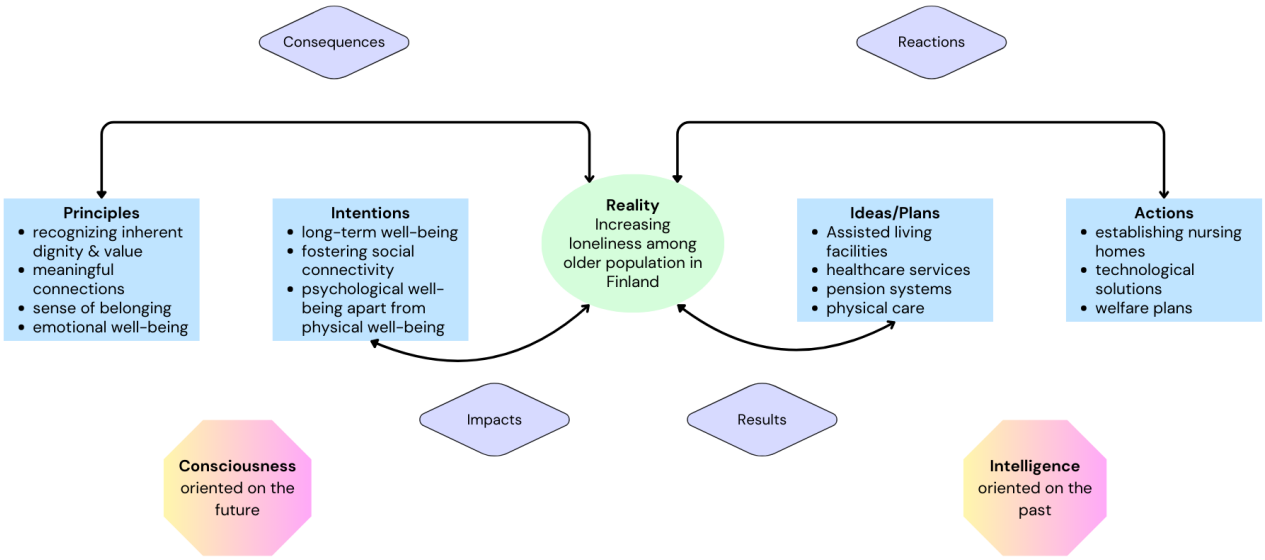


Figure 1. *Loneliness among older population vis-à-vis feedback loop model.*

Foreseeing consequences

There is an increase in the loneliness level of elderly people,
it is because they prefer to be alone.

The rise in the loneliness level of elderly people is linked to multiple underlying factors.
Where is this issue heading towards?

In linear thinking, the stress would primarily be on taking immediate actions and making short-term plans, similar to a non-serious person's behavior. But to look at a problem from the lens of systems thinking, the task would not just be to dig deeper into the root cause, but also to examine the future patterns, like a sensible person would do.

In order to step into consciousness, making connections with future is a pre-requisite. It is crucial to pay attention to what the future will receive. And to proceed towards a better future, present ideas, plans and actions need to be shaped accordingly. The challenge of loneliness among elderly is dealt majorly by relying upon intelligence, which limits the role of emotions, empathy and sympathetic introspection in problem-solving. Meanwhile, consciousness evokes aspects of intentions and principles – it foresees the consequences and impacts of an action.

Did the Godfather of artificial intelligence considered its potential consequences with differing degrees of foresight? For him it was an accident born out of a failure while he only dreamt of simulating a neural network on a computer (Hinton, 2023). Also, the innovators of plastic, DDT pesticides, and fast food etc. did not think of the consequences of their actions, they did not make the future aware of it.

To interpret the underlying behaviors of the actions and plans, systems level analysis is carried out. The systems approach has laid an important ground for both transition studies and futures studies, by exploring the manifold interactions and linkages of a phenomenon rather than just emphasizing on its reductionist core. Huutoniemi and Willamo call this approach "looking outside" (Huutoniemi, 2014). The section below interprets the challenge of loneliness among elderly people in Finland by analyzing the patterns and determinants in depth. It carries out a systems levels approach to explore the actions and plans of today.

Current Patterns and Determinants: The Systems Level Analysis

The world we live in today encompasses complexities and complications at every level. Responding to these complexities and challenges requires a systemic level analysis (Auvinen, et al., 2015). The feeling of isolation among older adults is also influenced by a complex interplay of political, social, demographic, economic and cultural factors. This section unfolds the current patterns and determinants of loneliness among the elder population of Finland, while giving a hint of Nordic region as a whole.

The systems level analysis of the mounting loneliness among elder people requires interpretation of **governmental** policies including workforce policies – extensive working hours causing distances among the family members; healthcare policies – exclusive of holistic health needs; housing policies – pressure-buildup in the younger generation to leave their parents' house at an early age due to high housing costs; and institutionalization – attractive incentives for people to leave their parents in the nursing and old homes. Such governmental level actions overlook the negative consequences, while simultaneously being beneficial under some aspects.

Moreover, **social demographics** like gender, marital status, support networks, and household composition could also uniquely effect the prevalence of loneliness among residents (Reine, et al., 2024). The **economic** factors, like employment, income, pension, and funding, also shape the feeling of isolation in the old at-risk people. The following data illustrates loneliness percentage in the Nordic region across age, gender and marital status dimensions:

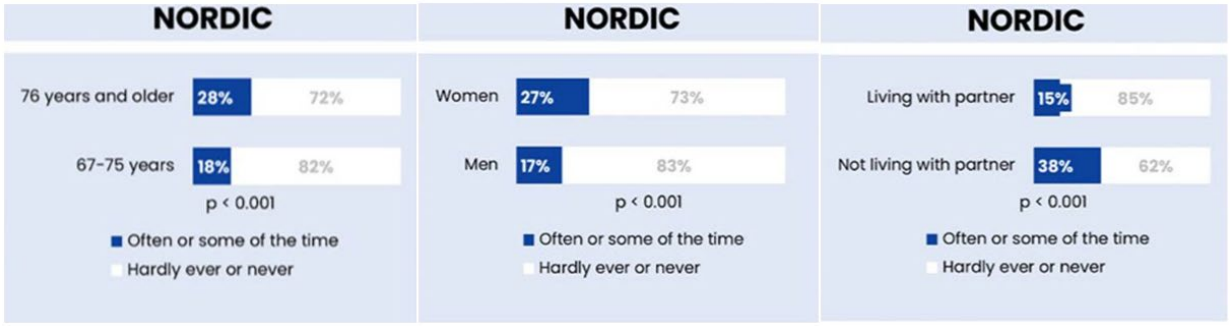


Figure 2. *The loneliness percentage in the Nordic region across age, gender and marital status dimensions. Source:* https://pmc.ncbi.nlm.nih.gov/articles/PMC11071080/figure/fig1/

Last but not the least, the **welfare regime** in a country has a notable impact on loneliness levels. The home care services provided to the elder are sometimes not satisfactory. 23 per cent of elders receiving formal home care experience loneliness and over 20 per cent are not satisfied with the help and support they receive (Ristolainen, et al., 2024).

In Finland and other Nordic regions, less reliance on own individual resources is the primary mode of loneliness eradication, in comparison to other regions, where strong family and social ties can help tackle the issue of loneliness (Reine, et al., 2024). Nevertheless, it is partly true that all of the Nordic region's elderly people would agree to this. For instance, in Finland, Sweden and Denmark, emotional support scarcity leads to loneliness, meaning the older people do require emotional support from their family despite being self-sufficient due to the facilities being provided by the welfare regimes. The **cultural landscape** of Nordic region plays a significant role in this context. Cultural norms and values are highly centered on the notion of individualism, independence and privacy matters – which can shape the individual experiences of loneliness among the residents.

Stereotypes, Narrative Building, and Discourse Analysis

Stereotypes and negative discourse dissemination are the contagious underlying causes of most of the problems we deal with in today's world, including the challenge of mounting sense of loneliness among older population. Stereotypes exert social pressure on folks to conform to a certain behavior in order to get acknowledgment in the society. It is a contagious disease.

There are multiple stereotypes embedded in the Finnish culture – Finns are shy, Finns are introvert, Finns are reserved. To put it simply, just don't talk to Finns. To support this own criticism of mine, who is not like that when you first meet them? Everybody I think, or maybe most of the people. Finns grow up listening to such narratives, and these partially applicable narratives transform into a reality or fact. And then these imposed facts prompt a vast number of individuals to act in a certain way to get their society's approval. I have even heard someone say, you are loud and out-spoken, are you even a Finn? Well, the harsh reality is that these narratives are being taught at an educational level. Unfortunately, this was the first lesson I learned in my Finnish class which confined me in every possible way.

The problem with the negative discourse dissemination is that it is double sided; it not only impacts the individuals whom the narrative is about, but it also contaminates the minds of the people who are exposed to it. It is like, you don't want to be approached, and no one wants to approach you. This way a comfort zone is built, and stepping out of it would be considered objectionable. I believe that the Finnish stereotypes are one of the major causes of the rising loneliness level, not only among the older but also younger generation. The sense of individualism can also be slightly touched upon in a way that approaching an old person with a bag of groceries would hurt this notion of theirs. If the world is exposed to these stereotypes, progress to solve this and many other issues, cannot be made.

Future Patterns: Technology is a Boon and Bane

Although a major part of conscious thinking has been touched upon in the above sections, but this section explores the future possibilities of eradicating loneliness by delving into the technological sphere. Reason for highlighting it separately is because I am a techno-optimist, and putting technology under the root causes of this problem wouldn't do justice to it.

Contemporarily, the decision-making does not adequately consider the concept of technology as both, a boon and a bane. Meaning, technological advancement has been either fully criticized or supported in most cases. but this section tries to look out for a middle ground. It wouldn't be wrong to admit that technology has created distance among individuals by reducing face-to-face interactions. But it also wouldn't be wrong to claim that it has bridged distances by connecting people from across the world. If there is a portion of elderly people who do not feel lonely, one of the reasons could be that they are connected with their loved ones via internet. It depends on us individuals whether we prefer to benefit from technology or become its slave.

Moreover, the developing technologies like Aging and Assisted Living Technologies (AALT) – encompassing technologies like life alert, pillpack, and lively mobile plus – would provide cognitive assistance, social communication, and monitoring, and thus provide a 'home' for elderly people (Horgas & Abowd, 2004). At last, it is important to acknowledge that the rapidly changing dynamics of technology are tough to interpret and there is a dire need to think one step ahead.

Conclusion

In this paper, the daunting challenge of loneliness among elder people of Finland is analyzed systematically across political, social, economic, and cultural dimensions. Despite examining these domains separately, it is crucial to acknowledge that these are all interconnected, and there could be other domains which might also contribute to the exclusion of elderly. The four feedback loop model is used to highlight the negligence towards ‘consequences’ and ‘impacts’ of our current actions and plans. Stereotypes and narrative building are discussed as one of the underlying causes of this challenge considering my personal observations so far. Significantly, the metaphor of juvenility as linear thinking and maturity as systems thinking is drawn considering the bizarre similarities among these. The motive is to step beyond intelligence and emphasize on consciousness and future patterns. Future research endeavors should delve into the longitudinal studies to interpret the causal relationships of loneliness among the elderly people.

References

Auvinen, H. et al., 2015. Process supporting strategic decision-making in systemic transitions. Elsevier: Technological Forecasting & Social Change, Volume 94, pp. 97–114.

Cross, F. R., 2021. Loneliness feels like being invisible. [Online] Available at: https://www.redcross.fi/become-a-volunteer/friend-activities/what-is-loneliness/#:~:text=Up%20to%20one%20in%20three,from%20getting%20to%20other%20people. [Accessed 27 October 2024].

Dahlberg, L., McKee, K. J. & Rehnberg, J., 2022. A social exclusion perspective on loneliness in older adults in the Nordic countries. European Journal of Ageing, Volume 19, pp. 175–188.

Hinton, G., 2023. Godfather of AI" Geoffrey Hinton: The 60 Minutes Interview [Interview] (09 October 2023).

Horgas, A. & Abowd, G., 2004. The Impact of Technology on Living Environments for Older Adults. In: Technology for Adaptive Aging. s.l.: National Research Council (US) Steering Committee for the Workshop on Technology for Adaptive Aging.

Huutoniemi, K., 2014. Thinking outward: Heuristics for systemic understanding of environmental problems. University of Helsinki.

Reine, I. et al., 2024. Loneliness in the Baltic-Nordic Region. In: Determinants of Loneliness. s.l.:IntechOpen, p. 122.

Reine, I. et al., 2024. Unraveling the dynamics of loneliness in the Baltic-Nordic region: a comparative analysis in the wake of COVID-19. Front Public Health.

Ristolainen, H., Tiilikainen, E. & Forma, L., 2024. Social exclusion among older people receiving formal home care services in Finland: prevalence and associated factors. Bristol University Press, pp. 1–26.

FUTUS1 Ethics of Futures Studies

Ethics of Futures Studies (5 cr) is one of the compulsory core courses in the Master's Degree Programme in Futures Studies. The aim of the course is to contend with ethical issues related to work as a futures practitioner, both within and outside academia. The course assignments have two focus areas: understanding the ethical responsibilities of a futurist; and evaluating ethical dimensions of possible future developments. A compulsory ethics course is especially important in a futures studies programme because the field is usually considered value-rational by nature. Alternative futures cannot be studied without involving – and examining – one's own values and ethical judgments.

The course emphasises ethical discussions on relevant topics, including both general ethical considerations in futures work and ethical issues in substance areas, such as the potential consequences of developing specific technologies. The course begins with principles of research integrity and research ethics established by the Finnish National Board of Research Integrity (TENK) and continues by considering the value basis of futures studies in relation to contemporary issues and debates. Students take part in interactive seminar discussions and complete a group work assignment in addition to writing a short essay. The primary learning outcomes are awareness of the breadth and depth of ethical issues in futures studies and of the resources and tools that can help the students to deal with them.

The teachers of the course were Senior University Lecturer, Adjunct Professor **Katriina Siivonen** and Doctoral Researcher **Morgan Shaw**.

Dewina Leuschner has chosen an interesting theme about children's participation in decision making processes, and developed an insightful perspective on it in her discussion in the essay. She has narrowed down her research question well and carried out a thorough discussion of the theme in her own voice throughout the whole text, with clear argumentation. Ethical standpoints are well presented, and Dewina gives well-considered answers to her questions. Some additional references to futures studies literature and ethical discussion in relation to it would have further increased the strength of the essay.

Emilia Rieger's essay focuses on how to contend with potential harms stemming from the content moderation policies of social media platforms. Beyond producing an especially well-structured text with clear argumentation, Emilia has made effective use of a care ethics perspective to deepen her analysis of this issue. The essay concludes with the clever and creative choice to encapsulate the main points in a direct message to Meta Platforms CEO Mark Zuckerberg.

Ready, Set, Don't Go – Is it the Child or the Adult Who is Not Ready Yet for Children to Participate in Decision-Making Processes?

Dewina Leuschner

Turku School of Economics, University of Turku

Introduction

Young people should have a range of opportunities for meaningful participation and decision-making influence within the systems and institutions that affect them. (Blakeslee & Walker, 2018, p.1)

From an early age on, many children around the world spend a lot of their time in educational institutions. It starts with kindergarten, pre-school, school and maybe university. While it is therefore unarguable that those educational institutions affect them, they have little to no power to impact decision-making within those institutions or about the educational system on a national and international level. Children cannot decide what and how they learn at school and definitely not if they even want to commit their time to their education. The decisions are, with few exceptions, made by adults. Parents, teachers, principals, school boards and politicians. Therefore, it can be said that while children are the group most affected by the educational system and its institutions, their influence is limited.

The United Nations Convention on the Rights of the Child (UNCRC) states in Article 12 and Article 13 that the views of the child should be heard and considered and that children have the right to seek information, form an opinion and express it in all kinds of ways (United Nations High Commissioner for Human Rights, 1989). It is therefore more than just some scientists understanding of right and wrong that children should be able to participate in the decision-making processes that form their lives. It is required by a UN convention that was accepted by most of its members. However, neither the articles of the convention, nor the moral statements of scientists are that easy to translate into behavioral standards and practice. This essay will therefore address the question "should children participate in future decision-making processes about the education they receive and what role should the voice of the child play?"

Whether or not children are involved in decision-making impacts their development and learning of democratic skills, the quality of the decisions made and the overall involvement of the civil society in organization. We all have been children and all those who are children right now, even if they are not entitled to make decisions today, will make the decisions for our whole society tomorrow, which makes it utterly important to understand the consequences and responsibilities that are connected to the (not) participation of children in decision-making processes.

In the context of this essay, the term 'child' refers to all people below the age of 18. Participation, based on Hart's (1992) and Juliussen et al.'s (2023) definition describes a process of shared decision-making between children and adults and the meaningful involvement of children in questions that impact their lives.

The Voice of Children and Who Should Listen

While there is a growing desire to involve children in policy making and structural decisions concerning their lives, there is still debate about the degree of involvement, the role of children and the level of power they should have. One reason for that is a lack of understanding especially regarding the effects of children involvement on the quality of the decisions made. Besides that, there are different evaluations about the ability and therefore role children can play in our society.

Children – the not yet Ready Human

In any decision-making process there are different perspectives to consider, which weigh differently. When assessing them, Brighouse (2003) differentiates between authoritative views and consultative views. Authoritative views are views that "must be taken as defining the person's interests for the purpose of decision making." (Brighouse, 2003, p.692). While these views are guiding decision making, a person's authoritative view does not always lead to the decision being made in accordance. In an election, the individuals vote can be seen as an authoritative view, however, if the majority votes differently it can overrule other individually authoritative views. A consultative view on the other hand describes a view expressed by a person that can be taken into consideration but has by no means any right to result in the final decision.

In Brighouse's (2003) opinion, the view of children should be understood as nothing more than consultative, even if the same view expressed by an adult would be seen as authoritative. He clearly states that children have welfare rights but no agency rights, which will only change once they grow up. In the context of decision making in education, that would mean that children can be asked for their opinion, but there is no obligation to follow it. At its core, Brighouse (2003) bases this opinion on three reasons:

1. His interpretation of the UNCRC is that children have a right to share their voice, not for it to have a meaningful impact. Brighouse (2003) states that Article 12 grants children certain rights to express their views, however, in his understanding it is wrong to derive from that any claim for these views to be authoritative.

2. Children lack the abilities and skills needed to make decisions that are essentially good for themselves and their surroundings. This also shows in the fact that children depend on their parents or any other adult for their own well-being as they cannot yet understand the consequences and connections of their decisions. Children are special in comparison to other dependent groups of our society as they will at one point outgrow this dependency but until then should remain under the decision-making of their legal guardians. While Brighouse (2003) admits that some children may have the needed skills, he thinks an age limit for participation is needed to ensure that what he assumes to be the majority that does not yet have the skills does not get the power of an authoritative view. However, he supports the idea that children should learn in a safe environment and therefore understands it as a responsibility of any legal guardian to regularly expose their children to situations in which they can train their decision-making skills.

3. Children lack future awareness. For most children, the immediate interests are more important and easier graspable than any possible future interests which results in conflicts between them. Children are unable to understand these conflicts as they do not yet understand the impact of their decision on a future that for them is even more blurry than for most adults. As a result, children set their foci different and sometimes do not set them according to their actual needs but according to present desires.

For the context of decision-making in the educational system this assessment would mean that children may be invited to share their opinion but are not seen as participants in any decision-making processes. Brighouse (2003) understands children as "not yet ready" humans that need to develop certain skills and understandings before they can be entrusted with more powerful participation roles that allow them to enact influence upon the structures they live in.

Adults – the not yet Ready Human

In most areas of social life, it is commonly accepted that those affected by a decision should be involved or at least considered. In management, this is called stakeholder awareness and management. As children are the biggest social group connected to education, one could argue that they are the main stakeholders in education and therefore definitely should participate in decision-making processes. Several researchers clearly state that they should and can. Tisdall (2008) understands children as underestimated in this regard and says:

"Writers affiliated with the 'sociology of childhood' have argued for perceiving children as agents (…). They have demonstrated how traditional conceptualisations of childhood – and particularly conceptualisations from Northern countries – frequently failed to recognize children's agency and instead placed them solely in passive and dependent positions, requiring protection and provision but certainly not participation." (Tisdall, 2008, p.420)

Wyness (2001) also supports the participation of children in decision-making processes and bases this on a different understanding of the UNCRC than Brighouse (2003) presents. While they agree that children in general do not per se have political rights, they understand Article 12 as the obligation for authorities, parents and other decision-making adults to assess the ability of every child individually and with respect to their ability include their opinion in the decision-making process in a meaningful way. For that, children have the right to gain information and form social groups.

The claim that children should participate in decision-making processes, especially in cases when their lives are affected is not only based on the right of the child to be heard but there are at core three positive outcomes that can result from such participation.

First, the participation of children in decision-making processes ensures that their interests are met which ultimately leads to a higher quality (Brighouse, 2003) and legitimacy (Tisdall, 2008) in decisions made on all levels. The participation of children can help adults to gain a more wholistic understanding of a situation and generates important information (Juliussen et al., 2023) that can lead to more effective and responsive services (Cavet & Sloper, 2004).

Second, through the participation in decision-making processes, especially when children are connected to the outcomes, they learn important skills that enable them to be active participants of democratic societies. Skills that can be developed through active participation include general leadership and problem-solving efficacy (Blakeslee & Walker, 2018). Hart (1992) especially argues that it is unrealistic to expect children to be able to participate in decision-making once they have reached a certain age and therefore claims that they need to learn participation in real-life situations that affect their realities. If this is done, it will according to them also enhance social competence and responsibility in children and help them develop political self-determination. Hart says:

"Participation is an important antidote to traditional educational practice which runs the risk of leaving youth alienated and open to manipulation. Through genuine participation in projects, which involve solutions to real problems, young people develop the skills of critical reflection and comparison of perspectives which are essential to the self-determination of political beliefs. The benefit is two-fold: to the self-realization of the child and to the democratization of society." (Hart, 1992, p.36)

Participation can also have a positive impact on the psychological and health development of children. It therefore has an overall positive impact on their development (Cavet & Sloper, 2004).

The third and last reason why the participation of children is beneficial is a direct consequence from the second one, namely that it increases overall engagement. If children learn how to participate and are empowered to do so, it results in more children being actively engaged in different kinds of projects and organizations (Blakeslee & Walker, 2018). Hart (1992) further states that this supports general community development as children learn through positive experiences how they can organize and work in their own interest.

In the context of decision-making in education, this would mean that children can and should actively and meaningfully participate in the decision-making processes. This results from an understanding of children as important stakeholders, informants and sources of knowledge, who can improve the decisions made by filling the gap of what adults may lack. Early on participation in contexts that affect them also helps children to acquire the skills needed to participate in a democratic society and the education system, as something

that every child goes through, could serve as a great place to learn in a save and guided, yet real environment.

Discussion

The literature answers the question whether children should participate in decision-making processes regarding their education in two different ways: Either the child is not ready yet to participate or the adult is not ready yet to collaborate. This can be derived from the fact that so many researchers speak in favor of the participation while in practice it is still at best a weak signal. Research tells us the positive effects participation has on children, however, there is only limited scientific background on how this participation also leads to higher quality in the decisions made (Cavet & Sloper, 2004). There are some claims that adults would need to understand children as valuable resources and this mindset shift would lead to improved decision making (Blakeslee & Walker, 2018) or that the competence of children is undervalued (Hart, 1992). Wyness (2001) explains the problem as an understanding of the political child as the “unchild” because it does not fit the typical image of children. They argue that it is important to not only assess the needs of children as if that was something that can be done solely from the outside perspective but also their interests which is the first step in understanding children as advocates for themselves.

For children to actively, meaningfully and safely participate in decision-making processes, some realities would need to change. Tisdall (2008) for example warns about the risk of participation of children being implemented when it fits the needs of an adult but with no honest interest in the views of the children. Hart (1992) therefore argues that as a basic condition it is necessary to reflect on power dynamics to create an awareness and an environment that allows for true participation that goes beyond using the presence of children for the own agenda.

Several researchers draw a connection between the participation of children and a general change in how decisions are made. Children have different skills and styles of communication and that make it necessary to adapt the methods and rooms of decision making to maximize the ability of children to meaningfully share their views (Hart, 1992).

Overall, children may not (always) be able to participate in classical decision-making processes the way they are now as they are specifically designed for the skills and preferences of adults. However, that does not mean that in the future children should not participate in decision-making processes in education and all other fields that concern them. Children do have the ability to share their views and collaborate with adults in meaningful ways which researchers agree would not only be beneficial for the learning process of the child but also for the quality of the decisions made. Therefore, rooms need to be adapted, and adults trained for this collaborative decision making to be successful for all stakeholders, children and adult.

Conclusion

Whether someone thinks children should participate in decision-making processes about their education or not seems to depend on their understanding of who needs to change to allow for this participation to be meaningful. There is not really a scientific voice saying they should not or do not have the right to, however, there are voices saying children are not ready yet. I would argue that a child deserves to be heard and as the child cannot speed up the process of growing up, the adult needs to bow down. Adults could wait for children to grow up and participate in decision-making processes on education and any other matter but then there will still only be the view of adults. The perspective of children would be lost. But it does not have to be and more importantly it should not because children have the legal and ethical right to participate in all decisions that affect their lives, which includes their education. Children have knowledge and expertise, especially when it comes to their realities and therefore should be considered as experts. In a future that grants children this right to participate, structures of decision making need to change, adults need to unlearn and relearn and certain fixed mindsets need to be overcome on both sides to overcome the barrier

between childhood and adulthood. And maybe letting go of some of our belief systems to allow some of theirs would actually not result in a change for worse but for better. Better for the children, the society and the world. Because in the end, it is not just the obligation of the adults towards the children to make an effort in listening. It is an obligation to our future as a society.

References

Blakeslee, J. E. & Walker, J. S. (2018). Assessing the Meaningful Inclusion of Youth Voice in Policy and Practice: State of the Science. Portland, OR: Research and Training Center for Pathways to Positive Futures, Portland State University.

Brighouse, H. (2003). How should children be heard. Arizona Law Review, 45(3), 691–712

Cavet, J., & Sloper, P. (2004). The participation of children and young people in decisions about UK service development. Child Care Health and Development, 30(6), 613–621. https://doi.org/10.1111/j.1365-2214.2004.00470.x.

Hart, R. A. (1992). Children's Participation: From Tokenism to Citizenship. Innocenti Essays, 4. https://eric.ed.gov/?id=ED359090.

Juliussen, A. K., Garmy, P., & Olsson, A. (2023). Political representatives' experiences of child participation in decision-making processes: A qualitative interview study. Children & Society, 38(4), 1095–1112. https://doi.org/10.1111/chso.12786.

Tisdall, K. M. (2008). Is the Honeymoon Over? Children and Young People's Participation in Public Decision-Making. The International Journal of Children S Rights, 16(3), 419–429. https://doi.org/10.1163/157181808x311240.

United Nations High Commissioner for Human Rights. (1989). Convention on the Rights of the Child. Office of the United Nations High Commissioner for Human Rights, Geneva, Switzerland. https://www.ohchr.org/sites/default/files/crc.pdf.

Wyness, M. (2001). Children, childhood and political participation: case studies of young people's councils. International Journal of Children's Rights, 9(3), 193-212.

Free Speech Versus Protection from Harm – Ethical Considerations About Evolving Content Moderation Policies on Social Media

Emilia Rieger

Turku School of Economics, University of Turku

Introduction

> *"We are going to simplify our content policies and get rid of a bunch of restrictions on topics like gender and immigration that are just out of touch with mainstream discourse" (@zuck, 2025).*

On the 7th of January 2025, Mark Zuckerberg posted a video on Instagram explaining new policies for Meta platforms, with the goal of ensuring "free expression". This includes less fact-checking, fewer restrictions, higher thresholds for content to be taken down and more community-based content moderation (@zuck, 2025). I will present in the next section, what exactly his plan included. However, I want to emphasize here how much power lies in the hands of platforms like Facebook and Instagram. That smartphones are a part of our everyday lives is evident at this point. However, social media no longer is just a place to connect socially, but it is a space that is slowly replacing high-quality journalism and enables people to spread their ideas and information without the professional ethical considerations a journalist has (Crilley & Gillespie, 2019). I would also argue that the role of social media in the future is not to be underestimated, as especially young generations show the highest use of the platforms at the moment (Policy Department for Citizens' Rights and Constitutional Affairs, 2023), and will be the one's shaping the world in the future. Additionally, social media enabled extremely one-sided groups to grow quickly online, groups that often create violence and harm and can now easily spread misinformation which in turn contributes to sexism, racism, xenophobia and a decline of trust in the media (Crilley & Gillespie, 2019). So, while social media was already considered a challenging tool in 2019, with Meta decreasing its regulations in 2025 new questions arise. I will focus on the following one in this essay: Should more platform regulation be put into the hands of the community to ensure long term free expression? At first, it might seem quite democratic, but it will also lead to more hate speech and harm, which also Zuckerberg confirms (Duffy, 2025). So, if people affected mostly by hate lose their space to speak their opinions as it is not safe for them to share them, can this be called an act to ensure free expression or will it solely open the doors for more harm for the most vulnerable people in the future?

I will discuss this question from a rather clear ethical stance while also showing possible challenges when it comes to connecting ethics and platform regulation. First of all, I will explain the announced changes in platform regulation from Meta in more detail, then I will discuss Howard's (2024) work which targets platform regulation from the angle of moral responsibility of the platforms. From there, I will move on to the ethics of care and demonstrate why platforms have an ethical responsibility to care for their users even though relationships between users and platforms are not as evident as for example between friends.

Meta Wants to Make «Fewer Mistakes»

The average time spent on social media was at 143 minutes per day in 2024 (Statista, 2024). Social media is a part of many people's lives and also acts as a source of information. An important question here is who provides this information and what information is spread most. Meta is one of the most prominent social media platform owners on the market and announced to loosen their fact-check regulation early this

year (Duffy, 2025). Mark Zuckerberg says they want to make “fewer mistakes”, as in the past too much content has been taken down which should not have been (@zuck, 2025).

While Meta argues their new regulations would be a step towards more freedom of speech and would lead to less bias on what will stay on the platform and what not, it is a crucial danger concerning hate speech, violence and especially marginalized groups are threatened by that (Duffy, 2025). The new regulation concept of Meta points in a similar direction to what X has introduced when Elon Musk bought it: Community-driven platform regulation, which means that content which gets reported enough times by social media users might get taken down from the platform. @zuck (2025) also announced, that the threshold for something to be taken down will be set much higher, Meta’s filters will only prohibit illegal and openly violent content, and other harmful content will be only taken down if people will report it. Additionally, this number was also altered, meaning more people have to report something before it gets taken down, which also means more people will see harmful content.

Other than that @zuck (2025) has announced more measures, like getting rid of their fact checkers and relying on community notes, which will allow more misinformation to spread. Meta’s argumentation is that the fact-checkers were too politically biased. A few sentences later however @zuck (2025) explains that they moved content moderation teams within the USA from California to Texas, also because they were too biased in California. Last but not least, as seen in the introduction of this essay @zuck (2025) also promised to get rid of restrictions on topics like immigration and gender, as he wants everyone to have a space online where they can express opinions. For me, it seems absurd to even have to argue against these new policies from Meta on an ethical and academic level, as it allows hate and violence to become opinions. Considering how positive the reactions were to his videos and gazing onto world politics, and “mainstream discourse” as Mark Zuckerberg calls it in his video, I think it is valuable and crucial to tackle the question of whether it is ethical to put the platform regulation into the hands of the community while knowing it will hurt others. Do platforms not have a responsibility towards their users and their peaceful experiences on their platforms, especially towards users who belong to minorities?

The Ethics of It All: Freedom for Whom?

Why Are Platforms Ethically Obliged to Moderate Content?

Howard (2024) has written an argumentation exactly about that question while also discussing the aspect of free speech. Platforms have a moral responsibility to engage in content moderation of wrongful speech, which Howard (2024) defines as an umbrella term for speech including misinformation, violence and harm. His first argument relies on the basis of an ethical duty to defend others from wrongful harm and not causing or contributing to such harm. While one might argue that social media platforms are not publishers and thus cannot be seen as morally responsible for the content posted on the platforms, social media platforms can still be seen as corporate agents, who have moral duties (Howard, 2024). Other than that, the platforms become complicit in the speech on their platforms, by providing a space where wrongs can be committed. Especially, as we have heard that there is a clear awareness for example Mark Zuckerberg knows that community content moderation will lead to more harmful content on his platforms (Duffy, 2025). How can it be ethically acceptable to be fully aware of this issue and even communicate it in public but decide it is not in their hands anymore? Of course, reducing the complicity of the platforms to zero seems impossible at this point, as social media platforms are built to be community-centred and harmful ideas and opinions are a cruel reality we cannot ignore, and censorship can reach vast extents. The issue here is also that different people have different views on what should be censored and what not. Going deep into this question would extend the boundaries of this essay. But I emphasize again, that no matter what people online can say or cannot say, platforms have to be aware of the power of the space they are providing, and while it can be a valuable space to express opinions, form connections and mobilize for just ends, it can also have substantial negative impacts on people’s lives. Howard (2024) argues that as agents they have to

find a balance between enabling beneficial communicative interests while also reducing the likelihood that wrongdoing is occurring on their platform. Meta and Zuckerberg have chosen to ignore the latter and as they call it get rid of “political bias” and censorship of people’s opinions that include different ideas (Duffy, 2025). At this point, I want to include the question that caring ethics poses: Who benefits? Who is left out?

The Hidden Relationship Between Platforms and Users

Who benefits if so-called different ideas can be posted and seen online? Crilley & Gillespie (2019) argued that social media enabled extreme groups to grow quickly online and create violence and hatred. The simple conclusion here is, that while everyone might be able to post more freely, which can benefit everyone, the groups of people who create violence against marginalized groups profit the most, as they get a bigger stage, a bigger audience and fewer restrictions. While on the receiving end, the affected persons might get a bigger stage, but also get much more harm and additionally might get suppressed by the algorithms (Noble, 2020). So, is it fair and ethically right to ensure free expression in this way? Do platforms not have the ethical responsibility to care for their users?

Social media platforms are full of connections, communities and also relationships. This is why I chose to tackle this question from a care ethics perspective. In close relationships, we as humans most often naturally care. Like for example mothers care about their children and taking care of them comes to them mostly naturally (Noddings, 2013). However, when this natural care is not a given, care ethics suggests that ethical caring in contrast to natural caring requires more effort and commitment to the situation. So, in the example of minorities on social media, the people affected mostly by harm are the ones to be cared for ethically speaking. Who are the ones who should care for them? In my opinion, it is the platform as well as the other users. As it seems that both of these instances do not have the natural caring instinct when it comes to profiles online, ethical caring would be highly needed. The issue one might see here is that the relationships between the different parties are well estranged. Profiles are often anonymous, and relationships might be one-sided online between users. When we add the platforms into the equation, we can detect that there is a relationship between users and platforms, because as said before users spend a lot of time on these platforms every day, and the relationship is ongoing. Additionally, users might post personal experiences online and Meta collects private data of all their users, which makes the two parties linked closely. This also points towards a power imbalance in this relationship, which shows who is supposed to care (the platforms) and who is to be cared for (the users). Nonetheless, platforms completely distance themselves from the users when it comes to questions of protective relationships. While we as users see the platform as something big and impersonal, the platforms seem to have the same understanding towards the users. However, behind every user, if we exclude bots and trolls there are real human beings, and also behind these platforms and their rules and regulations, there are again real people. If we become aware of this simple fact, we should realize that we are definitely ethically obliged to care, especially for marginalized groups on social media. Noddings (2013) confirms that we are obliged to care when there is a relation or a connection between the one who is caring and the one who needs care. Additionally, we are obliged to care when we are aware of the situation that someone needs care and we are capable of caring. As stated above Mark Zuckerberg is indeed aware of the increased hate speech which occurs due to his content moderation changes. From my perspective, it is also obvious that platforms are capable of caring, as they have the monetary resources and the needed power to intervene in hate speech.

So one might ask, but what about the higher good of “free speech”? Is it not ethical to enable that to its fullest? From a care ethics perspective, this statement ignores the context completely (Noddings, 2013). Care ethics argues that we cannot apply the same universal rules in all situations. While free speech and for example the right to demonstrate are integral parts of democracy, harming other people directly with it is not. There needs to be a closer look at what “free speech” consists of. Applying a care ethics lens, we need to consider who is being harmed and what protection they need. While minorities suffer from more hate speech and lose a valuable space of communication, the dominant members of the digital space get

more screen time and no consequences for their actions and on top of it all, harmful ideas can easily spread and become normalized. In this context, the platforms are obliged to intervene and care for the affected persons. Additionally, experiencing harm online, the affected persons also lose their right to free speech, as it is not a space anymore where they feel safe to do this, or even worse, with community-managed moderation, their voices might get censored by the dominant groups. Noddings (2013) does acknowledge that no one can care for everyone equally as the obligation to care is limited, especially when it comes to distant strangers. Following, one could argue that a platform being so big and anonymous cannot have a personal relationship with every user and thus is not obliged to care. However, platforms as said do build some kind of relationships with their users and create and have power over the spaces that the users engage in. Following I do argue that platforms do have a responsibility towards users as also Howard (2024) nicely demonstrated. Turning the responsibility over to the community fails their ethical obligation to care for the most vulnerable members of the platform's communities.

Concluding Dm to @Zuck

To conclude, my DM (slang for direct message on social media platforms) to Mark Zuckerberg, @zuck on Instagram would look like this:

"To make "fewer mistakes", you have to care for the community, especially for the most vulnerable people, and not provide more space for hatred. And here is why: From an ethical perspective there is a moral duty to defend others from harm. While social media platforms might not be seen as publishers, they are still corporate agents with ethical responsibilities. One of your responsibilities is to minimize the complicity in creating harm and violence, which is definitely not happening with the new policy announcement you made in January. You must find a balance between beneficial communicative interests while also reducing the likelihood of wrongdoing on the platform. Trading off free expression for the most dominant groups of people with the protection of the most vulnerable ones is not in line with said balance. If this is not persuasive enough yet, let's look at it from a care ethics perspective: Platforms and users do have a relationship built on daily usage, data gathering and the fact that real people act behind profiles and also partly behind content moderation. This, accompanied by the awareness of "bad stuff" happening which you mentioned in your video and the fact that you have proven before that Meta does have the capabilities to influence the content on the platform, concludes in the obligation to care. And a little outlook on the future: Be aware that the space you are providing is the living room for many young people and it will shape their thinking and all of our futures. We can do that by creating positive spaces and opportunities to connect or by spilling oil into the fire and letting different extreme groups online go against each other while harming the most vulnerable communities that will possibly carry long-term harm. You are not enabling "free expression" for everyone but opening the door for harm to the most vulnerable people. Please, think about who you are benefitting and hurting, the next time you announce that you want to make "fewer mistakes"."

References

Crilley, R., & Gillespie, M. (2019). What to do about social media? Politics, populism and journalism. Journalism, 20(1), 173–176. https://doi.org/10.1177/1464884918807344

Duffy, C. (2025, January 7). Meta gets rid of fact checkers and says it will reduce 'censorship' | CNN Business. CNN. https://www.cnn.com/2025/01/07/tech/meta-censorship-moderation/index.html

Howard, J. (2024). The Ethics of Social Media: Why Content Moderation is a Moral Duty. Journal of Practical Ethics, 11(2). https://doi.org/10.3998/jpe.6195

Noble, S. U. (2020). Algorithms of Oppression: How Search Engines Reinforce Racism. New York University Press. https://doi.org/10.18574/nyu/9781479833641.001.0001

Noddings, N. (2013). AN ETHIC OF CARING. In Caring (2nd ed., pp. 79–103). University of California Press; JSTOR. http://www.jstor.org/stable/10.1525/j.ctt7zw1nb.10

Policy Department for Citizens' Rights and Constitutional Affairs. (2023). The impact of the use of social media on women and girls (No. IPOL STU (2023) 743341). European Parliament, Directorate-General for Internal Policies. https://www.europarl.europa.eu/RegData/etudes/STUD/2023/743341/IPOL_STU(2023)743341_EN.pdf

Statista. (2024). Global daily social media usage 2024. Statista. https://www.statista.com/statistics/433871/daily-social-media-usage-worldwide/

@zuck. (2025, January 7). [Mark Zuckerberg announcing free expression by getting rid of fact checkers] [Video]. Instagram. https://www.instagram.com/p/DEhf2uTJUs0/

FUTUS2 Theories of Futures Studies and Transformation

FUTUS2 Theories of Futures Studies and Transformation (6 cr) course explores selected societal, socio-technical and cultural transformation theories, and reflects their premises and outcomes about cultural and societal change against the theoretical traditions of futures research. The course catalyses discussion of the role of theory and theory-building in futures studies. Specific theories of transformation are taught (e.g. K-waves, evolutionary economics, cultural transformation, and multi-level perspective on socio-technical change) and the role of agency in these theories. In relation to these, the course takes a deeper look into the various theoretical traditions of futures research (e.g. critical futures research, utilitarian dimensions) as well as the lineage of key futures studies concepts. Students encounter recent debates about the development of theoretical bases for futures studies, such as anticipation and futures literacy framework.

The teacher of the course was Professor **Markku Wilenius**.

Kalpani Pavithra Alahakoon Arachchige shares her own learning experience with us in a wonderful way. She guides the reader to her own insights, all of which are related to the central themes of the course. She excels at summarizing the essential message of each lecture while highlighting how the theories, methodologies, and perspectives raised during the course complement each other. A truly brilliant diary!

In her learning diary, **Lara-Maria Holocher** describes her introduction to futures studies in a wonderful way. She explores, delves deeper, and searches for information to understand how futures studies open up a new perspective on her own field of organizational research. She guides her readers to her own insights and deepens them with references. In this way, the course lectures provide her with a strong introduction to future thinking and awareness. A wonderfully and carefully crafted diary!

In his learning diary, **Andrey Melnikov** thoroughly explains the key features of the course in a way that leaves no one indifferent. He writes extensively about what he has heard and read, and develops his own conclusions in an enjoyable and often surprising way. His deep knowledge of the subject matter is evident in every paragraph and provides a solid foundation for his reflections. A memorable diary!

Learning Diary: Navigating Change and Transformation: Insights and Reflections from Futures Studies Theories

Kalpani Pavithra Alahakoon Arachchige

Turku School of Economics, University of Turku

Introduction

In this Learning Diary, I will reflect on the sessions of the “Theories of Futures Studies and Transformation” course, with a particular focus on the concepts of change and transformation explored throughout. Drawing on lecture materials, course readings, and additional supporting resources, I will assess various theories that shed light on societal and cultural transformations. My primary goal is to understand how change is conceptualised across various frameworks and connect it to notions of alternative futures and the uncertainty surrounding future outcomes. Therefore, through critical reflection and analysis, this diary will offer insights to deepen my understanding of how transformations are conceptualised and how I can apply these theories for my own research purposes and contribute to the evolution of my personal theoretical perspectives further.

The course features key societal, socio-technical, and cultural transformation theories, such as Kondratieff waves, evolutionary economics, and the multi-level perspective on socio-technical change. It also assesses evolutionary economic theory and the evolution of futures studies, alongside psychological approaches like futures consciousness. Cultural transformation and cultural sustainability are further explored within these frameworks. By integrating these perspectives, I will try to grasp the role of agency in transformation processes and engage with the latest arguments on the theoretical traditions of futures research, including futures literacy and anticipation, which are critical to understanding the foundations of futures studies.

Additionally, Futures studies is fundamentally about understanding change and transformation at various levels and exploring potential future shifts such as societal, technological, cultural, or psychological through multiple perspectives (Wilenius, 04.09.2024). By assessing these different approaches, we gain a more comprehensive understanding of how change happens and how it might unfold in the future. Therefore, this broad view helps us better anticipate and navigate potential developments, providing us with the tools to engage with and influence future transformations more effectively.

Thus, I will begin by reflecting on each session separately, offering insights into the key concepts and theories covered. Finally, the learning diary will conclude with overall reflections and remarks, highlighting the broader implications for my understanding and my own research purposes.

Reflections on the Sessions

In this section, I will reflect on each session individually, examining the key concepts, discussions, and insights presented. I will emphasise how these elements contribute to a deeper understanding of change and transformation. Through these reflections, I aim to highlight the relevance of the course content and its significance for my overall learning experience in the field of futures studies.

Session 1: Theories focusing on Socio-Technical Transformation

"It is becoming even more evident that the longer we wait to make the changes, the more expensive the changes will become" (Wilenius, 2017, xvii). This quote underscores the importance of foresight in today’s

rapidly changing world. As we face new challenges and uncertainties, it becomes clear that we must act now to avoid higher costs later. Foresight is not just about predicting the future; it is a systematic way of exploring long-term possibilities and making informed decisions today to create a sustainable future.

Through the readings, I have learned that foresight is a complex and multifaceted process. It allows us to understand potential outcomes better and informs our present actions. According to Minkkinen et al. (2019), embracing diverse foresight approaches and promoting collaboration among different perspectives is vital for developing effective policies aimed at the future. This insight highlights how working together can enhance our ability to navigate the complexities of our world.

A key aspect of foresight is its recognition of uncertainty. Roy Amara's premises (1981) remind me that the future is neither entirely predictable nor predetermined. This understanding encourages me to embrace unpredictability, which can lead to innovative solutions and flexible responses to emerging challenges. Moreover, while we have the power to influence the future through our choices, the outcomes remain uncertain. This awareness of our agency helps me navigate the complexities of decision-making while recognising the limits of what we can foresee.

Additionally, the various foresight frames we encounter can complement one another, forming a cohesive system. Dufva and Ahlqvist (2015) stress the importance of having a diverse range of foresight perspectives, even if not every stakeholder engages with every approach. This diversity enriches the foresight process and emphasises the value of collaboration among different actors. As I reflect on this, I see how crucial it is to create spaces for dialogue and cooperation in foresight work, which is increasingly interconnected and collaborative. Overall, understanding the pluralistic nature of foresight and the importance of bridging different perspectives is essential for addressing the complexities we face and enhancing our collective capacity for future-oriented decision-making.

In reflecting on this, I came across a theory in Sociotechnical Transitions, also known as the Multilevel Perspective (MLP), which deepens my understanding of how the changes we anticipate through foresight can materialise. The MLP explains how transitions in society, particularly technological innovations, unfold through interactions between three levels: niches, regimes, and landscapes (Geels, 2002). This framework complements foresight by showing how these future possibilities are shaped and influenced by real-world systems and pressures.

As I learned more about the MLP, I became fascinated by the concept of niches, which are spaces where new and radical innovations begin. These niches, however, face significant challenges in breaking through the regimes of the established systems or structures that dominate the current landscape. I realised that for niche innovations to gain momentum, they often need external pressures, which the MLP refers to as the landscape level. These pressures, such as economic crises or environmental changes, can create windows of opportunity for new technologies to disrupt existing regimes (Sovacool & David, 2017).

One aspect of the theory that resonated with me is the variety of transition pathways it outlines. Depending on how niche innovations develop and interact with regime and landscape pressures, transitions can unfold in different ways. For instance, in the case of technological substitution, niche innovations that are ready to scale can replace existing regimes when landscape pressures align. Alternatively, transformation occurs when regimes gradually adjust under pressure, without a full replacement of the system. These pathways helped me understand why some changes seem to happen quickly and disruptively, while others take longer and evolve more slowly.

The MLP also places a strong emphasis on learning and co-evolution, which I found particularly insightful. Just as foresight involves continuous learning and adapting, the MLP suggests that niche innovations evolve by interacting with existing regimes and landscape pressures. This ongoing learning process allows for incremental adjustments and adaptations, making transitions more dynamic and responsive to real-world challenges. It made me think about how new technologies often need to be refined and adapted before they can truly challenge existing systems.

In reflecting on the MLP framework, I now see how deeply interconnected innovation, societal systems, and external forces are. It is not just about developing new technologies or ideas but about understanding how these innovations interact with the broader landscape and existing systems. This perspective has given me a more distinct view of how change happens and the complex forces that shape the future, reinforcing the importance of active participation and learning throughout the transition process.

Seeing these conceptual interlinkages between futures studies and the MLP framework has opened a new perspective on how I approach the study of societal change. Both fields offer powerful tools for understanding how transitions happen. Futures studies focus on identifying weak signals, trends, and megatrends that may shape the future (Vähäkari et al., 2020), while MLP explains how niche innovations interact with established regimes and broader landscape forces. Together, they provide a more holistic framework for analysing the complexity and unpredictability of these shifts. The way both frameworks emphasise the role of gradual changes and sudden disruptions, whether it is megatrends in futures studies or landscape pressures in MLP, helps us see how different factors influence societal transitions. This combined approach allows us not only to anticipate potential futures but also to plan more effectively for the transitions needed to achieve them.

Moreover, I found the Kondratieff Wave (K-wave) theory as a valuable tool for predicting big changes in society and the economy, as this theory suggests that economies go through long cycles lasting about 40 to 60 years, driven by new technologies and shifts in how we live and work. Understanding these cycles can help us make sense of the changes happening around us and prepare for what is coming next.

One of the key insights I have gained is that K-wave theory helps identify patterns in how society evolves. Each wave builds on the previous one, with new technologies and social interests emerging over time (Wilenius & Kurki, 2017). By recognising these patterns, we can better anticipate future trends. For instance, understanding that we are likely moving into a new wave driven by innovations like Artificial Intelligence (AI) and renewable energy can inform strategic decisions in both business and policy. This reflection challenged me to think critically about the technologies and ideas we embrace today and how they may shape our future.

This theory also connects well with the MLP framework, which emphasises how different levels of society interact. K-wave theory reminds me that changes do not happen in isolation; however, they are part of larger trends that have historical roots. This realisation prompts me to consider the importance of context in understanding societal change. It is a reminder that while we often focus on immediate challenges, we must also look at the bigger picture and learn from past cycles to navigate the complexities of the present. These learnings encourage me to adopt a more reflective mindset, where I appreciate the interconnectedness of various trends and recognise the importance of preparing for the future by learning from history.

Session 2: Evolutionary Economic Theory; Evolution of Futures Studies

Reflecting on today's lecture, I found the discussion around profit maximisation, uncertainty, and bounded rationality particularly thought-provoking. Alchian's (1950) point that profit maximisation becomes meaningless under uncertainty resonates with how real businesses operate. In unpredictable environments, firms cannot foresee every variable, making the idea of "maximising" profits impractical. This challenges the traditional economic models I have often come across, which assume perfect foresight.

Herbert Simon’s (1955) concept of bounded rationality deepens this understanding. Instead of aiming for perfect decisions, firms and individuals make choices that are “good enough” given their limited information and cognitive constraints. This makes sense in the real world, where time and resources are always limited. It is interesting to realise that, in practice, businesses prioritise adaptability over strict profit maximisation. This shift from theoretical ideals to practical decision-making highlights the importance of flexibility in uncertain environments, which is something that feels much more aligned with how I imagine companies operate daily.

Fostering the ideas of adaptability and bounded rationality, I found it intriguing to see how biological evolution mirrors business dynamics. In this comparison, mutation represents innovation or new recruitments with diverse skills, injecting fresh ideas into a company. Migration can be seen as new businesses entering the market, reshaping competition. Natural selection reflects consumer preferences, as their choices determine which firms succeed. (Kuhmonen, 18.09.2024.) Finally, genetic drift symbolises the role of chance and external forces in business outcomes.

This comparison really deepens my understanding of how businesses evolve and adapt. Just like in nature, it is not always the "fittest" or most profit-driven company that survives, but the one most able to adjust to changing environments. Innovation through new recruitment or product offerings keeps the company evolving, while new competitors keep the market dynamic, forcing adaptation. Consumer preferences act like the environment, determining which companies thrive based on how well they meet needs. The randomness of market shifts or unexpected events such as economic downturns or technological breakthroughs parallels genetic drift, showing how external factors can shake up even the best-prepared businesses. Overall, this evolutionary framework reminds me that business success is staying agile and responsive to change.

The readings on this topic deepened my understanding by introducing four core process theories, such as Evolution, Dialectic, Life Cycle, and Teleology, as outlined by Van de Ven (1995). I found the evolutionary theory particularly insightful, as it closely ties to the concepts I have been exploring. The evolutionary process emphasises that change occurs gradually and is shaped by variation, selection, and retention. Organisations must introduce some form of variation, whether through new ideas, products, or strategies, to create opportunities for change. From these variations, certain strategies or innovations are selected based on external factors, such as market conditions or consumer preferences. What gets selected is then retained and becomes part of the organisation's ongoing development.

A key takeaway for me was the idea that change is cumulative. Organisations do not start from scratch; they build on their existing paths and decisions, reflecting that there is no “clear table” or point zero in the change process. (Kuhmonen, 18.09.2024.) This cumulative nature reinforces the need for adaptability, as firms must continuously evolve based on their past experiences and the shifting environment around them. Kuhmonen (18.09.2024) further elaborates on how evolutionary thinking is widely used in futures research. In this context, variation represents alternative pathways to the future, encompassing different scenarios and trends, while selection pertains to alternative operating environments, including futures images and foresight practices. This approach not only helps organisations anticipate potential challenges but also allows them to explore diverse strategies for growth and innovation.

Additionally, as noted by Dennett (according to Kuhmonen, 18.09.2024), evolutionary theories are algorithmic; if certain conditions are met, specific outcomes will occur, allowing for a structured understanding of change. This insight provides organisations with clear strategies for navigating change effectively. Recognising that change is continuous and cumulative underscores the importance of fostering a culture of innovation and adaptability. By embracing variation as a pathway to new opportunities, organisations can encourage proactive risk-taking and experimentation, which are essential in today’s rapidly evolving market. This understanding will inform my problem-solving approach and enhance my ability to contribute to discussions about organisational growth and sustainability, ultimately helping me drive initiatives that promote resilience and adaptability in the face of change in future.

Session 3: Psychological Theories in Futures Studies; Futures Consciousness

During this session, learning the relationship between the past, present and future was thought-provoking. According to Poli (2010), two of the explicit assumptions for the Future are: to some extent, the future is shaped by the past, and we can better engage with the future by being open to new ideas and considering a variety of perspectives without solely seeking the roots of the future in the past. These two approaches can be classified as forecasting and scenario planning, and they typically complement each other, as they examine the future from distinct viewpoints (Poli, 2010).

Based on the first assumption, some future decisions are often made concerning past experiences. However, under the second assumption, futures images are developed, serving as a vital foundation for decision-making and behaviour in the present. Consequently, this image of the future will serve as the primary driver of change, shaping our behaviour in significant ways. This learning prompted me to reflect on my own vision for the future as I strive to reach my desired state in a few years. I came to understand the significance of the quality and clarity (Polak, 1973) of this future vision, as all my current decisions are influenced by it. If my image of the future lacks clarity or substance, I may struggle to become the person I aspire to be or to achieve my goals in the coming years.

Furthermore, future literacy skills will further enable us to shape the future according to our desires by helping us understand that the future is not just an extension of the present and by distinguishing between different types of futures (Poli, 2021). This challenges the common assumption that what happens next will always resemble what we are experiencing now. Being futures literate involves recognising that multiple futures exist and can unfold in different ways depending on various factors and decisions made in the present. For instance, there are probable futures, based on current trends, but also possible and preferred futures shaped by our aspirations and choices. This distinction allows us to be more mindful of how we think about the future, helping us understand that there are options beyond the predictable path.

Moreover, learning how futures literacy enables us to use the future in the present (Poli, 2021) was beneficial rather than viewing the future as something distant and out of reach; it can be a tool for shaping our current actions and decisions. This way of thinking empowers us to influence the future by considering a variety of potential outcomes and preparing for them.

Contemplating the concept of future consciousness and how it relates to both personal and collective decision-making made me reflect on my own ability to think long-term and how much of my current mindset is focused on short or medium-term outcomes. Frederik Polak's (1971) idea that raising future consciousness should be a key goal in futures research resonated with me, as it is essential in breaking reactive patterns and becoming more proactive towards futures. The idea of time perspective in future consciousness (Ahvenharju et al. 2018) made me reconsider the value of long-term thinking, not just in terms of personal success but in how my actions today can impact broader systems and future generations.

Moreover, the agency beliefs, trusting in one’s ability to influence the future (Ahvenharju et al. 2018), highlighted how empowering it can be to recognise that I can shape what lies ahead, rather than simply reacting to external forces. However, it is not just about personal agency; openness to alternatives and systems perception helped me see the importance of questioning the status quo (Ahvenharju, 15.09.2022) and understanding how everything is interconnected. These elements inspired me to think more critically about how my choices contribute to the larger social, environmental, and global systems. The concept of concern for others was particularly powerful, as it brought an ethical dimension into play, reminding me that futures thinking is not just about personal gain, but about striving for a better future for everyone. This made me reflect deeply on how I can approach problem-solving and decision-making more holistically and inclusively.

Session 4: Cultural Transformation; Cultural Sustainability

In this lecture, I gained a deeper understanding of how crucial it is to grasp the concept of culture, as highlighted and discussed. Recognising the role of culture is essential, as it stands out as one of the key driving forces shaping the future (Siivonen, 02.10.2024). Accordingly, I learned that culture can be understood in two different ways: as a stable framework and as a dynamic process. The framework perspective sees culture as a relatively fixed structure, providing a foundation for social activities (Goody, 1994). Greetz's (1957) viewpoint highlights that the stable aspects of culture can shape our worldview and guide social interactions.

On the other hand, culture can also be seen as a constantly evolving process, much like a river that is always moving. As Hannerz (1992, 4) suggests with the phrase "You cannot step into the same river twice," culture is continuously renewed through interactions between people and their surroundings. Reflecting on these concepts, I now understand that culture is both a stable foundation and a dynamic, evolving force where the framework gives structure to our beliefs and actions, while the ever-changing, fluid nature of culture allows it to adapt and grow. This dual view emphasises the importance of preserving cultural values while embracing change, showing that culture not only defines our present but is essential in shaping and guiding the future.

Along with this, the ethical dimensions of futures studies remind us of the need to respect the rights of future generations, as well as to appreciate the rich diversity of human beings and cultural expressions. This emphasises the responsibility to act sustainably and to engage with the future through a lens of ethical awareness and inclusivity. We have an ethical obligation to cultivate a strong cultural core that exists in harmony with nature, which is often understood as “living one’s life in an ecologically sustainable way” (Siivonen, 2018, 19). By embracing this responsibility, we can ensure that our actions today contribute positively to the well-being of both our communities and the environment.

In exploring the concept of anthroposemiosis, I have gained insight into the evolving relationship between humans and their environment. This dynamic connection means our surroundings continually shape our understanding of ourselves and the world. By integrating Deely’s ideas with the concepts of cultivation and culturalization (Siivonen, 2018), I realise that nature is deeply embedded in our minds, influencing our perceptions and actions.

A key takeaway is that culture should not simply be viewed as a dimension of sustainability; rather, it serves as a foundational platform for all aspects of sustainable development. To achieve true ecological sustainability, we must redefine our relationship with nature, recognising its powerful influence on human systems. (Siivonen, 2018.) This cultural shift is essential for guiding us toward a future where our development aligns harmoniously with nature.

Reflecting on sustainability transitions, I realise that achieving meaningful change requires us to alter our daily behaviours and recognise the significance of agency, which is the capacity to act (Huttunen et al., 2021). Understanding how agency influences these transitions calls for an investigation of the interconnectedness among various socio-technical systems, as described in the Multi-Level Perspective (MLP) framework. Acknowledging our human impact on planetary boundaries reinforces the necessity of aligning our development with sustainability.

I was already aware that futures workshops could play an important role in our sustainability journey, but this lecture reinforced their significance. These workshops provide an essential space for us to come together and co-create visions for a sustainable future. Engaging in these discussions can truly foster meaningful cultural change, and I feel reassured that by participating, I can make a meaningful contribution to building a more sustainable world.

Conclusion

Reflecting on this learning journey, it becomes clear that the various theories and frameworks we have explored, such as cultural transformation, economic evolution, futures consciousness, Kondratieff wave theory, the Multi-Level Perspective (MLP) framework and foresight are deeply interconnected, forming a comprehensive understanding of change and transformation. These concepts illuminate how organisations can navigate complexity and uncertainty in a rapidly evolving world. The interplay between stable cultural frameworks and dynamic processes highlights the need for businesses to adapt while preserving their core values. Economic evolution reinforces this adaptability, emphasising that firms operate within systems shaped by historical legacies, consumer preferences, and environmental factors.

Understanding the complexity of time and temporality is central to these discussions, as it enables us to appreciate the significance of past experiences, present choices, and future aspirations. Futures consciousness encourages us to see the multiplicity of potential futures, promoting a proactive stance that is vital in developing futures literacy.

The connections between these theories and futures studies methodologies enhance our understanding of how to sort out complex challenges. The MLP framework, for example, provides a structure for analysing the interactions among micro-level innovations, meso-level regimes, and macro-level landscapes, which will be pivotal in my master's thesis on preferred futures images of a carbon-neutral economy in Finland by 2035.

As I prepare for my future career as a futurist, these insights will be instrumental in guiding my approach to problem-solving and decision-making. The interconnectedness of these theories equips me with a holistic perspective that recognises the ethical dimensions of our actions, particularly in fostering a sustainable future for all. By integrating these concepts into corporate strategies, I aim to promote resilience and adaptability in the organisations I work with.

Ultimately, the understanding gained from these frameworks will inform my contributions to the corporate world, enabling me to encourage innovative practices that align with organisational goals and the imperative of sustainability. By incorporating this comprehensive understanding of change and transformation, I can help shape a more sustainable and equitable future for generations to come.

References

Ahvenharju, S. – Minkkinen, M. & Lalot, F. (2018) The five dimensions of Futures Consciousness, Futures, Vol. 104 (2018), 1–13.

Ahvenharju, S. (15.09.2022) The lecture on Theories of transformation, Anticipatory approach (Actors and processes) at Turku School of Economics.

Alchian, A. A. (1950) Uncertainty, Evolution, and Economic Theory, Journal of Political Economy, Vol. 58 (3), 211–221.

Amara, R. (1981) The futures field: searching for definitions and boundaries, Futurist, Vol. 15 (1), 25–29.

Dufva, M. & Ahlqvist, T. (2015) Elements in the construction of future-orientation: a systems view of foresight, Futures, Vol. 73, 112–125.

Geels, F. W. (2002) Technological transitions as evolutionary reconfiguration processes: A multi-level perspective and a case-study, Research Policy, Vol. 31(8), 1257–1274.

Geertz, C. (1957) Ritual and Social Change: A Javanese Example, American Anthropologist, Vol. 59 (1), 32–54.

Goody, J. (1994) Culture and Its Boundaries: A European View. In Robert Borofsky (ed. by), Assessing Cultural Anthropology. New York et al.: McGraw-Hill, Inc., 250–261.

Hannerz, U. (1992) Cultural Complexity. Studies in the Social Organisation of Meaning. New York: Columbia University Press.

Huttunen, S. – Kaljonen, M. – Lonkila, A. – Rantala, S. – Rekola, A. & Paloniemi, R. (2021) Pluralising agency to understand behaviour change in sustainable transitions, Energy Research & Social Science, Vol. 76 (2021) 102067.

Kuhmonen, T. (18.09.2024) The Lecture on Evolutionary thinking and futures research at Turku School of Economics.

Minkkinen, M. – Auffermann, B. & Ahokas, I. (2019) Six foresight frames: Classifying policy foresight processes in foresight systems according to perceived unpredictability and pursued change, Technological Forecasting & Social Change, Vol. 149(2019) 119753.

Polak, F. L. (1971), Prognostics: A science in the making surveys and creates the future. Elsevier, Amsterdam & New York.

Polak, F. L. (1973) The image of the future (Elise Boulding Trans.). Elsevier, Amsterdam.

Poli, R. (2010) An Introduction to the Ontology of Anticipation, Futures, Vol. 42 (2010), 769–776.

Poli, R. (2021) The challenges of futures literacy, Futures, Vol. 132, 102800. doi: 10.1016/j.futures.2021.102800.

Siivonen, K. (2018) Sustainable everyday culture from local archipelago culture. In Inger Birkeland & Rob Burton & Constanza Parra & Katriina Siivonen (ed. by), Cultural Sustainability and the Nature-Culture interface. Livelihoods, Policies, and Methodologies. London, Routledge.

Siivonen, K. (02.10.2024) The lecture on Cultural transformation and cultural sustainability at Turku School of Economics.

Simon, H. A. (1955), A behavioural model of rational choice, The Quarterly Journal of Economics, Vol. 69 (1), 99–118.

Sovacool, B. K. & Hess, D. J. (2017) Ordering theories: Typologies and conceptual frameworks for sociotechnical change, Social Studies of Science, Vol. 47(5), 703-750.

Vähäkari, N. – Lauttamäki, V. – Tapio, P. – Ahvenainen, M. – Assmuth, T. – Lyytimäki, J. & Vehmas, J. (2020) The future in sustainability transitions- Interlinkages between the multi-level perspective and futures studies, Futures, Vol. 123 (2020) 102597.

Van D. V. – Andrew, H. & Poole, M. S. (1995) Explaining Development and Change in Organisations, Academy of Management Review, Vol. 20 (3), 510–540.

Wilenius, M. (2017) Patterns of the future: understanding the next wave of global change. New Jersey: World Scientific.

Wilenius, M. & Kurki, S. (2019) K-Waves, Reflexive Foresight, and the Future of Anticipation in the next Socioeconomic cycle, Springer International Publishing, R. Poli (ed.), Handbook of Anticipation, 695–715.

Wilenius, M. (04.09.2024) The lecture on Theories focusing on socio-technical transformation at Turku School of Economics.

Specific Note on Reference Style and Use of AI

AI was employed exclusively to enhance the clarity and readability of the text.

Learning Diary: Theories of Futures Studies and Transformation

Lara-Marie Holocher

Exchange student from University of Hohenheim, Germany
Turku School of Economics, University of Turku

Introduction

»Das Leben gehört dem Lebendigen an, und wer lebt, muß auf Wechsel gefasst sein.«
„Life belongs to the living and who lives must be prepared for change."

Johann Wolfgang von Goethe

We are exposed to changes and new situations every day in our everyday lives, like this citation from Goethe shows as well. As human beings, we have to adapt to them and deal with it. I have chosen this course to better understand change and it´s consequences. I also find the idea of the future and how it can change from a black box to something more concrete particularly exciting. I chose this course because I think Future Studies offers deeper insights into the dynamics of change and transformation. As I am studying Organizational Behaviour and have worked in Human Resources before my master's degree, I think this will be particularly valuable for me. Because in Human Resources, and in general, organizations are increasingly facing complex challenges: digitalization, demographic change and sustainability are only a few factors that are impacting the working environment. Everything is in transformation, and it is important to see and support people with all these trends and changes coming.

Through Futures Studies and this course, I hope to learn tools to recognize future trends, develop scenarios for the future and respond strategically to upcoming challenges. This knowledge helps to develop change management strategies and shape organizations to remain successful in times of upheaval. Furthermore, I hope to gain a versatile and, above all, interdisciplinary insight into the field of Futures Studies from this course, as this is a course in which I have only superficial knowledge so far. I want to be able to apply my knowledge in predicting possible future scenarios both in my further studies and in my everyday work. I am particularly excited about the connection to transformation, as this is something we deal with every day, whether as individuals or as organisations. It will be increasingly important to be able to adapt quickly and well to changing environmental conditions. I look forward to getting to know methods to understand futures, futures trends and more.

This Learning Diary offers me the opportunity to reflect on what I have learned and to work out the important points for myself. I hope that I will be able to apply the knowledge that I have learned in theory directly and thus establish a practical connection for myself. I also think that Learning Diary will give me the opportunity to challenge myself and the knowledge I have acquired. I am looking forward to the course and am excited about the various contents.

Reflection on the Learning Sessions

Learning Diary Lecture 1: Theories Focusing on Socio-technical Transformation

How change is conceptualised and characterised in theories and frameworks presented in the session?

In my view, the most important insight gained from the first lecture is that we see everything through different lenses. Although this realization and philosophical insight is not new, I believe it should be made clear again and again and our own views should be questioned. Each lens has advantages and disadvantages depending on how it is framed. There are also reasons why everyone has different lenses and understanding these helps to understand other perspectives. Therefore, this reflection is not only important for Futures Studies, but in my opinion for all areas of life.

As I have no previous experience with the field of Futures Studies or only know it from other contexts, the graphic presented by Matti Minkkinen et al. provides a good overview and starting point for the different options (ctf. Minkkinen, Auffermann, Ahokas, 2019). This shows how many possibilities there are to predict changes. It also helps me to understand what the goal of a research can be and how to categorise different aspects. Furthermore, the graph demonstrates that changes can occur at different levels, and it shows the variety of research options.

The tendency towards the transformative frame as approach in Futures Studies can be explained by the volatile, uncertain, complex and ambiguous (VUCA) environment, in which we are currently operating (ctf. Taskan, Junca-Silva, Caetano, 2022). The level of perceived unpredictability is high, and the movement is towards open systems with a higher level of pursued change (ctf. Minkkinen, Auffermann, Ahokas 2019; Child, Rodrigues, 2011). In the Organizational Behaviour research this is reflected in the increase in agile working methods (ctf. Grant, 2020). These aim to enable teams to adapt more quickly to changing environmental conditions and thus conform to the transformational frame. Based on my previous study experience, I find it very interesting how working methods and organizations are changing to adapt to changes in the environment. In particular, what tools are available to support and cushion this transformation for employees. The lecture helped me to understand that we see events happening, but we often don´t see what it is behind it. That is why I understand Futures Studies as a systematic thinking and trying to see the whole, rather than parts. This is something that I would like to learn more about during the upcoming lectures.

What are the key elements of change? What is changing or what is expected to change?

The Multilevel Perspective Theory (MLP) according to Rotman, Schot and Grin differentiates between various layers in transformation processes (ctf. Geels et al., 2010). In my view, this simplification and reduction of complexity allows to illustrate very well which dynamics occur in change processes and which layers need to be considered. Through the illustration of MLP, I have understood that they are embedded systems, and that change can occur at all the different layers and influence each other. I find the dependence of the levels particularly interesting. The higher the level, the slower the change processes tend to be (ctf. Deviney et al., 2023). As I come from a region in Germany, that is heavily dependent on the automotive industry and its suppliers, I find this development compelling. Within the last few years, these companies have had increasing difficulties, which is mainly due to the emergence of electromobility, environmental protection and the strengthening of new marketing. Innovations that previously only existed as niches are increasingly being refreshed and can initiate transformation processes. However, it remains to be seen how these will develop (ctf. Gandenberger et al., 2020). Therefore, I see the MLP as a very good way to look at transformation and as a chance to understand the change that is happening.

One important insight I learned from this lecture is that crises are always opportunities for innovation. This was made clear by the example of the Finnish timber industry. This indication gives me optimism for what comes next after a crisis. One can always keep in mind that one never knows exactly what will happen after a crisis, but that transformation cannot be turned back. However, it is encouraging that it will or can develop in such a way that – after a certain period – it can be said that it has evolved into something better.

How time and temporality is understood in theories? What are temporal scopes? How future, or multiplicity of futures, is understood and unravelled?

Kondratieff´s theory and the further development by Schumpeter make it clear that the future comes in waves and that there are distinct patterns in the changes (ctf. Wächter, 2020). These waves are classified by recurring temporal periods consisting of growth, peak, crisis and downturn. They are replaced by the next wave, which brings new key technologies and supersedes old structures. One can speak of a continuous transformation. The duration of these periods has differed by several decades. However, economists' observations of the waves can be further divided into short- and long-term ones. The length of the waves indicates the duration required for a technological revolution to fully unfold and ultimately be replaced.

The biggest learning I take away from this is that we are expecting a new wave of innovation, which could be strongly influenced by upheavals in connection with climate change, renewable energies and digitalization and globalization. It could be characterized by innovations in living systems, intelligent technologies and bio world. We are currently entering the 6th wave, in which niche technologies are still seen as seeds, which are growing and taking over. From the perspective of organizational development and Organizational Behaviour, it is very important that we as humans behave differently depending on whether the economy is in an up or down phase. Personally, I think this is a very important point that companies should always bear in mind and, above all, involve and support their employees accordingly. I particularly keep in mind that new innovations and creative destruction lead to long-term fluctuation.

Whilst I understand the waves and the repetition in them theoretically, I have a bit of a problem seeing them as given in the future. During the lecture I asked myself the question of how we can be sure that they will occur in a similar way when we say that we don´t know the future. I also asked myself to what extend we as actors can really influence this future and what agency we have. So far, I have not been able to make a clear decision for myself. I currently see change as something that we have an image of and a desire to move towards and therefore we try to move into that direction as individuals and as a society.

What kinds of linkages the theories presented in the session have on FS theories and methods?

In my opinion these findings are very important, as they demonstrate how we have developed and evolved as a society. Regarding the 6th wave, it becomes particularly clear that humans will be further integrated. I find this integration of humans, nature and technology and how these will develop further interesting, as it will be exciting to see what impacts this will have and I am personally looking forward to seeing these developments, especially in terms of harmonizing nature and people. In my view, this is necessary to secure our future.

The concepts presented in the lecture show how the future can be seen. From my point of view, this is important to be able to analyse future megatrends and what the technologies of the future could be. They can help to develop forecasts and possible future scenarios. It also became clear to me that we need visionaries who see things differently and act accordingly.

All in all, the general importance of Futures Studies became clear to me in this first lecture. This was shown not only by the content of the lecture, but also by the different degree courses of the participants. Dealing with the future is necessary across all sectors.

Learning Diary Lecture 2: Evolutionary Thinking and Futures Research

How change is conceptualised and characterised in theories and frameworks presented in the session?

In this lecture, the connection between evolutionary thinking and change became particularly clear. For me, this was a completely new aspect and way of thinking, that there are connections between evolutionary biology and Futures Studies. The application of evolutionary thinking has been applied across other sciences, which makes it fascinating for me. In the lecture, many parallels were drawn between business and biological theories. As I hadn´t realized this connection before, I am very happy to get a new perspective and angle. I particularly remember the two examples from the lecture, which link business and biology. Firstly, the application of migration to the business, when business have spin-offs or establish subsidiaries and then migrate either to new areas or geographically. I was able to relate and to confirm the second example based on my previous work experience. A mutation in the business context is possible when organizations are interested in hiring people from the external labour market in order to bring new skills and experience into a company. In this way, different sights can be brought into an organization from the outside and then change it from within. From my point of view, this is one of the main responsibilities from a Human Resources Management – finding people from the outside, who bring knowledge and new ideas and insights into a company. The theories mentioned in the lecture help me to get a better overview and to understand how changes take place in organizations (ctf. Van de Ven, Poole 1995).

What are the key elements of change? What is changing or what is expected to change?

Change is understood to have a direction, to be cumulative and that variation is a precondition for change. I find these definitions or explanations very plausible, since they make the concept of change more concrete. The graphic by Poole and Van de Ven depending on their meta-analysis helped me to understand what key motors of change can be and how different or similar they can be (ctf. Pool & van de Ven, 1995). I gained an understanding that evolutionary biology and change is always about variation, selection, retention and the connection. Furthermore, I understood that change is evolutionary when a population changes, or even a life cycle or an organization. I was particularly impressed by the statement that even minor events at an early stage can have a significant impact.

The example of Human Resources Management (HRM) with the recruitment of people with different skills also applies here. This is an intentional variation, and the aim is to bring change into a company. I find this a very interesting aspect, because empirically, it has been proven that many people tend to hire employees who are similar to themselves and who represent the same working methods, values etc. (ctf. Nielsen, 2021). The role of an HRM is to prevent this or more to ensure that a diverse workforce with different perspectives is hired. From my point of view, this is the only way a company can remain relevant and innovative and keep up with current developments. Therefore, this lecture provides me with valuable theories that can support my future work. This is an opportunity for me personally to orient myself on empirical evidence.

A further insight for me was that evolutionary theory can prove that social organisms such as organisations consist of a multitude of routines and structures. It is possible that most of the employees within don´t even recognize them anymore. This, and the fact that organizations differ in their characteristics, means that favoured characteristics receive more resources from the systems, at the expense of others (ctf. Metz, 2004). This shows the fitness, which was discussed in the lecture as the most important concept in biological change. It is the same as when animals adapt to their environment. That is why change within companies is often difficult to achieve and why it is not possible to change as quickly as it might be desired. These impressive biological images helped me to better understand processes in companies and to recognise how important the context is. I also learnt about the importance of fitness and fitness landscapes in a business context.

What also surprised me, is the realization that change often comes rather suddenly. In the lecture, it was emphasized that there are often long phases in which there is no major change, but that as soon as the environment changes a major change can occur quickly. Personally, I used to believe that a change would begin slowly and be noticed late. That´s why I find this insight very important, and I think that the current times also provide good examples here. A current example is the introduction of EU regulations regarding trucks. They established fines on companies that sell more than a specific percentage of conventional diesel trucks. Therefore, these companies need to change now and adapt to this change in environments (ctf. Rat der EU, 2024).

How time and temporality is understood in theories? What are temporal scopes? How future, or multiplicity of futures, is understood and unravelled?

I have understood that a distinction is made between a well-functioning and a not well-functioning world. This is where the foresight and how the future is viewed differ. In the lecture, it also became clear that the dialectic or lifecycle theory is applied from process theory. The cycle goes from a crisis to a new kind of direction and then to growth and afterwards again to crisis. It was also stated that time passes, but the change always goes forward. The lecture made it clear that everything has an end, even mega-trends (ctf. Geels et al., 2010). The example of urbanisation was particularly illuminating for me, because it is very clear that only a 100% of people can be urbanized. It was an important learning for me that trends and mega-trend are finite and have an end, because this is something that I have never considered. They only have a short-term predictability.

What kinds of linkages the theories presented in the session have on FS theories and methods?

In the lecture, the big picture was drawn that there is cyclical pattern in system change and that systems are actually self-organized around different attractors. Most of the societies so far have organized around fossil economy and it is interesting to see what those are changing now. Because it is very important that there are changes happening for our environment. In addition, the link has been made to how selection environments evolve. There are many dimensions of fitness for businesses, which are linked to many different aspects. For example, they may need to comply with social norms or regulations. Here is also a link to a class I am taking about Intercultural Marketing Management, which shows the different values and norms in different cultures. I´m looking forward to hear more about this and the link to change in the next lecture. The connection was drawn to the first lecture and the MLP theory. This gradually gives me an overall view.

All in all, it was a new realization for me that evolutionary biology can be such a framework for Futures Studies and can be used to understand complex and dynamic systems. It is interesting to see the logical connection here. I am looking forward to continuing to work on this topic and hope to get an even broader picture of it in the upcoming weeks and lectures.

Learning Diary Lecture 3: Theories of Transformation – Anticipatory Approach (Actors and Processes)

How is change conceptualized and characterized in theories and frameworks presented in the session?

The third lecture illustrated what images of the future can look like and how they influence us. It showed the previous discussed topics from a different perspective. In addition, it became clear what significance these images of a future have, how they are important for understanding the present and how they develop (ctf. Dufva & Ahlqvist, 2015). Here, the connection to the fourth lecture, the cultural transformation, was shown and how the present, future and past are connected. I understood that the individual experience of

the future can work in two ways. There is knowledge and our behavior from the present, which influences the ways how we think the future will become. On the other hand, the image of the future is influencing how we behave. This is not dependent on the history (ctf. Polak, 1973). I always thought that we used the past to understand how the future might be and neglected the importance of the images of the future. I found the background to Polak´s theories mentioned in the lecture particularly impressive. I would not expect that the lack of prospects in society in the 1970s had such an influence on the images and discussions about images of the future and that there was therefore no variety or motivation to talk about the future. For me the biggest takeaway is that all decision making has to do with the way how we understand the future.

It was interesting to hear what influence the current situation has on the image of the future and that it is important to have a positive impression or motivation here. It is like in sports, you need a goal and the idea that you can achieve it so you can get closer to it. Only in these ways can goals or even images of the future become a reason for change. Our image of the future is our source of change, on an individualist as well as on a societal level. The graph on the ability to influence the future and importance of influencing evoked associations with the current political situation in Germany. There appears to be a disenchantment with politics, which is also reflected in the fact that the blame for many of the current crises is being placed solely on the government (ctf. Germerott, 2024). The prevailing mood is that everything is negative, but that we cannot influence it ourselves. This can clearly be categorised in the lower left quadrant. All in all, I found Polak´s impressions very exciting and take the quote “silent death of our visions” (Polak, 1973) as a reminder for me.

Another interesting takeaway was how many factors (can) influence our image of the future and how much this depends on the individual. I was surprised to realise how volatile images of the future can be, that we are constantly producing them and that they can change all the time. Moreover, I would not have expected them to appear so differently, unconsciously or in a more concrete way. I would have expected them to be relatively stable over time and only adapt through relevant experiences. That is why it is also important to realize that if the predicted future changes, also the picture of the present changes. Therefore, the predictive future is also a driver for change in the present, from my point of view.

What are the critical elements of change? What is changing, or what is expected to change?

The anticipatory system presented in the lecture shows how the various factors influence the image of the future and therefore also of change. Here, the connection between biology and Futures Studies became clear to me again. As in the second and fourth lectures, the theories discussed came from a natural scientist, in this case Mr. Rosen, a biologist (ctf. Rosen, 1985). The above example made it obvious that we as a system have a model of our future in mind, which determines our behaviour. Added to this are external influences. I found the discussed example of pursuing a Master´s degree very impressive and once again understood how having a picture of my future in my head influences me personally and how I work towards it.

For me, the most important takeaway from this lecture was the understanding of biases and how we deal with information. The lecture provided us with knowledge, which we can also use in our everyday lives. The question of how we deal with information, whether we receive it or in what context we use it, is always relevant, as we are constantly in contact with information in our everyday lives. The biases and mental models can limit our views on reality. The mentioned examples about costs being higher in the present than in the future illustrated even more how the different backgrounds influence us. In my opinion, it is very important to recognize how much our environment impacts us and I was surprised to hear how it affects the images of the future and therefore, our opportunities. I realized what a privileged situation I come from and how grateful I can be for the fact that I have always been supported and made aware that I can achieve what I want – if I work for it. Our environment can influence us to go after things we want or not. If poor

people were raised in a culture, where there is no capacity to aspire, there is often no chance to get out of poverty.

Therefore, it is even more important for me to understand that not everyone has this capacity and that it is a big hurdle to come from a culture and environment where there is no capacity to aspire. This can have a negative impact on the image of the future. This is particularly important for future jobs and positions, that in order to get more diversity, you have to realise how different challenges can be for different people and that it is the task of organisations to adapt and support them. One should find ways to show how to get out of a seemingly hopeless situation. I also realised the importance of a good education system and how important it is for equal opportunities.

Nevertheless, it also became clear that even with the same information, we would still do different things out of it, because there are so many different capacities and all of us use them differently. Interesting was also to hear that we as humans need feelings to make decisions. If we were all homines oeconomicii and make only rational decisions, we couldn´t make any decisions at all. Even the seemingly simple question of which pen to use to sign a document with, would take forever, as we must weigh up the pros and cons.

How time and temporality is understood in theories? What are temporal scopes? How is the future, or the multiplicity of futures, understood and unraveled?

The presentation of prospection theory and the feed-forward-feedback loop built on what I already had learnt. I am familiar with this from my previous work in Human Resources and personnel development. We introduced the feed-forward-feedback method for employees and managers. However, this was only introduced as one of many methods to choose from. With the knowledge gained in this course, that it is not the past that influences our behaviour, but the future, I would now redesign the content and point out the importance of feed-forward. In general, the takeaway from this lecture is that the prospection theory is something you see in all moments of everyday life. You have expectations, to which you come up with observations and which you then compare with reality and revise (ctf. Seligman et al., 2013). Again, the learning that our future influences how we act in the present is an important realisation, which needs to be applied here.

Overall, we learnt about many different concepts in this lecture, which gave me a good overview. In found the Foresight Maturity Model particularly interesting, with its focus on organisations and seeing what influence which aspects have (ctf. Roehrbeck, 2010). And it was fascinating to see how the big picture was put together at the end and the resulting dimensions.

What kinds of linkages do the theories presented in the session have on FS theories and methods?

The link to the fourth lecture and the behaviour of people was shown in this lecture. I was particularly surprised by the results of the studies presented, as a higher level of futures awareness and capacity has an impact on positive mental health and more empathy.

All in all, what I took away from this lecture is that people have different starting points and that these strongly influence the image of the future. In futures thinking, there is a variety of inequality, from education, upbringing, culture etc. This is therefore an important point to start with and work on. Especially, because this is an area where I believe I can help to make a difference. In my role in Human Resources Management, I am also responsible for the apprentices and trainees and this is a chance to understand them better and also help them accordingly. The takeaways from this lecture should also be in mind when recruiting and selecting new employees. Furthermore, this can help to customize personnel development and better adapt the corporate learning. In addition to those aspects, it was important for me to realise how I influence my own image of the future and how my own situation can or will develop.

The futures literacy definition helped me to further understand how we see and discuss the future in the present and in the futures. The two additional articles provided further supported my learning process and gave me more clarity on the points mentioned in the lecture. The lecture provided a good overview of the topic and helped me to develop my comprehension of the Futures Studies further.

Learning Diary Lecture 4: Cultural Transformation and Cultural Sustainability

How is change conceptualized and characterized in theories and frameworks presented in the session?

To begin with, I can say that this was the lecture I was most looking forward to as the contents fit in with my degree programme at my home university very well and I wanted to get a lot out of it.

The lecture started with a definition of culture, as many other lectures do. However, I had not yet asked myself the question of whether we need a definition of culture. Answering this question and the multitude of definitions we discussed in the lecture opened up new perspectives for me. All in all, I feel that I have gained a good overview of the concept of culture and that new aspects have emerged that I would like to explore in more detail.

Until now, I have always categorised culture more as a way of life, something intangible rather than as a (cultural) product or production (ctf. Sesana et al., 2021). In the lecture, this aspect was not very clear to me at first, but now that I have thought about it again and researched it, I understand this statement more and more. However, for me, the most important takeaway from the lecture was the division or classification of culture into framework and river (Goody, 1994). This distinction reminded me personally of how definitions can help us perceive things. The definition of the framework helps to explain why there are boundaries, differences and disputes (ctf. Geertz, Clifford, 1957). Furthermore, the concept of the river helps us to understand how dialogues and habits emerge and function, and that culture is something that is constantly changing (ctf. Wantzen, 2024; Hannerz, 1992).

Discussing these two concepts in class helped me to understand how differently culture is perceived and discussed. It showed me once again that we are the creators of culture and that we have a responsibility to actively engage with it, because we as individuals are very powerful. It was also interesting for me to understand even more that we are in the middle of it right now and therefore perceive the culture differently.

It was also clear from the definitions that these are very subjective and that our view is strongly influences by what we have experienced and the current situation we find ourselves in. This was a link to the first lecture, that we see everything through different lenses. Each definition illuminates a certain part, but another one will always be in the shadows, depending on how the focus is set. I try to retain this learning and use this knowledge in the future to question further definitions.

What are the critical elements of change? What is changing, or what is expected to change?

In the lecture it became clear that we are the critical element in change and cultural transformation. We as human beings create, we co-create, we learn, we do something. However, the ”we” is central here and runs through all the areas of life (ctf. Gerholm, 1994). It is through these interactions and what we humans share with each other that our insights and attitudes are formed. It also became abundantly clear that change is inevitable, dynamic and always comes from us humans. This emphasised our responsibility as individuals and the power this can have.

The most important realisation for me was that we as humans are all involved and that this works independently of social and organisational processes. The understanding that cultural power can be understood as micro-level and goes beyond the meso- and macro-level surprised me and showed me once again the influence of culture and how the different levels interact. I found the classification of the different

forces that influence the flow of culture particulary interesting (ctf. Hannerz, 1992). From my point of view, this once again highlighted the multitude of factors, both seemingly small and large, that can have such an impact. This list gave me another good overview.

I initially had to look up the meaning of semiosis as a primary force, but the discussion in the lecture helped me to understand it more precisely. After the lecture I looked at the term again and developed a deeper understanding of it and its connection to culture. I understand anthroposemiosis now as a form of semiosis in which people use signs to give meaning, to communicate and to interpret. In the process, and through observations in my daily life, I realised how central signs and symbols are in our everyday lives and how different they can be as well as how much depends on the interpretation. The differences were already apparent to me in small ways when I arrived here in Finland. There are some other signs and rituals that I didn´t recognise at first glance, even though Germany and Finland are similar in many ways. This made me realise once again the role of the interpretant, but also of culture as a dynamic process. What fascinates me about this topic is that it can drive cultural change and that we as human beings should actively use this. The importance of semiosis became very clear to me in this lecture.

In the lecture, we also looked at what is changing or needs to change. For me personally, the link to sustainability was very interesting because it is the most important issue at the moment and I think there is no question that something has to change drastically. So, I found it very exciting to hear about the link between culture and sustainability and that we need to adapt it in order to achieve sustainable environmental goals. In addition to new technologies, we need new values that we give ourselves and we need to change ourselves as humans. This was explained by the fact that we as humans have to consider ethical aspects in every decision we make, regardless of whether we do something or not (ctf. Poli, 2017). In my view, the discussion about professional ethical responsibility emphasised how important it is to include different worldviews in the transformation process. One of the key lessons I took away is the role of inclusion and participation in cultural transformation. Culture can only change sustainably if people have the opportunity to actively participate. You can´t force people to move into a certain direction, you can only give them the option. This realisation can be applied to all other areas of life. You can´t force anything on anyone, but by involving them you can try to change things together.

How time and temporality is understood in theories? What are temporal scopes? How is the future, or the multiplicity of futures, understood and unravelled?

The importance of our own experiences was once again emphasised in the lecture. It was also exciting to hear how these affect the way we perceive past experiences in the past and how our current situation influences this. From this we can also conclude how we humans perceive futures differently and that no two people will have the same idea out of them. It became clear to me once again how both individual and collective memories have an indirect effect on the futures. The fact that people with similar conditions and memories can achieve similar results or produce no unexpected futures is very logical to me. This demonstrates the importance of diversity and the need for different insights to things. It also closes the circle to the second lecture, that you tend to hire people who are similar to yourself. All in all, the lecture showed that our current situation is very much influences by our image of the past and the future.

What kinds of linkages do the theories presented in the session have on FS theories and methods?

This lecture brought a full circle for me, as the topics of cultural transformation complemented the other topics very well. As culture runs through all areas, many aspects were taken up again here. Above all, I take away the fact that culture is constantly renewing itself through interaction and that we actively help to shape the culture. Culture is understood as a multi-layered construct. I can apply many of these findings to my further studies and my thesis, as this also can be applied to organisations.

Conclusion

On the one hand, the course gave me the chance to engage academically with the topic of Futures Studies and to learn new content. On the other hand, it gave me the opportunity to get to know myself better and to understand where I currently stand and how my image of futures influences my daily life. It gave me the chance to look at the lenses through which I see the world and, above all the general awareness that I perceive everything through lenses when I think about the future.

All in all, I learnt a lot of new things, as most of the mentioned theories were completely new to me. That was a challenge for me, and I had to look at many of the topics in detail again after the lecture in order to understand them fully. The Learning Diary was an advantage for this, as I was forced to work through the lectures straight away. From my point of view, the course gave a rounded overview of topics that gave me a big picture when I think about transformation. Above all, I take away how culture and Futures Studies are connected and how many different dimensions transformation has.

I approached this course without many expectations as I thought it sounded exciting, but I couldn't imagine what it would be like. Nevertheless, the course gave me many different impressions and impulses. It has not only given me academic added value, which I can use for my thesis, but also, I am taking many things with me for my own life. It gave me a glimpse into the thinking and working of Futurists and an understanding of how change and transformation can work. I plan to continue studying the topics I have learnt in the lectures and have already looked which courses my home university offers, that complement what I have learnt so far.

All in all, I was positively surprised by this course and would recommend highly it to other (exchange) students.

References

Child, J. and Rodrigues, S.B. (2011) How organizations engage with external complexity: a political action perspective, Organization Studies, Vol. 32 No. 6, pp. 803–824. https://doi.org/10.1177/01708406114108.

Deviney, A. V., Classen, J. J., & Bruce, J. A. (2023) A methodology for using a multilevel perspective framework to analyze complex systems. Methodological Innovations, 16(2), 123–137. https://doi.org/10.1177/20597991231160280.

Dufva, M., & Ahlqvist, T. (2015) Elements in the construction of future orientation: A systems view of foresight. Futures : The Journal of Policy, Planning and Futures Studies, 73, 112–125. 10.1016/j.futures.2015.08.006.

Gandenberger, C., Clausen, J., and Grimm, A. (2020) Theoretische Grundlagen für die Analyse von Transformationsprozessen auf Branchenebene und Anwendung auf die Automobilbranche. Hans-Böckler-Stiftung. 10.24406/publica-fhg-300507.

Geels, F. W., and Schot, J. (2010) The Dynamics of Transitions. A Socio-Technical Perspective. In: Transitions to Sustainable Development: New Directions in the Study of Long Term Transformative Change, edited by John Grin, Jan Rotmans, and Johan Schot https://doi.org/10.4324/9780203856598.

Geertz, C. (1957) Ritual and Social Change: A Javanese Example. American Anthroplogist, 59: 1, 32–54. Ritual and Social Change: A Javanese Example on JSTOR

Gerholm, L. (1994) The Concept of Culture in Ethnology. In Annick Sjögren & Lena Janson (ed. by), Culture and Managegement in a Changing Europe. Botkyrka: Multicultural Centre & Stockholm: Institute of international business, 15–28.

Germerott, I. (2024) Warum sind so viele Deutschen unzufrieden mit der aktuellen Politik? National Geographic. Warum sind so viele Deutsche unzufrieden mit der aktuellen Politik? | National Geographic

Goody, J. (1994) Culture and Its Boundaries: A European View. In Robert Borofsky (ed. by), Assessing Cultural Anthropology. New York et al.: McGraw-Hill, Inc., 250–261. https://doi.org/10.1111/j.1469-8676.1992.tb00238.x.

Grant, C. (2020) Concepts, Terms and Measurement in Agile Working. In: Grant, C., Russell, E. (eds) Agile Working and Well-Being in the Digital Age. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-60283-3_2.

Hannerz, U. (1992) Cultural Complexity. Studies in the Social Organization of Meaning. New York: Columbia University Press. Hans-Böckler-Stiftung, -1, 2020. https://publica.fraunhofer.de/handle/publica/300507.

Metz, D. (2004) Beratung komplexer Organisationen. In: Baecker, D., Dievernich, F.E.P., Schmidt, T. (eds) Strategien der Organisation. Deutscher Universitätsverlag, Wiesbaden. https://doi.org/10.1007/978-3-322-81153-0_5.

Nielsen, M. (2021) Gender in academic recruitment and selection. The Gender-Sensitive University: 28-40. 9780367431174_Text.indd (oapen.org)

Polak, F. L. (1973) The image of the future (E. Boulding Trans.). Amsterdam: Elsevier.

Poli, R. (2017) Introduction to Anticipation Studies. Cham, Switzerland: Springer International Publishing AB. https://doi.org/10.1007/978-3-319-63023-6.

Rat der EU (2024), Schwere Nutzfahrzeuge: Rat beschließt strengere CO_2 Emissionsnormen, Schwere Nutzfahrzeuge: Rat beschließt strengere CO_2-Emissionsnormen (europa.eu)

Rohrbeck, R. (2011) Corporate foresight. Towards a maturity model for the future orientation of a firm. Heidelberg: Physica-Verlag https://doi.org/10.1007/978-3-7908-2626-5.

Rosen, R. (1985) Anticipatory systems: Philosophical, mathematical, and methodological foundations 2nd Edition: Springer New York, NY. https://doi.org/10.1007/978-1-4614-1269-4.

Sesana E., Gagnon A.S., Ciantelli C., Cassar J.A., Hughes J. J. (2021) Climate change impacts on cultural heritage: A literature review. WIREs Clim Change; 12:e710. https://doi.org/10.1002/wcc.710.

Seligman, M. E. P., Railton, P., Baumeister, R. F., & Sripada, C. (2013) Navigating into the future or driven by the past. Perspectives on Psychological Science, 8(2), 119-141. https://doi.org/10.1177/1745691612474317.

Taskan, B., Junça-Silva, A. and Caetano, A. (2022), Clarifying the conceptual map of VUCA: a systematic review, International Journal of Organizational Analysis, Vol. 30 No. 7, pp. 196-217 https://doi.org/10.1108/IJOA-02-2022-3136.

Van de Ven, A. H. & Poole, M. S. (1995) Explaining Development and Change in Organizations.

Academy of Management Review 20 (3), 510-540 https://doi.org/10.2307/258786.

Wächter, L. (2020) Kondratieff (auch: Kondratjew), Nikolai D. In: Ökonomen auf einen Blick. Springer Gabler, Wiesbaden. https://doi.org/10.1007/978.

Wantzen, K.M. (2024) River culture: How socio-ecological linkages to the rhythm of the waters develop, how they are lost, and how they can be regained. The Geographical Journal, 190, e12476. https://doi.org/10.1111/geoj.12476.

Learning Diary: Theories of Futures Studies and Transformation

Andrey Melnikov

Turku School of Economics, University of Turku

Introduction

This paper represents the learning diary of a Master's Degree Student, Andrey Melnikov as a reflective personal summary of five sessions (lectures, readings and discussions) within the "FUTS3102 FUTUS2 Theories of Futures Studies and Transformation" course led through Sep.– Oct. 2024. The content of the diary is related to lectures, reading assignments, and discussions.

Through the diary, I tried to follow the questions suggested by Markku Wilenius, as follows:

1. How can we conceptualize and characterize the theories and frameworks presented in the session?
2. What are the key elements? What is changing, or what is expected to change?
3. How are time and temporality understood in theories? What are temporal scopes?
4. How are futures, or the multiplicity of futures, understood and unravelled?
5. What kind of connections do theories presented in the session have on futures studies theories and methods?

However, I realize that sometimes I tend to fluctuate between contextual takeaways and personal thoughts and doubts detached from those questions. I hope that it neither distorts the attention of the reader nor breaks the narrative.

I would prefer to commence the diary content introduction with a spontaneous, albeit rather imminent idea or question raised by one of my classmates, almost at the end of the 1st lecture: "Do you believe in inevitability?" One could admit the reasonability of that question by contemplating the patterns and waves of humankind's development. However, with its seeming simplicity and temptation to start answering immediately, it can distract us from the "yellow brick road" which leads us to futures images based on the analysis of human history and (human) methods of elaboration of those futures images. Let's leave it temporarily aside and turn our attention to the contextual source of its origin.

Reflections on the Sessions

Session 1. Theories Focusing on Socio-technical Transformation: Markku Wilenius, 04.09.2024

Minkkinen et al. (2019, p. 2) define the following core characteristics of foresight: "systematic inquiry into longer-term futures, including emerging and novel issues, which in turn enables present decision-making and action". The main argument of the authors is that the interdisciplinarity and complexity of foresight, and the variety of its practices, constitute the "cairn" of foresight approaches and might be systematized and analyzed through a two-dimensional scheme where one of the axes is a "level of perceived unpredictability" and the other "level of pursued change". Regarding these dimensions, a six-frame typology of foresight is suggested: 1 level – counting from closed to open systems (in terms of perceived unpredictability)

“predictive”, “scenaric”, and “critical” frames are suggested, this level implies foresight that serves to explore and describe futures, and build resilience; 2 level – counting from closed to open systems “planning”, “visionary”, and “transformative” frames are depicted, this level includes foresight that applied for “normative influencing”. (Minkkinen et al., 2019). In other, quite rough words, the plurality of foresight approaches permits not only forecasting (somehow) and preparing for the futures but also creating novelty and designing the futures (Minkkinen et al., 2019, p. 7).

From my perspective, the metaphor of a telescope, given in the session, might be employed to explain how the futures could be explored multi-dimensionally. Six frameworks of foresight (Minkkinen et al., 2019) in such analogy are the lenses through which we can get modalities of futures images whereas the theories of socio-techno-economical change are the gears and toggles to switch the telescope from one regime to another, tune it, and analyze images of the futures in different spectrums, e.g., infrared, ultraviolet, radio, etc.

In their research, Sovacool and Hess (2017) identified almost one hundred (96) theories/theoretical frameworks of sociotechnical change in 22 disciplines; fourteen are the most prominent and relevant. Since the diary is too small to describe them, I mention only the top three theories (according to the Sovacool and Hess (2017) ranking) that can be utilized for analytical exercises within foresight.

The most prominent theory frequently acknowledged by experts in technology and social science theory is MLP (Multilevel Perspective) or ‘Sociotechnical Transitions’. Stemming from different social and humanitarian disciplines, mostly connected with “evolutionary economics, science and technology studies, and sociology” (Vähäkari et al., 2020, p. 3), MLP suggests an analytical frame through a three-level perspective, namely the niche, the regime, and the landscape, usually depicted visually in such order bottom up where the niche is on the lowest level.

The niche contains experimental and disruptive innovations (-s) that appear predominantly independently from the upper levels and their pressure as a result of R&D or entrepreneurship/innovative activity in a nonregulated environment (Vähäkari et al., 2020, p. 4). The breakthrough or collapse of the mentioned innovations is dependent on various socio-economic factors (Geels and Schot, 2011, cited in Vähäkari et al., 2020, p. 4).

The regime consists of institutions, rules (cognitive, regulatory, normative), and policies constituting a sociotechnical system, including current markets, technologies, culture, science, and industry. The regime is dynamically stable even though there can be slight non-arguable changes. (Vähäkari et al., 2020, p. 4; Sovacool and Hess, 2017, p. 709).

The landscape is the broadest upper-level external sociotechnical context, which implies long-term, slow processes and scalable phenomena, such as climate, demographic change, and industrialization. However, some landscape changes can be relatively faster, e.g., any crisis (war, natural disasters, pandemics, market crash, etc.). (Vähäkari et al., 2020, 3–4; Sovacool and Hess, 2017, p. 709).

The interactions, rather often conflictual, among these layers result in one of the “transition pathways” summed up in four categories: 1) technological substitution (matured innovation disrupts the upper layers under the initial landscape pressure); 2) transformation (non-matured innovation under the pressure of the landscape is evenly accommodated to the regime); 3) reconfiguration (synergic innovations adjust to the regime with further architectural evolvements under the pressure of the landscape); 4) de-alignment and re-alignment (under considerable landscape pressures regime is undermined while innovations are non-matured; the regime is re-created around on of the underdeveloped niche-innovations). In such transitions, the upper layers suppress niches that might lead to their failure. (Sovacool and Hess 2017, pp. 709–710).

According to Sovacool and Hess (2017, pp. 709–711), although the MLP possesses vivid utility and benefits in explaining sociotechnical transitions in a systemic way, several shortcomings and limitations arise

since the model is still theoretical; hence, it tends to simplify reality. For example, the researchers frequently mention the agency and human needs ignorance, the size, and boundaries, including geographical ones, of the layers, and their overall ambiguity in addition to struggling with "politics, power, and hegemony" issues explanations (Sovacool and Hess, 2017, p. 711).

Despite the limitations, Vähäkari. et al. (2020) argue that the MLP obtains conceptual interlinkages with futures studies and might be applied both for historical (backward) analysis of socio-technological transitions or for future systemic development anticipation where megatrends correlate with landscape-level changes, trends with regime, weak signals, and emerging trends with niche, wild cards, and black swans with avalanche changes; therefore, the MLP framework might be valuable for the foresight and particularly for the scenario planning (Vähäkari et al., 2020, pp. 6–7).

In contrast with the previous approach, the Social Practice Theory (SPT), or 'theories of practice', as indicated by its name, handles human practices as a core element of the system change, including technology. Technologies here, along with material objects, are 'materialities' that are only one of the elements of the social practices, in addition to "competences", "meanings", and "connections" with a central role of "performance" (or "'doing' something"). Hence, the socio-technological transition implies an initial and primary change in social practices. Human actions driven by "beliefs, values, lifestyles, and tastes" are co-created with social structures and united into 'circuits' of practices that can foster or suppress technological developments. (Sovacool and Hess, 2017, pp. 711–713). "So, unlike the MLP, which places technology at its heart, Social Practice Theory zooms in on the actions of people." (Sovacool and Hess, 2017, p. 713).

The third theory most cited by experts in Sovacool & Hess's (2017) study is Discourse Theory. The central element – discourse – is a coherent collective "meaning-systems" that serve to understand the world and is historically created by the constellation of intertwined "objects, concepts, and practices". The Discourse Theory is rooted in poststructuralist philosophic ideas, e.g., Foucault's 'discourse' "as practices that systematically form the objects of which they speak" (Foucault, 1972, p. 49). The understanding of the reasons for socio-technological transitions lies in analyzing the discourses, narratives, and argumentation (deconstruction of thoughts and language) behind people (e.g., decision-makers), or institutions (that are tied with ideas or ideology), i.e., revealing the "regime of truth". The limitation of this theory is in its strength – the complexity of analyzed elements ('system of meanings') that might lead to substantial description rather than comprehension of core reasons; moreover, in the case of sophisticated and compound systems, such analysis might demand highly proficient multidisciplinary expertise. (Sovacool and Hess 2017, pp. 714–715).

In terms of futures studies, from my perspective, quite a similar approach is utilized by the Causal Layered Analysis (CLA) suggested by Inayatullah (1998) as a specific analytical method in futures research. Inayatullah succeeded in the operationalization of the discourse analysis through critical analysis of the 'text' and tended to "'undefine' the future" rather than predict (Inayatullah, 1998, p. 816).

The CLA includes four domains of analysis as follows: 1) Litany (conventional agenda); 2) Systemic causes (political, economic, historical, technological, and environmental aspects); 3) Worldview (deep cultural, paradigm entities, values, and assumptions); and 4) Mith/Metaphor (unconscious archetypical images and stories). The method serves to analyze visible (1st and 2nd layers) and hidden (3rd and 4th layers) challenges, issues ('discourse'), and, accordingly, possible solutions (Kaboli and Tapio, 2017).

In the framework of "foresight as a system" (Minkkinen et al., 2019) the constant and methodologically empowered inquiring about the futures in societal structures emulates the generic feature of multiple natural systems – anticipation – that implies proactivity in acting concerning a possible future event instead of reactive behavior as a consequence of an already happened incident (Poli, 2019, p. 5). Wilenius and Kurki (2019) suggest a similar concept, "of reflexive foresight," that is applied to the long-term socioeconomic waves and organizations as anticipatory systems rooted in Kondratiev's wave theory.

Kondratiev's wave theory, in short, might be explained as such: core technologies (clusters) with subsequent corresponding institutional structures drive economic growth in 40–60-year cycles, which in turn have tremendous transitive social implications. Wilenius and Kurki (2019, p. 4) argue that long-wave patterns can be utilized as an anticipatory tool for understanding society and its everlasting cyclic transformation. Moreover, the next wave nests in the previous one and can be modeled based on the main drivers within two intertwined key dimensions: social (e.g., changing social structures and needs) and techno-economic (e.g., emerging technologies that tend to become core ones). Such a concept overcomes the limitations of the abovementioned theories where one of the elements, social or technological, is dominant and a key driver for the transition.

From 1780 to our day, five waves made a full cycle where technological drivers and human interests changed from steam engines to digital communication technologies and from the motivation of decent life to the creation of new space correspondingly (Wilenius and Kurki 2019, p. 8). New rising from 2010 6th wave is anticipated as "intelligent solutions" based and driven by the following: 1) social changes and key trends: globalization, demographic change (aging and longevity), as well as rising complexity of society, environmental concerns, and web-based empowerment; 2) techno-drivers: resource-efficient technologies, bioeconomy, IoT, health services; resource productivity and human-focused solutions are the cornerstone of the pursuit in the wave (Wilenius and Kurki, 2019, pp. 10–11).

Also, this tool, or "cycle theory", is utilized for "social anticipation" by analyzing wider societal transformation patterns through long historical periods when each contains a particular form of human organization. One can observe the "self-organization stage" of such societal development attributed to the 6th wave. Self-managed, holistic in terms of working environment, visionary, and mission-oriented organizations and businesses with low hierarchy levels are the vivid markers of the rising wave. Moreover, these "organic creatures" are the consequence, the output of the globalized complexifying society, and simultaneously are a driving force for the sixth wave; their core features (CARE-model), such as quality in information sharing and collaboration, preference for soft skills, trustworthy and human-centered approach, focus on innovations, long-termism, risk-taking, and orientation to the future are the attributes that tend to become commonly accepted by 6th wave's organizations. Additionally, organizations of the upcoming wave possess a distinctive characteristic in their practice – reflective foresight – that empowers them with social (not just collective) behavior, common interests, shared values, long-term goals, missions, and common creative power. (Wilenius and Kurki, 2019, pp. 11–19).

From my perspective, Kondratiev's wave theory in terms of MLP might be considered an analytical foresight methodology for the upper-level – landscape –, since it implies megatrends and operates in a long-term perspective. Moreover, reviewing the content of the session (lecture, discussions, and reading) for multidimensional and profound strategic foresight I would combine almost all of the mentioned theories and concepts to construct the wholistic image of the future with possible transmission points and bifurcations.

Session 2. Evolutionary Thinking and Futures Research: Tuomas Kuhmonen, 18.09.2024

For me, this session and contemplating the content afterward occurred under the informal caption: "survivorship bias and lottery".

Following the biological evolutionary framework, Alchian (1950) argues that in a highly volatile and unpredictable environment and lack of rationality, the regular (more than half a century ago) 'profit maximization' strategy for business is inappropriate; hence, 'positive profit' as a main target and real 'trial-and-error' behavior should be prioritized to adapt to that environment for survival. Hence, fundamental elements of economic analysis are incomplete information and complex uncertainty, which should consequently be reflected in relevant foresight exercises. (Alchian, 1950).

To analyze how and why change occurs in social entities (primarily in organizations), according to van de Ven and Poole (1995), four types of process theories might be invoked: life-cycle, teleological, dialectical, and evolutionary theories. These theories contain drastically different explanations of drivers ("motors") and characteristics of the process itself, including mode and unity of change. From the author's perspective, the process, in that case, is "progression (i.e., the order and sequence) of events in an organizational entity's existence over time" and change is "an empirical observation of difference in form, quality, or state over time in an organizational entity", in that sense, development is a process of change (van de Ven and Poole 1995, p. 512).

Life-cycle theory considers change imminent and predetermined by certain program or logic (the motor of change) through necessary stages and influenced by environmental factors, i.e., maturation of the entity to the final prefigured state. That implies cumulative and conjunctive sequential development, likewise biological evolution, where each phase relies on the previous ones; however, in comparison with the below-mentioned Evolutionary theory, the unit of change is a single entity, and change is prescribed. In terms of organizational development, that might imply formation under the institutional rules or programs according to a prescribed order, for instance, specific stages to be proceeded by pharmaceutical firms in new drug production or innovation phases. (van de Ven and Poole 1995, pp. 515, 520).

In contrast with the Life-cycle theory, the Teleological theory postulates the primacy of purposeful development ("purposeful social construction" – the motor of change) with accommodative creative freedom when an organization is goal-directed (by individuals and groups), however, goal achievement is limited by external factors, resources, other actors, or institutional barriers, shaping that goal. By the final accomplishment, the organization reconstructs future goals under the lived experience and environmental constraints and change, and the cycle of 'action-evaluation-modification' repeats. In such a movement, organizational development is non-linear; however, the theory outlines rational decision-making as an impactful factor for path selection, even though it was triggered by environmental instability. As well as in the previous case (life-cycle theory), the unit of change here is a single entity. (van de Ven and Poole 1995, pp. 515–517, 520).

The Dialectical theory (originating from Hegelian philosophy) suggests an explanation of development as a consequence of the conflict between opposite goals and values, resulting in stability ("balance of power") through struggle and accommodation (confrontation and conflict – the motor of change). Hence, change originates from powerful conflictual forces. The conceptual scheme is 'thesis + antithesis = synthesis' where the last one is the novelty; however, that does not imply an imminent creative outcome, and organizations might adapt through synthesis ('win-win' outcome for efficient conflict management), or resist change, mobilizing power and antithesis can replace 'thesis' ('win-lose' outcome). The core unit of change within this approach is multiple entities. (van de Ven and Poole 1995, pp. 517, 521).

The Evolutionary Theory, rooted in the concepts of Darwin and Lamarck, follows a biological approach that contains, as core elements of organizational development and transformation, the processes of variation, selection, and retention in response to environmental changes and competition for resources. The motor of change within this framework is "competition for scarce environmental resources between entities" (van de Ven and Poole 1995, p. 521). Evolution can occur gradually (the classic Darwinian view) or by saltation (e.g., Gould 1989), and it possesses a hierarchy in individual and population-level changes. Likewise, in the Dialectical theory, the unit of change in this framework is multiple entities. (van de Ven and Poole, 1995, pp. 517, 520).

Additionally, van de Ven & Poole (1995) distinguish two different modes of change attributed to these four theories and assert that change can be prescribed (deterministic) with first-order adaptation – namely Life-cycle and Evolutionary theories – and constructive (emergent) with second-order, unpredictable adaptation – Teleological and Dialectical Theories. (van de Ven and Poole, 1995, pp. 522–524).

The practical (and theoretical) utility of the evolutionary theories presented in the session for foresight and futures studies in general is in applicability to embedded analytical work. Since the cyclical character of development and change is a common trait in all theories in addition to the crucial, determinative role of the environment (except the Dialectical theory), roughly speaking, the main activity of the futurist is to anticipate environmental fluctuations (changes, transformations, saltations) and model appropriate (possible, probable, plausible, preferable) way of organizational or, in a broader sense, societal development/change. In other words, according to Mannermaa (1991, p. 358 cited in Kuhmonen, 2024), futures research implies an identification of signs of destabilization, breaks, social movements, technological innovations, or bifurcation points, and a following mapping of the possibilities for the futures. That includes, for example, megatrends, trends, weak signals, wild cards/black swans analysis, scenario planning, and visioning (Kuhmonen, 2024).

Despite the almost full clarity of this approach, several details in the readings and the overall idea of the evolutionary framework still foster my doubts. For example, considering the van de Ven and Poole (1995) categorization of the theories, Freud is mentioned as a pioneer of Dialectical theory that, from my perspective, is slightly controversial. Although the conflict in Freud's theory is a central concept, his understanding of change is mostly attributed to individual, personal, rather than social (see, for example, de Berg, 2002), and it does not directly apply to the analysis of social phenomena. However, the ideas of Freud's successors in psychoanalysis tenets, e.g., Jung's concept of collective archetypes, are widely utilized in such analysis of societal matter, in futures studies, the most prominent example is the deepest 'Myth' layer in Causal Layered Analysis of Inayatullah (Jung, 1971, cited in Kaboli and Tapio, 2018, p. 36). Additionally, Freud's approach is based on the idea of personal development (of a child) as a process of gradual maturation and sequential evolvement through specific and common stages for all human beings (e.g., the oral, the anal, the phallic, the latent, and the genital). Hence, I believe Freud's name is better situated in the pool of life-cycle theories than dialectical ones.

Concerning the overall idea of evolutionary concepts in the social sphere, as I mentioned before, at least the Dialectical and partly Teleological theories might be excluded from this approach since the former is about the change as a result of the conflict of (collective) 'agents' and the latter implies voluntary change (goal-setting) even though triggered by the environment. I suppose that in the 'classic' evolution, there is a dramatic lack of agency and purposeful goal-planning since environment and (mis)fortune play basic roles in the survival and proliferation of the species. Hence, the evolutionary approach might be the initial point for futurist analysis of the environment, which still remains a critical factor of social development; however, subjectivity, agency, and purposefulness should be added to the equation, or… humankind will never reach Mars.

Session 3. Theories of Transformation – Anticipatory Approach (Actors and Processes): Sanna Ahvenharju, 25.09.2024

If the logic from the first to the third session were depicted visually the funnel would be the best image since it was the path from the upper broad societal layers and transformations within them (1st session) through the middle organizational layer (2nd session) to the individual layer where the subject vividly appears (3rd session). Or in another metaphoric picture, if the scheme of the MLP were zoomed by orders of magnitude then each pixel in the lines, arrows, and dots would be the individual/subject, whose random in terms of upper layers but voluntary and purposeful in their own viewpoint activities intertwined with their own kinds and is integrally resulted in each niche-innovations breakthrough, regime reconfiguration, and exogenous context fluctuation. In such cases, historians tend to discuss the role of the persona in history.

The session contains four major parts: 1) Individuals' relationship with the future as a source of transformation and change; 2) Individuals' capacity to think about the future; 3) Futures Literacy; and 4) Future consciousness.

The core idea of the first part is the postulate of the future(s) as a source of the present life systems, including human beings, decisions, and, consequently, action (behavior), or more broadly, social change. In that sense, two principal concepts are considered as necessary conditions for such present decisions: 'image(s) of the future' (source) and 'anticipation' (capability to produce the futures images). The former is rooted in the ideas of many scholars from various disciplines, e.g., Bergson and Simondon (Schick, 2022), Bell and Mau (1971), Polak (1973), Rubin (1998), etc., and implies an image as a 'myth', "mental construction" about the future expected possibilities "based on our beliefs about the past and the present, about causes and effects as well as our values" and created by anticipation which possesses a 'proactive force'. The latter – anticipation – is attributed to any living system/organism as a specific activity of the anticipatory system. Anticipation is multifaceted and might have similar concepts in a range of disciplines and theories, e.g., 'expectation', 'prescient learning', 'adaptive control', etc. (Ahvenharju, 2022b).

"An anticipatory system is a system containing a predictive model of itself and/or 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, p. 341 cited in Poli, 2010, p. 770). This is a core discrepancy between physical (non-living) and living systems – future states –that may determine changes of state in comparison with physics where only present states and present forces (Poli, 2010, p. 770).

Considering individuals, the capacity to think about the future and alternatives, if it is possible to say in a utilitarian way, can be rather useful, as it reduces delay discounting and existence bias, inspires, and can lead to success. Currently, multidisciplinarity in futures capacity studies provokes terminology constraints, and each concept brings new dimensions and details to an understanding of human capability to comprehend and design futures. However, at least three components might be mentioned as common or similar in various concepts, namely: motivation, cognition, and action (behavior), and, that is not less important, their interconnection with future time perspective in a systemic way. Two concepts were outlined more vividly since they contain quite a voluminous description of the individual's capacity to work with futures regarding the abovementioned domains: Futures Literacy (FL) and Future Consciousness (FC). (Ahvenharju, 2022b).

In short, FL implies the capacity for the purposive and appropriate deployment of anticipatory systems that include an epistemic element (acquisition and creation of various knowledge about futures) and correspondent skills of how to 'use-the-future' (Poli, Miller and Rossel, 2018, p.58 cited in Ahvenharju, 2022b).

FC is a more complex and sophisticated concept and integrates several concepts in future studies and foresight. The essential entity of the Futures Consciousness is the human anticipatory capacity, i.e., the generic ability "to understand, anticipate, prepare for and embrace the future" (Ahvenharju, 2022a, p. 72). As outlined by the author, the Futures Consciousness is not a specific skill that can be trained; rather, this capability appears as a personal trait or set of features inherent to an individual. Nevertheless, it can be developed throughout the individual's life, including education as a fostering environment. The FC contains five domains, namely "time perspective, agency beliefs, systems perception, concern for others, and openness to alternatives" (Ahvenharju, 2022a, p. 74). The unique combination of states (described by psychological concepts) within these domains might reveal how individuals anticipate the futures and, consequently, how that is reflected in their behavior. The domains are intertwined, e.g., 'time perspective' and 'agency beliefs' linked to the personal concern of consequences, continuity of 'past-present-future', personal control, and optimism about futures; whereas 'system perception' and 'concern for others' bear personal attitudes toward the social and natural environment (including caring for their well-being). The 'openness to alternatives', also influenced by four other domains, indicates readiness to consider and embrace novelty and being resilient to unpredictable futures. (Ahvenharju et al., 2021). To measure all incorporated individual psychological characteristics, the Futures Consciousness Psychometric Scale was developed (the standardized procedures of the psychometric scale elaboration and revision were applied) (Ahvenharju, 2022a; Lalot et al., 2021). It is worth underlining that the test does not measure behavior, awareness of particular trends, or image of the future, but psychological personal traits in cognitive, emotional,

and motivational spheres to act relatively: to behave, to be aware, and to create futures images (Ahvenharju, 2022b).

This session triggered me to consider my personal professional background in psychology substantively. Not deeply delving into the theoretical issues of two core concepts in the session – anticipation and futures consciousness – I would like to highlight tiny details about them.

Roughly speaking, anticipation (but in other terms) has been under investigation for almost a century, e.g., in the behavioristic learning theory: for instance, Thorndike assumed that human reaction to stimuli is not ultimately reactive (see e.g., Akpan and Kennedy, 2020). According to Bernstein (1947), even human motor movements are purposive, and motor skill formation in the initial stage implies voluntary (conscious and unconscious) variation of the solutions to the motor problem. From my perspective (disclaimer: not yet completely informed), the discussed model of anticipation inherited a general trait of the behavioristic approach – primacy of the environment, which an individual (or social entity) should anticipate and adapt in advance accordingly. Even though the individual sets the goal, that goal considers predominantly the future state of the environment, which in turn shapes the behavior and the following goals. In my viewpoint, such a paradigm neglects free imagination and utter will. For example, the initial ideas of Tsiolkovsky about space conquering were totally imaginary and detached from reality (in terms of the natural environment but not from physical laws) – the environment in such cases is utilized for 'meaningless' (in terms of future behavior in that anticipated environment) but purposeful action in the sake of pure curiosity (glory, fortune, etc.) rather than human beings simply adapting to the environment.

Concerning future consciousness, I would like to outline that despite the ongoing process of conceptualization (see, for example, Baars, 2015; Kriegel, 2020; Seth and Bayne, 2022) and a considerable number of theories in various disciplines without the ultimate notion of 'consciousness', in my humble opinion, contemporary understanding of the concept is more universal and aspect of 'mental exercises with futures' might be part of the "conscious content" (Baars, 2015) rather than the separated unique, one more type of consciousness. However, this minor comment on the theoretical aspect does not influence the concept and measuring instrument's perception as utterly valuable and useful on the practical level for operationalization and following estimation and development of human attitudes and behavior toward the futures.

Session 4. Cultural Transformation and Cultural Sustainability: Katriina Siivonen, 02.10.2024

Despite the word 'culture' and its intuitive notion virtually being in daily use, from a theoretical viewpoint and in terms of empirical research, it is hardly possible to find a more sophisticated, complex, complicated, and even elusive concept. This case is déjà vu-like and might be compared to the study of 'consciousness': we definitely know it exists, but how to reflect it since it reflects itself by itself to comprehend itself. Sometimes the metaphor of an elephant in a dark room is close to reality when each researcher highlights with their flashlight only part of the animal and interprets it from their perspective; hence, we can obtain precise descriptions of parts but fail in realizing the general concept of the elephant.

Despite the limitation in proper conceptualization, culture can be considered a product (e.g., tangible and intangible heritage like art, events, texts, etc.) and a way of life together (including worldviews/values, practices, and habits). Side note: All of the concepts and theories herein are the products and the process of cultural construction. (Siivonen, 2018, p. 21).

To explain how human beings share culture the metaphor of the 'river' might be rather valuable: culture in such cases appears in both dimensions – as a framework or structure (socially, geographically, nationally, ideologically, symbolically, etc. framed) and as a process (unstoppably renovated and recreated flow). (Siivonen, 2024). As it sounds in ancient sophism attributed to Heraclitus: "you could not step twice into the same river" since you are changing and the river is changing (Department of Philosophy, 2022). In terms of future(s) changing, two culturally determined and intertwined entities have crucial meanings –

individual and collective memories/oral history and images of futures. Sometimes, futures images can be strongly suppressed by (co)memorized and inherited past entities rather than bringing unexpected novelty and positive changes (Siivonen, 2024).

For example, cultural heritage (including traditions, habits, and tenors of life) can be somewhat controversial in terms of sustainable development. Although the outer observer might consider the centuries-old way of living in some areas harmonious with nature, a closer scrutiny reveals ecologically unsustainable practices/way of living. That fosters reconsidering the idea of 'cultural heritage' as a congealed concept. Its safeguarding (that is valuable by itself), or cultural sustainability in a broader sense, should be balanced and equated with ecological sustainability. Such reconsidering implies moving "beyond the instrumental use of cultural heritage" (Siivonen, 2018, p. 31). Culture, in general, should be transformed from one of the dimensions, or 'pillars' in the concept of sustainability (in parallel with economic, ecological, and social aspects) to a common platform for all forms of sustainability. One of the core mechanisms of that transformation is "anthroposemiosis". It implies including in the understanding of the surrounding world through sign creation as a mind tool for the interpretation of outside entities (of the outer world), their "cultivation and culturalization". The process of "anthroposemiosis" is everlasting, like in a river metaphor. Beyond signs are meanings, values, and human practices toward the outer environment; hence, changing signs (meaning) could be the way of changing attitudes (traditions) and behavior (habits) toward nature, making it more ecologically sustainable. (Siivonen, 2018). However, a more fundamental approach in terms of general sustainability is when culture is considered "as sustainable development" with an "evolutionary, holistic, and transformative role, providing a new paradigm to the question of sustainable development" (Dessein et al., 2015, pp. 29-31 cited in Siivonen, 2024)

This session finished for me with exciting reading when I found the arguments for my earlier comments on the sources of changes, such as 'agency' and the intuitive idea of integration of systemic theoretical frameworks with socio-psychological ones to get a holistic and coherent explanatory model, which includes subjects, their agency, and relations as driving forces of transformation. Huttunen et al. (2021) argue that the MLP framework might be considerably enriched by incorporating the analysis of individual and institutional agency, embedded practices, and relational agency, as well as behavior change as a source of sustainability transitions on all levels (niche, regime, landscape). "While the MLP combines several approaches and has provided an analytically useful heuristic to understand socio-technical transition processes, it can benefit from further diversification and focus related to agency." And vice versa. (Huttunen et al., 2021, p. 3). Even landscape exposures to change "through discursive work" of "moral entrepreneurs" and routine "actors' behaviour in everyday life" (Huttunen et al., 2021, p. 2), or in another word, through the 'way of living', i.e., culture as a river. This is one of the possible ways to succeed in the paradigm shift regarding Meadows' system leverage points (Meadows, 2009).

The logical output of the suggested approach for futurist work is an understanding of the necessity of participation in the foresight of a maximum possible number of 'actors' and co-creation of futures through collaborative forms, such as futures workshops. This approach also involves a scrutiny analysis of the socio-cultural realms to reveal all subjects with agency, unlimited imagination, and absolute will to desire unexpected but better futures (Siivonen, 2024).

Session 5: 09.10.2024 – Conclusion

The fifth session might be presented as a summary of the entire course; hence, I decided not to dedicate a separate chapter to the conclusion. Moreover, during the session, the main takeaways and questions about each previous one were presented.

Considering my learning journey, I can admit that from session to session, my theoretical understanding of social transformation frameworks and concepts (overall models, driving forces, sources, agents, relations, etc.) has been maturing gradually and provoked questions that were answered in the next stage, by

following the lectures and reading. Starting from the analysis of the upper-level, socio-technical landscape, and high-scale changes in the first session, through the meso-level, highlighting the societal aspects as a source of evolutionary transformation under environmental pressure, to the subject agency of actors whose imagination and volition drive futures possibilities. Currently, I believe that the entire course fostered the development in my mind (futures consciousness?) of a holistic map of theoretical ground for foresight and futures studies.

Despite the broad and highly saturated content of the course, some, perhaps naïve, questions remain, for example, what is a 'change'? If we are stuck to the evolutionary approach, what kind of variations could be clearly named 'change'? New 'social traits' or dramatically novel 'social species'? Moreover, what number (or extension) of changes might be considered 'transitional' or 'transformational'? For instance, the core economic model – growth – has not been changed for centuries and provokes, among others, overconsumption and natural resource depletion (see, e.g., Jackson, 2017). What kind of foresight should be done to be named 'transformative', i.e., to change the vision of the futures drastically and not just follow the anticipation of environmental (social and natural) transformations and crises? Not to be a hostage of the behavioristic approach and strive for development instead of evolving?

Although Luis de Molina (Masini, 2009) argued almost half a millennium ago that human beings possess free will, his postulate about the ultimate future alternatives known to God proved to be rather impactful to the contemporary worldview. Not opposing the idea of the Highest Force, I would rather think about futures as utterly unknown and exposed to human (futurists?) transformative force without boundaries, only respecting physical laws and life and freedom as a fundamental value. In such a case, foresight and futures studies are evoked to help us to break through "to space of mastery over paradigms" (Meadows, 2009, p. 165).

As you can see, the initial question of my classmate "Do you believe in inevitability?" might be answered by the entire learning diary, but I simply say: "No, I don't!"

References

Ahvenharju, S. (2022a) Futures Consciousness as a Human Anticipatory Capacity – Definition and Measurement. Turun yliopisto. Turun kauppakorkeakoulu. Print.

Ahvenharju, S. (2022b) 'Theories of transformation–Anticipatory approach (Actors and processes)' [AdobeAcrobat presentation] Theories of futures studies and Transformation 2024 (FUTUS2): Session 3, University of Turku. Available at: https://moodle.utu.fi/mod/folder/view.php?id=1839043 (Accessed: 12 October 2024).

Ahvenharju, S. et al. (2021) 'Individual futures consciousness: Psychology behind the five-dimensional Futures Consciousness scale'. Futures : the journal of policy, planning and futures studies. [Online] 128102708-.

Alchian, A. A. (1950) 'Uncertainty, Evolution, and Economic Theory'. The Journal of Political Economy. [Online] 58 (3), 211–221.

Akpan, B., and Teresa J. K., eds. (2020) Science Education in Theory and Practice. An Introductory Guide to Learning Theory. 1st ed. Cham: Springer International Publishing.

de Berg, H. (2002) The Birth of Psychoanalysis, in Freud's Theory and its Use in Literary and Cultural Studies: An Introduction. Boydell & Brewer (Studies in German Literature Linguistics and Culture), pp. 1–16.

Baars, B. (2015) 'Consciousness'. Scholarpedia journal. [Online] 10 (8), 2207-.

Bell, W., & Mau, J. A. (Eds.). (1971) Sociology of the Future: Theory, Cases and Annotated Bibliography. Russell Sage Foundation. http://www.jstor.org/stable/10.7758/9781610440394.

Bernstein N.A. (1947) On construction of movements [in Russian]. Medgiz, Moskva.

Department of Philosophy (2022) 'Heraclitus'. The Stanford Encyclopedia of Philosophy. Stanford University. Available at: https://plato.stanford.edu/entries/heraclitus/. (Accessed: 17.10.2024.)

Inayatullah, S. (1998) 'Causal Layered Analysis. Poststructuralism as method'. Futures, 30 (8), pp. 815–829, Pergamon.

Jackson, T. (2017) Prosperity Without Growth: Foundations for the Economy of Tomorrow. 2nd edition. Abingdon, Oxon; New York, NY: Routledge.

Foucault, M. (1972) The archaeology of knowledge. (World of man) Translation of L'archeologie du savoir. Includes the author's The Discourse on Language, translation of L'ordre du discours.

Huttunen, S., Kaljonen, M., Lonkila, A., Rantala, S., Rekola, A., Paloniemi, R. (2021) 'Pluralising agency to understand behaviour change in sustainability transitions'. Energy research & social science. [Online] 76102067-.

Kaboli, S.A., Tapio, P. (2017) 'How late-modern nomads imagine tomorrow? A Causal Layered Analysis practice to explore the images of the future of young adults'. Futures, 96 (February 2018), pp. 32–43. https://doi.org/10.1016/j.futures.2017.11.0.

Kriegel, U. (2020) The Oxford Handbook of the Philosophy of Consciousness. 1st edition. [Online]. Oxford University Press.

Kuhmonen, T. (2024) 'Evolutionary thinking and futures research' [AdobeAcrobat presentation] Theories of futures studies and Transformation 2024 (FUTUS2): Session 2, University of Turku. Available at: https://moodle.utu.fi/mod/folder/view.php?id=1839043 (Accessed: 02 October 2024).

Lalot, F. et al. (2021) 'Aware of the Future?: Adaptation and Refinement of the Futures Consciousness Scale'. Psychological Test Adaptation and Development. [Online] 2 (1), 102–110.

Masini, Eleonora Barbieri (2009) 'Luis De Molina as a precursor of the basis for philosophical and ethical thinking in Futures Studies'. Futura, Vol. 28 (1), 6–14.

Meadows, D., H. (2009) Thinking in Systems: a Primer. (Eds.) Wright, D. Earthscan, London.

Minkkinen, M., Auffermann, B. and Ahokas, I. (2019) 'Six foresight frames: Classifying policy foresight processes in foresight systems according to perceived unpredictability and pursued change'. Technological forecasting & social change. [Online] 149119753-.

Polak, F. (1973) The Image of the Future. Amsterdam: Elsevier.

Poli, R. (2019) Handbook of Anticipation: Theoretical and Applied Aspects of the Use of Future in Decision Making. 1st ed. Cham: Springer International Publishing AG.

Poli, R. (2010) 'An introduction to the ontology of anticipation' Futures : the journal of policy, planning and futures studies. [Online] 42 (7), 769–776.

Rosen, R. (1985) Anticipatory Systems. Philosophical, Mathematical and Methodological Foundations. Pergamon Press, Oxford.

Rubin, A. (1998) 'The images of the future of young Finnish people'. Publications of the Turku School of Economics and Business Administration. Series D-2: 1998. Turku: Grafia Ltd.

Seth, A. K. & Bayne, T. (2022) 'Theories of consciousness'. Nature reviews. Neuroscience. [Online] 23 (7), 439–452.

Schick, J. (2022) 'Images of the Future: Anticipating, Fabulating and Inventing with Bergson and Simondon'. Culture Unbound, 13(3), 86–106. doi: 10.3384/cu.1689.

Siivonen, K. (2018) 'Sustainable everyday culture from glocal archipelago culture'. Cultural sustainability and the nature-culture interface : livelihoods, policies, and methodologies. Birkeland, I. J. (Eds.) London: Routledge.

Siivonen, K. (2024) 'Cultural transformation and cultural sustainability'. [AdobeAcrobat presentation] Theories of futures studies and Transformation 2024 (FUTUS2): Session 4, University of Turku. Available at: https://moodle.utu.fi/mod/folder/view.php?id=1839043 (Accessed: 14 October 2024).

Sovacool, B. K. & Hess, D. J. (2017) 'Ordering theories: Typologies and conceptual frameworks for sociotechnical change'. Social studies of science. [Online] 47 (5), 703–750.

van de Ven, A. H. & Poole, M. S. (1995) 'Explaining Development and Change in Organizations'. The Academy of Management review. [Online] 20 (3), 510–540.

Voros, Joseph. (2019) 'Big History and Anticipation'. Handbook of Anticipation. Theoretical and Applied Aspects of the Use of Future in Decision Making. Cham: Springer International Publishing. 425–464. Web.

Vähäkari, N. et al. (2020) 'The future in sustainability transitions - Interlinkages between the multi-level perspective and futures studies'. Futures : the journal of policy, planning and futures studies. [Online] 123102597-.

Wilenius, M. and Kurki, S. (2019) 'K-Waves, Reflexive Foresight, and the Future of Anticipation in the Next Socioeconomic Cycle'. Handbook of Anticipation. [Online]. Cham: Springer International Publishing. pp. 695–715.

Wilenius, M. (2024) 'Theories of futures studies and transformation. Introduction to the course 2024 (FUTUS2) course: Session 1' [AdobeAcrobat presentation] Theories of futures studies and Transformation 2024 (FUTUS2): Session 1, University of Turku. Available at: https://moodle.utu.fi/pluginfile.php/3454985/mod_folder/content/0/Session1_FUTUS2_mw%20.pdf?forcedownload=1 (Accessed: 10 September 2024).

Wilenius, M. and Casti, J. (2015) 'Seizing the X-events. The sixth K-wave and the shocks that may upend it'. Technological Forecasting and Social Change, 94 (2015), pp. 335–349. doi: https://doi.org/10.1016/j.techfore.2014.12.003.

Wilenius, M. and Halonen, T. (2017) Patterns of the Future: Understanding the Next Wave of Global Change. New Jersey: World Scientific.

AI Disclosure

Please be advised that AI (Grammarly) was partially used in this essay writing to enhance the quality of the English academic language.

FUTUS4 Strategic Corporate Foresight

FUTUS4 Strategic Corporate Foresight (5 cr) takes a deeper look into the field of strategic foresight theories and methods. The concepts and origin of strategic foresight are explained and reflected. Students are given cases to understand how systematic futures thinking enables corporations to set and pursue strategic goals. During the course, we collaborate with a case company with their future strategies. The students then perform strategic foresight analysis for the case company. Company representatives' comment and give feedback about the work.

The teacher of the course was Professor **Markku Wilenius**.

In her essay, **Sini Forsblom** brilliantly describes her own learning experience in the world of corporate strategic foresight. When discussing the themes of the course, she also reflects on her own experiences in the world of sports and draws excellent parallels. Sini's writing is a wonderful example of how the course can provide tools for better understanding one's own experiences.

Suvi Kurki has created a very personal learning diary that reveals a truly interesting learning process. Throughout the course, Suvi reflects on what she has heard and read, occasionally transferring the context to the company where she works. The result is a delicious mix of high-level observations and broad perspectives combined with precise observations, questions, personal challenges, and lists of things that need to be addressed. Suvi's diary proves how this form of writing enables a significant internal learning process.

Andrey Melnikov takes us on an intellectual adventure he experienced during the course. He reflects, in his eclectic way, on the development of strategic foresight and describes his learning well throughout the course. As a whole, his diary is an excellent example of how to make the best of the course, which contains a real-life example of a major Finnish industrial company, Kone, and the implications of how strategic foresight has been used as part of their success story.

Learning Diary: Strategic Corporate Foresight

Sini Forsblom

Turku School of Economics, University of Turku

Introduction

In this essay I reflect some of my learnings from the course Strategic corporate foresight 2024. The topics I discuss are being reflected in real life experiences and through my personal views about worklife and sport governance, in which my background lies. Even though the course is topically about corporate foresight, I have embedded the learned information into non-profit and public organizations as to me these organizations can or at least should utilize the same skills. Therefore, even though this essay does not necessarily directly answer some specific questions regarding corporate foresight, I have tried to ponder the learned information in a more diverse context according to my own interests of the topic. The structure of the essay is as follows:

In the first chapter I reflect on diversity and long-sightedness in decision-making, followed by contemplation about K-waves. The last chapter covers some thoughts about growth and sustainability, after which the essay will end in conclusion.

About Diversity and Long-Sightedness

Corporate foresight can, naturally in the case of the foresight activities are actually existing, either benefit from the appearance of or be threatened by the lack of diversity in the decision-making. By diversity I do not only mean diversity in gender but also e.g. in age, cultural or professional/educational background. Diversity in foresight and in decision-making was emphasized also on the lecture (Wilenius lecture 18 January 2024). Having my background in the Finnish Police Force as well as in sports, I unfortunately have multiple experiences in how organizations and systems work and how the future is anticipated when being observed from quite homogenous perspective. Furthermore, I also have experiences of how it feels to express my own thoughts when they differ from the general views and especially, how it feels to be overlooked or undermined due to that. However, as I learn more about foresight and how to build effective strategies, it seems that I now am in the right place to learn more and potentially grow my capabilities of also presenting my arguments better. Unfortunately, the world has shown me its real nature to a young female in amongst a male-dominated crowd, which can still be generally seen e.g. in the politics or in the social media behavior. Culture, habits and awareness of toxic patterns of behavior can sometimes lead to the decreasing of diversity, if they drive away those who are “different” and cannot or do not want to adapt. What is the time frame for trying enough and when is it acceptable to leave? And how will the change happen if one always steps away instead of staying and following the development? Possibly, the strengthening of the values, openness and transparency that we are now facing with the Sixth K-wave (Wilenius, 2017), are such strong drivers that the change will and has come for good. However, diversity alone does not solve the issue if there is lack of communication or trust in the organization. In addition, foresight activities will be successful if they are adopted an included within the structure and consistently conducted and evaluated.

Even though the public decision-making is not specifically ‘corporate’, I think a municipality can be somewhat compared to a company in its long-term development nature (despite of some drastic differences in e.g. budgeting or the political nature of leadership). The yearly and long-term planning and budgeting are made in municipalities, and decision-making influences for decades to come. What if the decisions are being made by people that are only +50 years of age? Undoubtedly, they have extensive experience of life, and they have knowledge of different fields. But do they have an idea about how future generations

will want to live their lives in these municipalities? Do they understand the future developments and shifts in paradigms? Unfortunate examples of short-sighted decision-making can be seen when reading about the demolition of even only 30-year-old buildings in Helsinki (see Helsingin Sanomat, n.d.a) or contemplation on tearing down the arena in Turku (see Helsingin Sanomat, n.d.b). These may not necessarily have nothing to do with the age of the decision-makers, but it sure is not very sustainable to build buildings for a couple of decades. Had there been sufficiently long-sighted foresight activities, there would have been a better understanding of what kind of buildings should be built and where. Same goes for corporate actions; wrong kinds of investments or choices can be made (or are not made even if they should be) without sufficient view and understanding of the future.

About the K-waves

From this course, possibly my biggest take-away is the interpretation of evolvement of our society by the Kondratiev waves pattern. Without a doubt, my understanding of e.g. the macro-economics may not be sufficient, or my knowledge of the world politics might be somewhat narrow even though I follow the news and developments regularly. However, the K-waves provide a possibility to understand the wider system of our world and interpret the megatrends in a manageable context. In addition, for some reason I usually tend to get overwhelmed when thinking about the unlimitedness of the world, but the K-waves ease my thinking in that regard. What I really find interesting and would want to do is to mirror the events and developments of sport in the K-waves and observe how the sport world has developed in that regard and how it possibly will develop. Moreover, it would be interesting to observe the political connections within sport, as it has been a tool for totalitarian countries like Russia and China, for example, to strengthen their global political position. It could be possible to include something about the K-waves in my thesis, which I have planned to conduct about the future developments of (Finnish) sports. Interestingly, Harvey et al. (2015) has written about sport and social movements and has made a matrix about how e.g. politics and wars, human rights and environmental issues intertwine with sports since the 19th century. Naturally, Harvey et al. (ibid.) is observing the past but could give some new idea on how to analyze sports also in the future's perspective. Another topic that would be interesting to combine or compare with sport is the shift towards non-governmental organizations that according to Wilenius (2017) is one part of the Sixth Wave. Lately I have had my doubts about what will be the future of our sport governance as in Finland it is mainly based upon the NGOs and they mostly seem to lack foresight skills. However, the operative principles of the Sixth Wave do not seem to appear that visibly in sport that so unfortunately often is lagging behind the general level of social development; out of the mentioned operative principles (Wilenius, 2017, pp. 100-103) collaboration, sharing and interdepency exist, but openness and integrity...they shine in their absence within sport governance. Possibly that can also be seen as the pitfall of futures preparedness, as the decision-makers holding power in sport are reluctant to ideas that are new or at least different to their own. Looking at the Seventh Wave (Wilenius, 2021), it is not yet clear to me how the critical dimensions will reflect in the world of sport, but some consequences will eventually float in it too. Most likely some sport disciplines will vanish due to climate change and global warming, but that is inevitable despite of the K-waves.

About Growth and Sustainability

From the presentations of each group, I was left wondering how many groups had included the possibilities of economic growth or the respective countries as justification in their presentations regarding some new areas to take KONE into. In a sustainability course, that I am taking, dr. Ville Lauttamäki (lecture 11 January 2024) presented alternative or supplementary ways to measure if economy is successful or not: ecological economics as an option for the paradigm of constant growth. And Wilenius (2017, p. 215) brings up this same topic, in a more provocative manner saying the "idiotic mantra of economic growth being the panacea for all ills" should not continue anymore. But how do we, in fact, really change this paradigm? Politicians

worldwide make decisions and only some of them understand the need of change. And even if some would understand, they are making short-sighted decisions to stay in power. An example of this kind of decision-making is the recent overruled decision of EU Directive on Corporate Sustainability Due Diligence (Ministry of Economic Affairs and Employment, 2024). Naturally, companies are free to drive advanced solutions forward without this regulation. However, as Finnish Business & Society (FIBS, 2023) conducted a questionnaire to the largest 1000 corporations in Finland to understand the situation and views of the Finnish corporations on corporate responsibility, and the ways the executives of these corporations think about their current actions. The respondents were executive directors or chief sustainability officers from 184 companies, over one third being from the manufacturing sector. Even though 75% of the respondents realize there are business benefits in sustainability, the report indicates that companies are not letting go of their unsustainable practices even though they are aware of their unsustainable nature. In fact, according to the questionnaire, only 16% of the respondents declare not continuing with unsustainable business activities. (FIBS, 2023) Possibly, this could have something to do with the fact that the status quo of traditional way of doing business to only care for “our own” instead of considering “the benefit of others”, as professor Wilenius (lecture 15 February 2024) mentioned. Furthermore, the FIBS (ibid.) report also indicates that about 1/3 of the respondents’ companies concentrate on risk management in their sustainability work whereas also another 1/3 additionally focus on building innovative capacities of social and environmental systems besides risk management. If I were the foresight specialist in those companies whose focus is mitigating risks, I would work for a transformative change in the mindsets and goal setting of the executives to enable wider possibilities to succeed. To have alternatives, one must have goals (Wilenius, lecture 15 February 2024), but it also is a matter of what kind of goals are being set.

Regarding the interpretation and implementation of foresight information, the companies would definitely benefit from firstly, having long-sighted enough views to the future but secondly, integrating the views in their strategies and business activities. For now, my interpretation is that the tendency in the business world is to decrease the number of employees to make the business feasible, but not decrease the amount of work, which creates a circle of overloading the staff, which creates a circle of not being able to play the long-term game, so to speak. Once an organization loses its ability to implement foresight activities and make decisions accordingly, it ends up in an unfortunate situation of not seeing the forest from the trees, as the old saying goes.

Mirroring the previous into the context of sports and sport business, it is not that difficult to understand the challenges the Finnish sports have when it comes to foresight and long-term planning. The only obvious solution is considered to be money and funding, and as the funding is based on annual public decision-making, there hardly is space for visioning very much further in the future. The furthest scale of long-term planning in sport governance is the four-year Olympiad cycle, and as sad as it may sound, that is about as long as it gets. But. I am not saying that long-term planning or foresight would not be possible! Without a doubt it is, there just is not resources or capabilities of doing so. Again, we are facing the deepest ambitions of human nature: the fascinating will of being in power and the sometimes even desperate need of glory. Both of these are present in sport governing and, vice versa, quite often sport governing is lacking either the larger understanding of its macro-environment or foresight, typically both. With stronger strategic management and transformative foresight skills I dare to claim that the Finnish sport governance would do better.

Just as I slowly start sliding into the desperate mentality of seeing no successful future for sport governance, I get my glimpse of hope when returning back to the lectures. It was interesting to hear about the experiences of professor Wilenius (lecture 8 February 2024), especially about how the economic crisis around 2008 and how it was not foreseen by the foresight experts at Allianz or any other bank for that matter. This is a good example of what the human aspect in foresight means. Also, it gives me relief on the humane side of foresight and how it could still go wrong despite all the skills and resources.

Conclusion

The more I learn about futures studies, the more I think that it is imperative to have wide understanding of the surrounding world in general to be successful in foresight. The more one can widely comprehend different areas of society, it's complexity and how the systems work, the better they can operate and conduct or at least try to conduct foresight despite the nature of the organization. And to be successful in the future, one cannot neglect trying to understand the plausible futures. In the end, it is not about what we know but understanding what we do not know.

Foresight is one area of expertise and a tool for strategic planning, but as a conclusion of this essay I think foresight could possibly be even considered one essential quality of management to enable alternative ways of thinking. Nevertheless, framing the world in the Kondratiev waves was an eye-opener to me personally and will be give me food for thought for a long time.

References

Harvey, J., Horne, J., Safai, P., Darnell, S. & Courchesne-O'Neill, S. (2015) Sport and social movements: from the local to the global. London, England: Bloomsbury Academic.

Helsingin Sanomat (n.d.a) Purkubuumi valtasi Helsingin, 13 January 2024. Sanoma Media Finland. Retrieved 3 March 2024 from https://www.hs.fi/kaupunki/art-2000010093695.html.

Helsingin Sanomat (n.d.b) Aikansa ihme, 12 May 2023. Sanoma Media Finland. Retrieved 3 March 2024 from https://www.hs.fi/kotimaa/turku/art-2000009557844.html.

Lauttamäki, V. (2024) Economic perspective to sustainability, lecture, University of Turku. 11 January 2024.

Ministry of Economic Affairs and Employment (2024) EU Directive on Corporate Sustainability Due Diligence fails to receive a qualified majority of votes in Coreper. Valtioneuvosto. Retrieved 5 March 2024 from https://valtioneuvosto.fi/-/1410877/eu-n-yritysvastuudirektiivi-ei-saanut-taakseen-maaraenemmistoa-coreperissa?languageId=en_US.

Wilenius, M. (2017) Patterns of the future : understanding the next wave of global change. New Jersey: World Scientific.

Wilenius, M. (2021) Bioeconomy as a driver for upcoming 7th K-wave (2050-2100). In Koukios, Emmanuel, Bio#Futures: Foreseeing and Exploring the Bioeconomy. Springer Nature AG

Wilenius, M. (2024a) Strategic corporate foresight: Introduction, lecture, University of Turku. 18 January 2024.

Wilenius, M. (2024b) Strategic foresight course 2024, Corporate case: Allianz, session 3, lecture, University of Turku. 8 February 2024.

Wilenius, M. (2024c) Strategic corporate foresight 2024 (FUTUS4): session 4 set 1, lecture, University of Turku. 15 February 2024.

Learning Diary: Shaping Tomorrow – Foresight in Organizations

Suvi Kurki

Turku School of Economics, University of Turku

Introduction

This diary explores the topic of foresight in organizations. It contains personal reflections, insights, and observations on the importance of foresight, the challenges and opportunities it presents, and the ways in which it can be implemented and assessed. The diary also includes references to academic literature and research on the subject. Caution: This document may contain language and thoughts inappropriate for minors. As this is a diary, I did not sensor my initial reactions but wrote them as I felt them.

Session 1. Thursday 18 January 2024 10–14

The first lecture broadened my understanding of foresight and the complexities inherent in shaping the future. I found the significance of anticipatory systems and the role of belief systems in shaping our perceptions enlightening. Intuition plays a vital role in decision-making and can be prepared through training (Wilenius 2024a). It's intriguing to ponder how our beliefs, often unconscious, influence our anticipation of future events. And it was nice to learn than intuition can be trained. I tend to get strong gut feelings and sometimes that conflicts with my rationality. It’s been interesting to note that the struggle with these two can be intense. The gut really wants to dominate however biased it may be. So even the people who claim to be rational will get their first reaction based on intuition, which is inherent to humans. This brings me to the question of can people even be truly rational, since everyone has baggage?

According to Wilenius (2024a) embracing change is not only essential but desirable. However, it's evident that introducing new ideas and policies faces resistance. Understanding how to effectively argue and navigate differing opinions is crucial in this regard. If only I was better at arguing… TO DO: Look into how to improve argumentation skills.

The importance of diversity in shaping vision cannot be overstated. Gathering diverse ideas enriches the material and fosters creativity, while lack of diversity can lead to tunnel vision and limited options. (Wilenius 2024a). Fully agree, but in practice it is often easier to work with a homogenous group, where everything flows smoothly and there is minimum conflict. Simply because this is emotionally less straining. The older I get the less I relate to people who thrive on argumentation. I don’t seem to have the patience and energy to “go into battle” for something as easily as before. Suppose I have learned to pick my battles even though I still fall in love with my own ideas and opinions, but I have learned to get over things faster to avoid emotional baggage.

Customization and adaptability are key in addressing the evolving landscape of the future (Wilenius 2024a). I only hope management got this message as well. It is rather frustrating to hear repeatedly how we must standardize processes and operations to lower costs, especially when working in an organization that is quite unique to begin with. It’s time to get over standardization and embrace customization, but how could I contribute to this change besides digging my heels in when the custom solution I am responsible for is challenged to be switched to a standardized one? Note to self: Consider gathering arguments for the value and benefits of customization.

As human activities expand and interact, understanding and empathy become indispensable in dealing with differences and fostering collaboration (Wilenius 2024a). Yes empathy. The world would be a much better place if there was more empathy and compassion (and if old men stopped clinging to power).

Session 2. Thursday 25 January 2024 visit at Kone company headquarters in Espoo

The visit to Kone provided valuable insights into the dynamics of the industry and the challenges and opportunities it faces. Here are some of my key takeaways from the visit.

Regulatory requirements heavily influence the operations of mobility companies like Kone. Kone prefers to modernize existing infrastructure rather than replacing it entirely, reflecting a sustainable approach and a commitment to maximizing resource efficiency. Despite global urbanization trends, there has been a decline in urbanization rates over the past decade, posing challenges for companies operating in urban mobility sectors. (Vassinen 2024)

The concept of a straight-line demand curve challenges traditional assumptions about demand creation opportunities. (Vassinen 2024) My initial reaction was disbelief. Is this dude serious??? I'm having a really hard time buying this 'demand is given' -statement. Surely Kone could have some say for example through PR and social or community relations at least in Finland?

While IoT is trending, only a fraction of elevators are currently connected (Vassinen 2024). This indicates untapped potential for technological advancement and innovation in the industry. Despite the slow pace of the industry, competitive advantage is derived from scale, reliability, and resilience. Strategies tend to remain stable over time and the business model has formed organically. (Vassinen 2024) 'Build it and they will come' attitude seems to be alive and well. I did not see this coming. I was expecting also this industry to be affected by the rapid pace of change that seems to have taken over everything. I find it comforting that there are still business environments where slow and steady are the key.

Establishing a foresight team demonstrates a proactive approach to innovation and strategy development (Nisula 2024). I was surprised to learn that the foresight team at Kone was so young. I was expecting Kone to have a longer history with a dedicated foresight team as the company image is rather forward looking. Utilizing tools like PESTEL analysis, trend radar and scenario planning helps identify emerging trends and anticipate future challenges and opportunities. (Nisula 2024) Note to self: Consider the integration of foresight into personal development and planning as well.

I was really hoping to get more concrete insight as to how to organize foresight activities in a company, but apparently it depends. According to Iden et al. (2017) there is no "one-size-fits-all" approach to organizing strategic foresight, but foresight processes need to be customized to fit each business. Strategic foresight generally involves the use of formal and informal networks to gather information that can inform strategic decision-making. This approach allows for a wide range of perspectives and insights to be considered when making important decisions. (Iden et al. 2017) I agree with the importance of a network to avoid tunnel vision and also because the world today is so

complex and interconnected it's really difficult for one or a selected few to grasp the whole picture and all the dependencies. TO DO: Start planning who to involve in the network.

According to Rohrbeck and Schwartz (2013), one of the main challenges blocking the adoption of foresight activities is the uncertainty about the value creation. Firms may have doubts about getting a return on investment, which can limit the implementation of strategic foresight systems. The capacity and capability of an organization to perceive, interpret, and respond to change can also affect how foresight is carried out. (Rohrbeck and Schwartz 2013) Yes I feel this pain. In order to show the value in foresight a company needs to commit to it for a longer period of time, which does not fit well in the agile way of doing things.

TO DO: Start thinking how to sneak foresight activities amongst the daily operation of our agile team. And most importantly look into metrics and how to measure performance. Managers love KPIs.

Session 3. Thursday 08 February 2024 10-14

The exploration into transformative foresight was thought-provoking. It underscored the urgency of embracing change and shaping a future that is sustainable, equitable, and resilient.

The role of futurists as challengers was emphasized by Wilenius (2024b), urging us to dig deeper into the greatest problems facing humanity. According to Hines and Gold (2015) integrating foresight into corporations has proved to be challenging. They propose an organizational futurist role as an internal champion and broker to facilitate the integration process. The role of an organizational futurist is to promote foresight as a continuous process, engage in dialog and argumentation with stakeholders, and build foresight capacity and discourse within the organization. Again I agree with this view, but I am missing the how to make this reality and convince the leaders that this type of position is important and beneficial.

The weight of historical baggage can hinder progress. Transformative foresight requires a willingness to confront and transcend the limitations imposed by past paradigms. (Wilenius 2024b). Wilenius' (2024b) premise that the fundamental question has shifted from "How do we see into the future?" to "How do we ensure our survival and thriving in the next decades?", is eye opening and rattling, because it rings true and emphasizes the importance of foresight making it more tangible and relatable.

Companies must adapt to the dynamic interplay between external and internal environments. Understanding the "what," "why," and "how" of emerging trends and events is crucial in fostering resilience and sustainability. While events may appear local or regional, their ramifications often extend globally. It's imperative to see the big picture and analyze situations from a systemic perspective over a longer timeframe. (Wilenius 2024b) However according to Hines and Gold (2015) there are three principal challenges to the integration of foresight: episodic use of foresight, cultural resistance to foresight, and integration not being a priority. The organizational futurist role could respond to these challenges.

Addressing climate change requires more than just changing the energy system and cutting emissions. Understanding the intricate balance of the carbon cycle within Earth and human systems is paramount for sustainable solutions that cut the CO2 curve. (Wilenius 2024b) I was unaware that cutting emissions will not cut the CO2 curve. It is surprising that even with the vast amount of information available about climate change, one can still encounter new insights even regarding the basics. This highlights the complexity of the issue and the need for interpreting foresight data.

Interpreting foresight information in an organization is a fundamental dilemma. On one hand, a large variety of data sources have to be tapped into and the resulting collections of quantitative and qualitative data require human interpretation by ideally top managers to be effective. On the other hand, the limited time and attention span of top management prohibits sufficient exposure to the raw data. Firms tackle this dilemma in different ways, though each way has substantial downsides. These include outsourcing the initial data filtering to internal or external analysts, using IT tools for performing initial data analyses, and outsourcing the entire data analysis to management or strategy consultants. (Rohrbeck et al. 2015)

Once you get past the interpretation dilemma, you are likely to encounter a new dilemma regarding implementation of that information. Collection and interpretation are not much use if no action is taken based on the findings. This is what we are seeing with climate change. (Wilenius 2024a) The data and interpretations about it have been available for decades, but actions have been missing because of a lack of political will. And the future generations will need to clean up the mess that could have been avoided had people woken up sooner.

Since metrics are important to decisionmakers, foresight should be assessed. According to Haarhaus & Liening (2020) there are several ways to assess the quality and impact of corporate foresight activities. One way is to examine the effect of strategic foresight on dynamic capabilities, such as strategic flexibility and decision rationality, and how the influence of strategic foresight is moderated by the degree of environmental uncertainty. This can be done for example by conducting a quantitative survey and analyzing the results to determine the impact of strategic foresight on the selected dynamic capabilities. TO DO: Look deeper into this and decide the metrics to justify foresight activities.

Session 4. Thursday 15 February 2024 10-14

This lecture into the importance of foresight has been enlightening. Foresight serves as a beacon to dispel ignorance, offering clarity and understanding about future developments. By envisioning possibilities, we clarify pathways towards progress and innovation. Foresight makes intentions visible, bridging the gap between present actions and future aspirations. It aligns strategic decisions with long-term goals, fostering coherence and direction. By looking beyond immediate concerns, organizations can cultivate resilience and adaptability. (Wilenius 2024c)

Organizations should be interested in foresight because it can act as a dynamic strategic practice that helps them foster relevant future-oriented knowledge in a continuous process that builds on the systemic understanding of the operational environment. This can enable organizations to respond to system-level changes and societal challenges, and to build dynamic capacities in the organizational context. (Ahlqvist & Kohl 2016) Strategic foresight has a positive effect on both strategic flexibility and decision rationality, while environmental uncertainty strengthens the positive effect of strategic foresight on strategic flexibility. (Haarhaus & Liening 2020) Strategic foresight can generate value through an enhanced capacity to perceive change, interpret and respond to change, influence other actors, such as politics and other companies, and enhance the capacity for organizational learning. (Rohrbeck & Schwartz 2013)

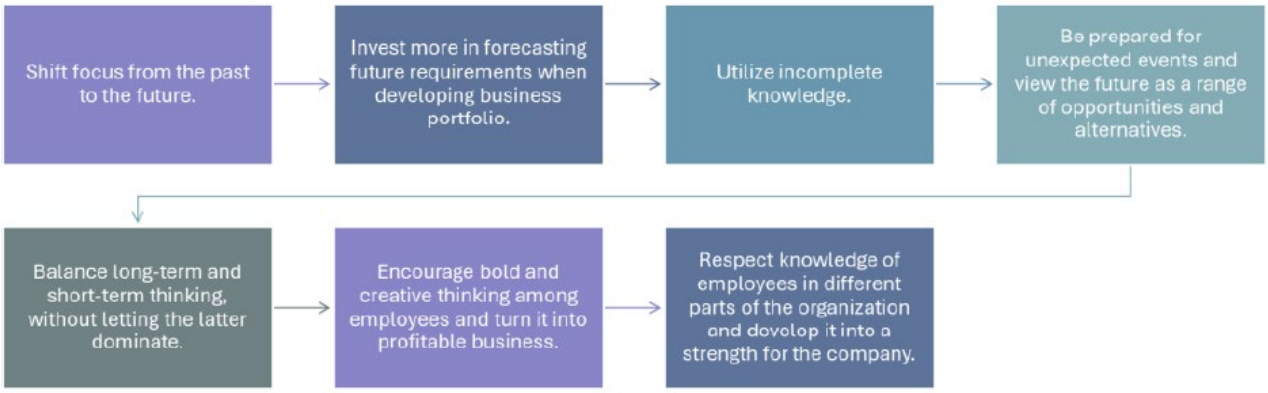
Clearly there is value to foresight, so why is it so bloody difficult to get organizations to see that and implement practices to perform continuous foresight activities??? Yes this is a personal struggle. I have a vested interest. I work as a Product Owner in IT service development and I would love to see foresight to be the next up and coming trend after service design in IT development. Service design and agile have now become the norm and there is room for the next new idea or way of doing things. I strongly believe that foresight should not be the privilege of the strategy and risk management department, but it should be utilized on the ground level as well where the actual development and decision making happens. It is challenging to avoid tunnel vision when you are developing services in your own bubble instead of embracing a bigger picture.

Understanding required competencies and fostering diverse networks are critical components of effective foresight. By considering a wide array of perspectives, organizations can avoid tunnel vision and embrace innovation. There is a holy trinity of innovation, strategy, and foresight in organizations driving sustainable growth and competitive advantage. Cultural maturity plays a pivotal role in nurturing this symbiotic relationship. (Wilenius 2024c) TO DO: Asses cultural maturity of the development team.

The roles of foresight practitioners are evolving, mirroring shifts from traditional managerial approaches to agile, self-managed structures. Adaptation and agility are crucial in navigating paradigm shifts and responding to stakeholder aspirations. Foresight should shift from managerial scanning to wide range scanning. (Wilenius 2024c) THIS!!!!! Fully agree. Autonomous agile teams need foresight tools to be able to make better and more sustainable decisions. I suspect that especially in larger organizations the managers currently doing foresight have no idea what happens at the grassroot level and what is truly relevant information there. It's the developers who need to figure out the how, based on a high-level idea from top management. Luckily I work in an organization that is starting to bridge the gap between experts and managers. We are nowhere near Reaktor, but well on the way. Strategy discussions are made available

to everyone at least on a superficial level. However, I still miss tools and processes for foresight in the everyday operations when making choices between technological solutions. TO DO: Map foresight roles to agile roles and start figuring out responsibilities and what is needed for foresight from that perspective.

Wilenius (2008) offers good key principles for organizations regarding foresight (picture 1).



Picture 1. *Adapted from Wilenius 2008*

These principles give guidelines to foresight, but the difficult question remains: how to obtain management buy-in and commitment to start heading down the path of foresight?

Conclusion

In conclusion, the exploration of foresight within organizations has been an enlightening journey filled with personal reflections, insights, and challenges. Foresight serves as a guide revealing pathways toward progress and innovation, aligning strategic decisions with long-term goals. It fosters resilience, adaptability, and dynamic capacities within organizations. However, despite its evident value, implementing foresight practices remains a daunting task. Challenges such as obtaining management buy-in, tailoring methods to organizational needs, and overcoming barriers introduced by Iden et al. (2017) including defensive management and short-term planning horizons, lack of resources, lack of knowledge, and lack of preparedness persist. By embracing critical success factors (Table 1) organizations can navigate these challenges and harness the transformative power of foresight to shape a sustainable and resilient future.

Table 1. *Adapted from Iden et al. 2017.*

Factors related to the project	Factors related to the method and process
Top management involvement	Tailoring the method and process to companies' needs
Conscious selection and involvement of internal stakeholders	Comprehension of the current situation
Participants committed to creating value	Innovative thinking throughout the process
Qualified facilitator	Strategic significance
Extensive communication between participants	
Incentives to get people involved and stay in the process	
Administrative support	

References

Ahlqvist, T. & Kohl, J. (2016). Constructing and mobilising futures knowledge in an organisation: foresight as a catalyst of dynamic strategic practice. Technology Analysis & Strategic Management, 28(10), 1138–1151.

Haarhaus, T. & Liening, A. (2020). Building dynamic capabilities to cope with environmental uncertainty: The role of strategic foresight. Technological Forecasting & Social Change, 155, 120033.

Hines, A. & Gold, J. (2015). An organizational futurist role for integrating foresight into corporations. Technological Forecasting & Social Change, 101, pp.99–111.

Iden, J., Methlie, L. B. & Christensen, G. E. (2017). The nature of strategic foresight research: A systematic literature review. Technological Forecasting & Social Change, 116, 87–97.

Nisula, S. (2024). Visit to Kone: KONE Profile [Lecture]. FUTUS4 Strategic Corporate Foresight, Markku Wilenius, Professor, Finland Futures Research Centre, Turku School of Economics, 25.1.2024.

Rohrbeck, R. & Schwartz, J. (2013). The value contribution of strategic foresight: Insights from an empirical study of large European companies. Technological Forecasting and Social Change, 80(8), 1593-1606

Rohrbeck, R., Battistella, C. & Huizingh, E. (2015). Corporate foresight: An emerging field with a rich tradition. Technological Forecasting & Social Change, 101, 1–9.

Vassinen, E. (2024). Visit to Kone: KONE Profile [Lecture]. FUTUS4 Strategic Corporate Foresight, Markku Wilenius, Professor, Finland Futures Research Centre, Turku School of Economics, 25.1.2024.

Wilenius, M. (2008). Taming the dragon: how to tackle the challenge of future foresight. Business Strategy Series, 9(2), 65–77.

Wilenius, M. (2024a). Lecture 1: Strategic corporate foresight: Introduction [Lecture]. FUTUS4 Strategic Corporate Foresight, Markku Wilenius, Professor, Finland Futures Research Centre, Turku School of Economics, 18.1.2024.

Wilenius, M. (2024b). Lecture 3: Strategic corporate foresight [Lecture]. FUTUS4 Strategic Corporate Foresight, Markku Wilenius, Professor, Finland Futures Research Centre, Turku School of Economics, 8.2.2024.

Wilenius, M. (2024c). Lecture 4: Strategic Corporate Foresight Course 2024 [Lecture]. FUTUS4 Strategic Corporate Foresight, Markku Wilenius, Professor, Finland Futures Research Centre, Turku School of Economics, 15.2.2024.

AI Disclosure

Microsoft Office 365 Copilot and ChatGPT were used for inspiration, rephrasing and translations.

Learning Diary: Strategic Corporate Foresight

Andrey Melnikov

Turku School of Economics, University of Turku

Introduction

This paper represents the learning diary of a Master's Degree Student, Andrey Melnikov as a reflective personal summary of four sessions (lectures and discussions) and teamwork that resulted in a group presentation in the feedback session and strategic foresight report on a KONE's case within the "FUTUS4 Strategic Corporate Foresight" course led through Jan.- Feb. 2023 by Professor, Finland Futures Research Centre (FFRC), Markku Wilenius. The content of the diary is related to lectures, reading assignments, and teamwork (report writing); however, it predominantly reflects the thoughts evolution throughout the course and project work in the team "Clairvoyants".

Reflections on the Sessions

Session 1. Strategic Corporate Foresight: Introduction, 18.01.2024

The initial question that arises while beginning to contemplate Strategic Corporate Foresight (SF) is what is the (added) value of it for the companies and organizations? Since foresight does not provide a precise answer to what the future the company can expect, is it wise and beneficial (profitable) to invest financial, human, and time resources not to get the prediction but a set of assumptions about the future? From my perspective, the answers to these questions are interconnected with another obvious option: does the company/organization need (can afford to have) the strategy itself?

The illustration made by Rohrbeck and Schwarz (2013) shows that firms with higher revenue noticeably more often value strategic foresight in terms of perception of the future, the strategic and innovation management of the company, and in terms of general valuation for learning and development. However, another observation appears: does it mean that companies with high incomes became successful thanks to strategic foresight usage, or did they initially succeed in business and then obtain enough resources to have additional activities like foresight that can have a strategic surplus effect?

That dilemma demands further investigation and clarification, since it might be reasonable that small-sized businesses do not need a long-term strategy; their main behavior (if they survive initially) is to adapt very fast, to be flexible, and promptly respond to market signals in their domain. They can afford to behave innovatively and diversely as long as they have small bodies that permit them to move rather quickly forward and back like 'Ameba' (Wilenius, 2024a, slide 21).

Whereas corporates in nature are less flexible, more hierarchical, more structured, and, hence, rigid; presumably, they need additional 'receptors' and long-term strategies to be successful far ahead. Additionally, it is interesting to consider the extent to which various approaches differ across distinct industries. For instance, contemporary IT companies tend to apply the agile methodology (and corresponding tools, e.g., Scrum). However, it is rather challenging to imagine 2-weeks sprints in mining or huge machinery companies, since they cannot change their assembly lines and technologies every two weeks. Which of them desires strategic corporate foresight more? I believe that the issue is predominantly derived from the imagination and the will of key persons, the primary decision-makers.

The SF is a correspondingly new field of knowledge and research in comparison to substantively mature sciences, such as the natural sciences or most of the humanities. According to Robreck et al. (2015), the

initial stage of foresight is attributed to the 1950s, when the French concept of 'la prospective' (Berger) and the American RAND Corporation (Hermann Kahn) emerged. The Strategic Foresight was born in the last-mentioned organization. However, the first mention of "foresight" belongs to Alfred Whitehead, who underlined the complex character of societies and the importance of system-thinking. Inspired by these two mainstreams, Italian "social forecasting" emerged at the end of the 1960s, when the Club of Rome became a truly remarkable event for the entire field (R. Rohrbeck et al., 2015, p. 3).

Since that time, SF has been evolving epistemologically and methodologically through the 'age of scenarios', with the resounding success of Shell corporation's case, when contemplating the futures became for tech giants one of the obligatory practices for strategic planning and mitigation of the business risks. Eventually, SF took its place among other fully integrated, routinized, and embedded as ongoing practices (continuous scanning and interpretation) in various business, non-profit, and governmental organizations basically in two directions: policy-making and corporate (organizational) strategic development; however, currently, it serves either strategic management or innovative one (technology roadmapping, science innovation, etc.) (Rohrbeck et al., 2015).

Session 2. KONE Portfolio, 24.01.2024

The session case – KONE – is one of the distinct examples when a massive (60,000+ employees, 60 countries, 0.5 bln. customers) and a matured (100+ years history) corporation is exploiting a stable business model ("new building solutions – service – modernization") throughout its entire life, however, it is constantly growing by employing flexible and innovative solutions. According to the presented mission, vision, strategic targets, ways, and culture, the corporation follows core megatrends and is oriented on the combination of aspects, including not only, e.g., technological innovations but also the values of customers and users (Vassinen, Nisula and Wilenius, 2024). The production (and the company) must bring satisfaction from both elements: the perfect 'elevating' and impeccable reputation. Currently, the last one is almost entirely based on the values of sustainable and responsible business.

'Institutionalized' Strategic Foresight in KONE is relatively young, having been established just two years after the business unit was formed within the corporation. However, foresight as a specific activity and support for strategic management has been utilized for years. That permits the company to innovate and anticipate future alternatives. The decision to explore the Chinese market at the end of the 1990s is an example of how the corporation, despite potential risks, foresaw its rapid growth. The fact that the specialized unit has recently appeared demonstrates the increasing demand for ongoing, permanent foresight activities in the volatile business environment: political, social, ecological, etc. It means that foresight is needed for advanced business and technologically innovative solutions to be ahead of competitors within the anticipated transformations of the business environment. Metaphorically, it looks like riding a bicycle – to keep balance, one must move at a particular pace.

KONE's foresight cycle is particularly directed at a strategic level – from horizon scanning to depicted strategic opportunities and scenarios that adjust the strategy of the whole corporation (Vassinen, Nisula and Wilenius, 2024). A more detailed analysis of KONE's papers allows us to acknowledge the company's commitment to a systematic approach that adheres to key principles of "quality foresight": future-oriented, anticipatory, long-term perspectives, knowledge collection, agile R&D, and audacity (Wilenius, 2008). Concerning my thoughts during the previous session, this example has somehow shaken my belief that agile methodology is applied primarily to IT companies with a less hierarchical organizational structure, like, for instance, Reaktor (Wilenius and Halonen, 2017, p. 174).

From the perspective of the current field analysis, the KONE case of 'adopting' foresight is not unique. The increasing interest of firms in integrating foresight into systematic activities to support business decision-making is also evident in the rapidly growing body of published research. The literature review made by Iden, Methlie and Gunnar (2017) demonstrates "that strategic foresight programs in firms are motivated by

the need to support decision making, improve long-term planning, enable early warning, improve the innovation process, and improve the speed in reacting to environmental change" (Iden, Methlie and Gunnar, 2017, p. 90). Even though there are few proves of successful practices with strategic foresight programs, several factors might be considered as ones that can contribute to the success, for example, a participative approach in foresight activities and involving decision-makers, establishing strong communication among stakeholders with an increase of trustworthy, and well-adjusted processes and methods (Iden, Methlie and Gunnar, 2017, p. 94). In the KONE's case, all of the mentioned elements are clearly shown.

It is worth mentioning here another characteristic of the tendency. Notwithstanding the flourishing practical utilization of strategic foresight and booming research on it, the theorization in the field is relatively weak – more than one-third of published research seems "to lack a specific theoretical foundation" (Iden, Methlie and Gunnar, 2017, p. 89). Probably, in the next stage, matured, integrated, and routinized strategic foresight should provide an opportunity for further theoretical conceptualization.

Introductory Session for the FIBRES Platform[1], 30.01.2024

Since the participants of the course have been organized as teams and the author of this diary joined the Clairvoyants, prior to the 'FIBRES session' it has been decided by the team to scan initially the KONE's environment, its current reports and presentations, and investigate slightly the case usage of the FIBRES. Before the session, the Clairvoyants group chose Q1[2] with the core task of building a strategy for KONE.

Panu's presentation of the FIBRES (https://app.fibresonline.com/instance/1366/dashboard) as a hands-on SaaS[3] tool for analysis within the PESTEL approach included a short introduction of the main users, the basic principles of the design, and the analytical work itself, e.g., the ways of horizon scanning and trend monitoring (bottom-up/top-down), aligned with further explanation of how the instrument to be applied by its multiple features. The FIBRES became the primary instrument for the analytical work up to the end of the course. Both analytical approaches – bottom-up and top-down – have been utilized.

Session 3. Disruptions and Transformative Foresight, 08.02.2024

The leitmotif of the session is the challenges of "growing complexity, the long view, and a desirable future".

The transformative power of foresight, roughly speaking, depends among others on the quality (in terms of logic, connectivity, and captivation) of the narrative[4] created within the analysis of the past, present, and envisioning the futures under the leadership of individuals with well-developed specific competence such as "distentive capability", i.e., the capacity of "thinking in time-streams" and simultaneously focusing on memory, attention, and anticipation enables one to read future results from current events (Sarponga, Eyresb and Batsakisa, 2019, p. 106). Since the environment is changing drastically at a high pace under the pressure of the uncertainly emerged disruptors the core role of strategic foresight (or futurist in this process) is to continually reproduce holistic narrative as a metaphoric time machine herewith detecting on periphery weak signals in present and not neglecting the past, like in the vivid example of Kondratiev waves with their internal dynamic (Wilenius, 2017, p. 34). Moreover, it should be established in an organization

[1] Invited lecturer: FIBRES CEO Panu Kause.

[2] Q1: What are the key developments (political, economic, social, technological, environmental, legal, cultural, etc.) that are shaping the future business environment of a global company in the long term (+5 years)? What will not change? What kind of business impact the changes would have on KONE?

Please provide: • Key trends and wildcards, build a trend radar • Impact and GAP analysis • Build a strategy for KONE

[3] SaaS – software as a service

[4] One of the examples is a scenario that is clear, consistent, and internally logical (Wilenius, 2017, p. 23)

(which has the intention to survive and develop) in a systematic manner, when strategic foresight constantly supports and feeds strategic planning in constructing a seamless path to achieve the organization's strategic objectives in a disruptive and intermittent environment. “Complexity can be tolerated if there is some order” (Wilenius, 2017, p. 45)

Allianz's case (Wilenius, 2024b) is a clear example of the adjustment of the entire level of strategic management in a transnational corporation by implementing a foresight in a systematic and holistic approach, e.g., ‘Foresight Generator’. The system, in a few simple words, routinized trends, signals, threats, and opportunities assessment and integrated foresight activity into the decision-making process, e.g. Future Map, which finally among others resulted in increasing of company’s flexibility, implementation of more human(client)-oriented interface (also literally on company’s site and in smartphones), and attraction of the new, perspective group of clients.

As described above foresight system implementation leads to and is tightly intertwined with the “horizontal anticipatory culture” (organizational culture) based on the “anticipatory agency” of the whole organization (Ahlqvist and Kohlb, 2016) where foresight is applied “as a dynamic, strategic and continuous practice that aims at building specific futures knowledge” (Ahlqvist and Kohlb, p. 1141) on several levels.

Session 4. Why Foresight? 15.02.2024

The session raises the core question of the entire course: Why Foresight? (Wilenius, 2024c) The answer tends to be straightforward: every mature organization must have it to survive and succeed in unforeseen disruptive changes since the core idea of foresight “is to look for options and opportunities for change before the business is forced to change”, hence, business which ignores this might highly likely pass key drivers to transform timely (Wilenius, 2008, p. 67). “Businesses must stop staring in their rear mirror and turn their attention and energy instead to the future” (Wilenius, 2008, p. 76).

However, in this context, it is worth briefly discussing the proper outcome of foresight itself. This is where we face some methodological difficulties. Being committed to the positivist approach in analysis and entirely based on a formal model of a historically formed ‘scientific’ framework that logically and consistently explains (in cause-effect schemata) present events one can fail in envisioning future developments in case of disruptive changes and, e.g., human-created innovations or “human-induced X-events” (Wilenius and Casti, 2015) as one of these disruptors since such disruptors restructure the fundamental order of things, launch paradigm shift (e.g. change in working life examples on a lecture), and “expands the ontological space” (Tuomi, 2012, p. 747). Hence, it might result in, for instance, neglecting ‘weak signals’ since there is no proper model for detecting them as ‘signals’ of impactful events. Moreover, the utilization of previously collected data sets through obsolete formal models can provide us with extrapolative predictors that do not work for “ontological unpredictability” (Tuomi, 2012).

In the situation of such “epistemic uncertainty” (Tuomi, 2012), foresight should shorten this epistemic gap by producing knowledge about possible futures rather than predicting (which is often expected from it). Thus, the quality of the foresight might be defined by the extent and wideness of the ‘enlightenment’ of the organization toward various, even preposterous, imaginative paths and events, with the proactive behavior of the organization itself. “In other words, the focus of future-oriented analysis should be learning, problem redefinition, and innovative construction of new empirically relevant categories, not predictive modelling.” (Tuomi, 2012, p. 748).

Finally, and again, why Foresight? From my perspective, simply speaking, this non-stop operating ‘time machine’ for collecting organizational ‘memories’ about unexpected futures aims to develop resilience as a capability that implies a well-balanced “agility-adaptability” system and (non-conventional) wisdom to detect the storm far ahead inside the current apparent auspicious trends and then benefit from the opportunities within the collapsing environment. (Wilenius and Casti, 2015). Because in times of asteroid rain, it

is better to be a bunch of small harmless (but organized) mammals under the surface than a giant menacing reptile terrorizing all the creatures around it in order to ride and enjoy sometime in the future the sixth K-wave.

Conclusion

The entire work on the course, including intensive and thorough teamwork with KONE's case (PESTEL, Gap, and Impact analysis and strategy formulating), substantively advanced me in terms of applying methods and techniques of Strategic Corporate Foresight, strengthened teamwork and analytical skills, and provided me with profound knowledge in the field. As a material and, I hope, a valuable result of this learning journey, my input[1] into the presentation and the report on a particular case of KONE Corporation were submitted separately.

However, what I believe is even more critical is that the courses pushed my boundaries in understanding the holistic, systematic, and dynamic picture of the contemporary world. Starting from the straightforward and rather pragmatic question "What Strategic Corporate Foresight is," the course ended up with a plethora of various wider follow-up questions for me, for instance, as follows.

Are we currently on the bottom of the previous fifth Kondratiev (K)-wave, since several hot conflicts shake Europe and Asia, the right-populist shift is a clear tendency in Europe, and democracy is shrinking in the world in general? Or do these waves overlap each other, and in the depth of the preceding wave, the next one is strengthening? Therefore, the sixth K-wave, where we witness the emergence of artificial general intelligence as a result of nanotechnologies and IT convergence, and simultaneously the collapse of old, conservative, imperialistic, and authoritative regimes, is rising. Metaphorically, the new wave lifts the residual rubbish from the demolitions made by the previous one. Or have we come to a new epoch where the grand wave splits into technological and social ones, and they are misaligning? Hence, how should Strategic Foresight be developed further as a precision tool for narrowing the strategic breakthrough point or as a multifaceted instrument for projecting multiple alternative decisions?

What I realized for sure as essence is that foresight is not a 'golden bullet' for strategic management, but it gives it ''productive dreaming'' (Wilenius, 2008, p.74) and courage to act purposefully in given messy circumstances since "preparing for the future also requires some audacity" (Wilenius, 2008, p. 69).

References

Ahlqvist, T. and Kohlb, J. (2016) 'Constructing and mobilising futures knowledge in an organisation: foresight as a catalyst of dynamic strategic practice' *Technology Analysis and Strategic Management,* 28(10), pp. 1138–1151. doi: http://dx.doi.org/10.1080/09537325.2016.1182148

Iden, J., Methlie, L. B., Gunnar E. Christensen, G. E. (2017) 'The nature of strategic

foresight research: A systematic literature review' *Technological Forecasting and Social Change*, 116(2017), pp. 87-97. doi: https://doi.org/10.1016/j.techfore.2016.11.002

Rohrbeck, R., Battistella C. and Huizingh, E. (2015) 'Corporate foresight: An emerging field with a rich tradition' *Technological Forecasting and Social Change*, 101 (2015), pp. 1–9. doi:https://doi.org/10.1016/j.techfore.2015.11.002

Rohrbeck, R. and Schwarz, J. O. (2013) 'The value contribution of strategic foresight: Insights from an empirical study of large European companies' *Technological Forecasting and Social Change*, 80(8), pp. 1593-1606. doi:https://doi.org/10.1016/j.techfore.2013.01.004

[1] political domain analysis, gap and impact analysis in the political sphere, and the new key driver 'Resilience' for the revised strategy with several explanations in the text

Sarponga, D., Eyresb, E. and Batsakisa, G. (2019) 'Narrating the future: A distentive capability approach to strategic foresight' *Technological Forecasting and Social Change,* 140 (2019), pp. 105–114. doi:https://doi.org/10.1016/j.techfore.2018.06.034

Tuomi, I. (2012) 'Foresight in an unpredictable world' *Technology Analysis and Strategic Management*, 24(8), pp. 735-751. doi: http://dx.doi.org/10.1080/09537325.2012.715476

Vassinen, E., Nisula, S. and Wilenius, M. (2024) 'KONE Profile' [*AdobeAcrobat* presentation] Strategic Corporate Foresight 2024 (FUTUS4): Session 2, University of Turku. Available at: https://moodle.utu.fi/mod/folder/view.php?id=1708712 (Accessed: 27 January 2024).

Wilenius, M. (2008) 'Taming the dragon: how to tackle the challenge of future foresight' *Business Strategy Series*, 9(2), pp. 65-77. DOI:10.1108/17515630810865671

Wilenius, M. (2024a) 'Strategic corporate foresight: Introduction' [*AdobeAcrobat* presentation] Strategic Corporate Foresight 2024 (FUTUS4): Session 1, University of Turku. Available at: https://moodle.utu.fi/mod/folder/view.php?id=1708712 (Accessed: 20 January 2024).

Wilenius, M. (2024b) 'Case: Allianz' [*AdobeAcrobat* presentation] Strategic Corporate Foresight 2024 (FUTUS4): Session 3, University of Turku. Available at: https://moodle.utu.fi/mod/folder/view.php?id=1708712 (Accessed: 10 February 2024).

Wilenius, M. (2024c) 'Strategic Corporate Foresight 2024' [*AdobeAcrobat* presentation] Strategic Corporate Foresight 2024 (FUTUS4): Session 4 set 1, University of Turku. Available at: https://moodle.utu.fi/mod/folder/view.php?id=1708712 (Accessed: 17 February 2024).

Wilenius, M. and Casti, J. (2015) 'Seizing the X-events. The sixth K-wave and the shocks that may upend it' *Technological Forecasting and Social Change*, 94 (2015), pp. 335–349. doi:https://doi.org/10.1016/j.techfore.2014.12.003

Wilenius, M. and Halonen, T. (2017) *Patterns of the Future: Understanding the Next Wave of Global Change*. New Jersey: World Scientific.

FUTULAB1 Introduction to Futures Research Methods

Introduction to Futures Research Methods (6 cr) course belongs to the Master's Degree Programme curriculum, and is typically studied during the first autumn of the two-year programme. After this course the student is expected to understand the field of futures research methods, make an informed choice of a futures research method, and compare the similarities and differences of futures research methods. Students may also participate simultaneously to the course FUTULAB2 Futures Research Method Demos for practical assignments.

One quarter of the course grade includes activity points scored during lectures. Three quarters of the grade are received from an essay, where the student compares two futures research methods with each other based on an individually performed literature search. The student is especially guided to search, read and review at least 10 articles published in key futures studies journals. A default length of the essay is 3000−5000 words.

The course teachers Professor **Petri Tapio** and Doctoral Researchers **Liisa Haapanen** and **Pasi Keski-Pukkila** reviewed the essays.

Emilia Rieger has an interesting way of analysing the Delphi method and Causal Layered Analysis (CLA) from a critical genderised perspective. This is an excellent piece of reflective writing, where she reflects academic literature with her own thoughts showing exceptional maturity. Emilia's comparison of the methods is also done in an original, intelligent way.

Tobias Rogasch compares interestingly extrapolation and backcasting. He writes in a very systematic way, however keeping the spirit exploratory avoiding the pitfall of overly technical text. Many would expect that by comparing the methods the student would find only differences, as these are often considered as opposite ends between determinism and visionary thinking. But Tobias thinks further and is able to see also common grounds and potential to combine the approaches.

Who's Alternative Futures? The Delphi Method and Causal Layered Analysis – A Comparison with a Feminist Twist

Emilia Rieger

Turku School of Economics, University of Turku

Introduction

"When we exclude half of humanity from the production of knowledge, we lose out on potentially transformative insights."
(Criado-Perez, 2019, p.312).

This quote states the importance of including everyone in the production of knowledge and points to the gender imbalance. Especially in futures studies where we highly rely on imagination, scenarios, ideas, and interpretation, this should be considered. Our belief system shapes our imagination, interests and ideas and influences how we think and speak about futures. This means the people who talk and think about futures and work with futures and anticipate futures, which in the end might be the foundation of decision-making, matter and have power.

That is why, in this essay, I am going to compare two methods applying the above quote as a lens. Another reason why I chose this lens is that I can imagine writing my thesis connected to a topic of gender equality or minorities and discrimination. In my thesis, I would like to apply a Causal Layered Analysis (CLA) and can also imagine using the Delphi method.

For now, I will compare these two methods. The Delphi method relies on expert panels and data gathering (Gordon, 1996) and the Causal Layered Analysis builds more on critical data analysis and poststructuralism (Inayatullah, 1998). CLA uses images as metaphors and displays hidden ideologies behind seemingly innocent realities (Inayatullah, 1998). The Delphi method is also connected to a metaphor as the name hints towards the Greek mythological oracle of Delphi (Gordon, 1996). I view the strength of Delphi as a tool that works beyond academia and could make change in the real world. CLA shines in critical thinking and questioning ideologies. All of these aspects are relevant for anticipating alternative futures which is essential, as the ability to create alternative futures is a core purpose of futures studies (Bell, 1997). Nonetheless, it is important to revise the tools of futurists and critically look at the strengths and weaknesses of said methods.

First, I am going to present the basics of each method and then I will go deeper and compare them, also applying the feminist lens. I will display that both methods could gain from a more participative approach and that the Delphi method lacks female and minority expertise. Overall, both methods have their strengths and possible pitfalls, but they complement each other nicely.

The Methods

The Delphi Method

The Delphi Method is a group communication process (Gordon, 1996). The method lies in the heart of the adapted foresight diamond, relying on all four diamond aspects, namely expertise, interaction, evidence and creativity and can be considered a mixed method (Popper, 2008). This means that Delphi is qualitative and quantitative. It works with questionnaires made by the researcher for experts and typically with multiple rounds of questionnaires (Gordon, 1996). Following, the questions are extremely important and should be

thought about carefully. Classically, after selecting and contacting the participants and designing the questionnaire, participants answer and give their opinions. Depending on the mode it will be an online questionnaire, or some also do one-on-one interviews, but this is rather uncommon at this stage. Later, the answers of all participants will be summarized and shown to them again. This is the moment for feedback, reassessment and discussion. This process can go on for multiple rounds and in different modes. After that, the researcher analyzes the results and highlights consensus arguments and divergence between participants and their justifications for disagreement. (Gordon, 1996.) Finally, recommendations or suitable actions can be derived from the analysis. This was a generalized and brief description of the process. In the following paragraphs, I will go deeper into variants and possible changes.

With the Delphi method, probable, possible and preferred futures can be discussed but I found that commonly the Delphi method is used to discuss most probable futures. Especially, in its early days, in which Delphis panels focused on finding consensus (Tapio *et al.*, 2017). Nowadays non-consensual and consensual Delphi exist. With non-consensual Delphi in the end there does not have to be one argument that wins compared to consensual Delphi (Von der Gracht, 2008). Generally, various applications of Delphi exist, like multiple-round Delphi, hybrid Delphi and real-time Delphi. Hybrid Delphi is not completely anonymous as discussions are partly organized face-to-face. The real-time Delphi is the counterpart to the multiple-round Delphi. The online questionnaire remains open for an extended time and participants communicate in real-time instead of multiple closed rounds. (Tapio *et al.*, 2017.) This points to the flexibility and adaptability of this method (Melander, 2018). Leaning on my encounters with research, I would say popular topics for the Delphi method are environment, management, population and transportation but also topics connected to digitalization like artificial intelligence and social media (see for example: Seuring and Müller, 2008; Tapio *et al.*, 2017; Melander, 2018; Flood *et al.*, 2023; Alon *et al.*, 2025).

Initially, the method was developed in the early 1960s for military foresight purposes by Helmer, Dalkey and Rescher. The name of this method has its origin in Greek mythology, the so-called Delphi oracle. This seems to stem from a humorous idea of the creators of the Delphi method (Gordon, 1996.) In fact, it is an interesting metaphor for this method which I will discuss later in more detail.

This method works primarily for data gathering and might be supportive in the data analysis and representation phase, but not so helpful for the organization of data (Tapio and Vinnari, unpublished showed in the lecture: Tapio, 2024).

Traditionally, the Delphi method used four main drivers for orientation: consensus, feedback, real expertise and anonymity (Gordon,1996). All of them have been questioned as presented by Tapio *et al.*, (2017). Firstly, as already mentioned, consensus is not as important anymore and differences in opinions are appreciated and the reasons for disagreement are being studied. Secondly, the practicality of using multiple rounds to ensure a learning and feedback process has become more flexible. The learning process is essential as the goal is to learn from each other, adapt some arguments and crystallize where consensus exists and where there is disagreement and why (Gordon, 1996). Nowadays real-time Delphi exists as an alternative. As mentioned above real-time means that questionnaires remain open for a longer time and participants can react immediately to comments from each other. The learning and feedback opportunity remain but it is less monitored and guided.

As Tapio et al.(2017) emphasized expertise should be discussed more in-depth: “And who do we call an expert here anyway – middle-aged, white, male, renewable energy engineers?“ (p. 32). I find this to be a relevant question, also regarding my lens for this essay. Varho's and Huutoniemi's (2014) idea to make a distinction between cognitive expertise and social expertise is one way to open the expertise to more unconventional panelists. Cognitive expertise refers to learned knowledge and skills by an expert mostly acquired through education or occupation. Social expertise refers to the status of expertise in the eyes of others which often still relies on formal degrees but can be opened up to soft skills or experiencing the issue firsthand. For example, university students can be considered experts in a Delphi study about the future of universities. (Varho and Huutoniemi, 2014.)

The fourth driver, anonymity, is important to ensure that all voices get the same attention. Hybrid Delphi includes an in-person discussion in the last round which of course is not anonymous. This might influence the comfort of sharing your views. One goal of Delphi studies is to question one's view during the process and find reasonings why you agree more with someone else. While being anonymous this might be easier, but having an in-person discussion can also gain from spontaneity and a better understanding of each other's points. In an ideal situation, anonymous or not, you question your stance and are open to learning, even as an expert.

For example, in a study about female violence, the experts were persons with academic experience on the topic of intimate partner violence or professional experience with immigrants who were victims of intimate partner violence (Cuesta-García, Fernández-Lansac and Crespo, 2023). This makes sense, and I agree with the statement that a group of experts is suitable to discuss probable futures (Gordon, 1996). Nonetheless, I think alternative experiences and opinions might be rarer when only talking to conventional experts. In this example, I feel like the affected persons' direct point of view is non-neglectable and the process should be more participative. This could indicate that the Delphi method works better in natural sciences than in social sciences. Especially if applied in minority studies, a more participative approach to Delphi should be considered. Revez *et al.* (2020) demonstrated in their study about just and inclusive energy transition that including unconventional experts and lay persons in the Delphi study provides more heterogeneous groups and more to discuss. The question of who's future scientists are working with is also interesting to look at gender-wise.

The study by Ahn, Choi and Seo (2024) has shown that Delphi panels are mostly male-dominated, especially in domains like management and finance. In fact, women are often underestimated in futures research and most of the time Delphi studies are not even transparent about the gender gap of their Delphi panel (Ahn, Choi and Seo, 2024). This is one of the great pitfalls of this method as well as discussed in class: panel bias. In this case, the gender bias of the panel is only one aspect but a crucial one as I pointed out in the introduction with Criado-Perez' (2019) quote about losing insights when ignoring half of the voices. In the end, as Gordon (1996) had already stated, it is always important to keep in mind that the Delphi method only represents the opinion of the particular panel.

Causal Layered Analysis

Causal Layered Analysis tries to unfold and question opinions and ideologies (Kaboli and Tapio, 2018). It is a qualitative method designed in the 1990s by Sohail Inayatullah (1998) used for data analysis of textual and visual data. It has the goal of creating transformative changes and thus it examines preferable futures rather than possible or probable futures (Kaboli and Tapio, 2018). CLA is often used to analyze failed solutions, in transformation studies and wicked challenges. In these studies, there is an emphasis on social matters, and they try to reveal hidden ideologies which bring us to the core of issues and let us imagine transformation beyond symptom tackling. (Kaboli, 2024.)

Of course, to start a causal layered analysis the researcher must define what will be studied in terms of problem and medium. Then the four layers of CLA, which I describe in detail further on, will be analyzed. This is the essence of this process and should be done multiple times and from various perspectives. After that, the goal is to gain insights across these levels that vary in-depth. The researcher wants to find out how they interact with each other and the problem itself. This can then be used to reframe the issue and generate alternative future images/scenarios. Finally one can pinpoint transformative actions with for example recommendations for policies or campaigns. (Inayatullah, 1998.)

It is a poststructuralist approach, and thus questions objectivity and fixed meanings, focusing on language. CLA is, as mentioned, built on four layers: Litany, social causes/system, worldview/discourse, myth and metaphor. (Inayatullah, 1998.) Litany is the surface level and includes the established meaning. It is often what one reads in the news or political landscapes (Inayatullah, 1998). The system level shows social

causes and discusses aspects like economy, culture, politics and history. This level goes beyond headlines of tabloids and is to be found in editorial newspapers and not-so-academic journals (Inayatullah, 1998). The third level, also known as worldview/discourse, consists of the story around the first two levels and legitimates them (Inayatullah, 1998). The goal is to question these discourses and how they frame and build the strong litany and system levels. Last but not least, the myth/metaphor layer is built on stories, feelings, and narratives. It is what deep down under the surface of all other levels, works as a driving force and is less obvious and works rather with images than words (Inayatullah, 1998).

With this fourth layer, Causal Layered Analysis can be positioned in critical futures studies according to Kaboli and Tapio (2018). Critical futures studies dive below what seems to be real for us in society and focus on the transformative potential of futures research (Slaughter, 1996). As said before, transformation is a key goal of this method. The fourth layer can be viewed as the most transformative one (Riedy, 2008). Myths and metaphors have a special position as they require consciousness and active imagination, which is what makes them transformative. Additionally, the strength of the fourth layer comes through storytelling, which has relatively great affectiveness on people and thus significant potential for transformation. It is not about finding the truth but disturbing present power relations and showing that what is seemingly normal and neutral is loaded with meaning and power. CLA asks which truths are privileged and which are not heard. (Shevellar, 2011.)

I can imagine that studying gender ideologies with Causal Layered Analysis can be a powerful and useful tool as it might reveal hidden beliefs that carry these inequalities and might open pathways for transformation. Like for example in Inayatullah, Milojevic and Hung's (2022) work on gender equality in the Asia-Pacific region where experts did a Causal Layered Analysis in a workshop to imagine new pathways for the region. They came up with a desired future by 2042 which included balanced gender representation in organizations, paid domestic work and gender-responsive AI technologies, as well as focusing on measuring wellbeing and sustainability rather than the GDP. Likewise, in Hurley's (2008) study which analyzed movies from an ecofeminist perspective with CLA, the researcher argued how these movies reproduce the understanding of a singular future, limiting it to be a patriarchal world where few rich and white men are most powerful. Imagine what the production of alternative images in Hollywood could do to the world.

During a CLA it is important to be aware of one’s own bias, and it is encouraged that more than one person analyses the data as results may vary (Kaboli, 2024). Other ideas Kaboli (2024) emphasized in her presentation were self-reflection in the form of journaling and diary writing, creating some distance from the work from time to time and coding things again when some time has passed and the mind has been occupied with different issues in between. Additionally, Bishop and Dzidic (2014) emphasize that from a psychological standpoint, futurists need to be aware not to use a top-down approach when applying CLA and actively give the persons a voice who need it most.

Comparison: Myths, Motion and Mixing Methods

In this comparison, I want to discuss the ability of the Delphi Method and Causal Layered Analysis to anticipate transformative gender-equal futures. As already pinpointed in the previous sections, I discuss who gets a voice and who does not. While both these methods have huge potential, there are issues to keep in mind and evaluate. Overall, these two methods can be combined adequately, and make each other stronger.

As discussed above, the Delphi method focuses mostly on data gathering and CLA on data analysis. This already shows that the two methods might be able to be used side by side. First, Delphi could be used to collect the data and then CLA to analyze it. Both methods can be located relatively centrally in Popper's (2008) research diamond. Causal Layered Analysis might be seen as somewhat more creative as it focuses more on imagination while Delphi focuses on expertise which mostly relies on a simpler understanding of knowledge. They both rely on expertise but while Delphi gathers expertise from the outside, in CLA

the researcher can be considered as the expert. This means for a Delphi study it is unavoidable to include other people, which is not mandatory for CLA, but encouraged to decrease bias and make the research effective, for example by using CLA in workshops.

The Delphi method has its roots in the 1960s while CLA was established in the 1990s. This is visible in the traditions of the methods. While the Delphi method sometimes yet seems to try colonizing the future, CLA is all about imagining alternatives and being open-minded about the future by analyzing the past and present (Bishop and Dzidic, 2014). Oddly, both these methods are connected to myths in a way. CLA with its fourth and considered most transformative layer and Delphi with its name which is based on Greek mythology. Even though it is said that this name was made up as a joke (Gordon, 1996), I want to have a look at it at this point, as CLA suggests this level of communication to be powerful. Von der Gracht (2008) clearly describes the origin of Delphi. Apparently, in Greek mythology, Zeus declared Delphi as the center of the earth. Later, his son Apollo chose this site for the Delphi oracle. Apollo was also known for his ability to foresee the future. But only a woman, Pythia could get in contact with Apollo and only priests could consult Pythia. (Von der Gracht, 2008.) In the course we discussed that Pythia could be seen as the Delphi panelists and the priests as the Delphi managers. Interestingly, today's realization of Delphi as a method does not include enough female Delphi panelists (Ahn, Choi and Seo, 2024). This aspect of the myth would have been good to consider and should be taken into account. Of course, also in the Greek myth behind the woman Pythia, there was still Apollo, so I won't argue that the myth was more feminist than the method. But it is interesting to see what kind of personas and narratives were used to foresee the future in Greek mythology and who works with futures and especially the Delphi method today.

What both these methods have in common and in my opinion do well is the aim to question the status quo and viewpoints. This quote by Afshari (2019, p.178) brings it to the point: "In a true Delphi, minority positions are treated as equally valid to majority positions. Trigger further follow-up studies to understand why two or more positions are seen as valid answers to a single question." While I understand this to be a rich and positive goal of the Delphi method, I fear this is often not reality. Within a Delphi panel that might be true but again we must think about who is on the Delphi panel. Even though many Delphi studies suggest less traditional experts, for example, young people (Melander, 2018), research shows that women's voices are missing and women are generally less seen as experts (Ahn, Choi and Seo, 2024). Melander (2018) also states that when rather unconventional experts are consulted, they provide alternative opinions compared to classic experts who often think in a business-as-usual way.

Causal Layered Analysis focuses more on the issue of alternative futures with it being an integral part of the data analysis to question the ideologies behind reality. But also here, I pose the question of whether in practical research after the analysis of the four layers, the transition is also part of the process or whether it might get lost easily. I think for the transformation, an affective communication of results is needed, for example to decision-makers or influential companies. Of course, this does not solely rely on the will of the researcher and if this possibility cannot be given, the new insights could also be worked with in workshops at schools, for example where kids could learn to question reality already in their young age.

Bishop and Dzidic (2014), pointed out that it is important to realize who gets a voice and that often in futures studies the research is very researcher-focused. I argue that by combining the Delphi method with Causal Layered Analysis and including a more participative approach, more gender-equal transformative futures could be in the picture. One first step would be that women and other minorities get consciously selected as experts and expert panels in Delphi studies are more diverse and the research and selection of panels more transparent. Additionally, besides increasing gender representation, I encourage like many others before, including unconventional experts (Varho and Huutoniemi, 2014; Tapio *et al.*, 2017; Revez *et al.*, 2020). I would go even further and say that the voices of laypeople could be beneficial in Delphi studies. Although this is not the primary idea in the Delphi method and goes against the idea of experts making the most of these futures, I think it portrays reality better and also builds a bridge to reality and might make the research more transformative and effective.

The same goes for CLA. Not only should the expertise of the researcher be used to analyze reality and code the data. An analysis by different people and experts like in the Inayatullah, Milojevic and Hung (2022) study could be applied more commonly. In this study, experts analyzed the gender equality situation in the Asian-pacific region with the four layers of CLA in a future workshop. Similarly, CLA could also be integrated into a Delphi study. An alternative could be to analyze the Delphi study with a CLA frame and find the hidden ideologies of experts. To conclude this discussion, I emphasize that the Delphi method and CLA are both insightful strong methods that have the potential to create gender-equal alternative futures when used consciously and when in the data gathering phase as well as in the data analysis phase a participative approach is applied.

Conclusion

As stated in the very beginning it is important to include diverse voices in the production of knowledge to gain transformative insights (Criado-Perez, 2019). I want to add here that like Inayatullah, Milojevic and Hung (2022), I don't see this issue in any way on a personal level but a systematic one. They emphasize that patriarchy and inequality have no gender. They are systems that are harmful to all genders, and it is crucial to work together to anticipate alternatives. In this essay, I have shown that applying the Delphi method in combination with a Causal Layered Analysis and a participative approach can be one part of this transformation and working together.

With this insight, I can imagine combining these two methods in my master's thesis. A topic which is suitable and important to me could be the future of social media with a focus on gender equality or the future of birth control. This would obviously need to be more specific, for example, I would choose a specific group of people, platform, content and time. I could also combine the two and study social media content about birth control with CLA and consult a diverse range of experts in a Delphi study about it.

Besides the age difference, and the very different research phases of these two methods, both carry the goal to include silent voices, open up a discussion, think beyond business as usual and be open-minded about the futures. When combining them, it is important to be aware of the (gender) panel bias, the importance of the questions, subjectivity, self-reflection and finding a participative way to conduct this research. All that, so that future futures research can get even more diverse, just and transformative, for a better future for all.

References

Afshari, A. (2019) 'Using the Delphi Method for Futures Studies', in. *Industial Engineering and Operations Management*, Pilsen, Czech Republic. Available at: https://api.semanticscholar.org/CorpusID:201104751.

Ahn, H., Choi, M. and Seo, Y. (2024) 'Gender gap and gender data gap in futures research: Focusing on the studies employing the Delphi technique', *Futures*, 159, p. 103378. Available at: https://doi.org/10.1016/j.futures.2024.103378.

Alon, I. *et al.* (2025) 'The future of artificial intelligence: Insights from recent Delphi studies', *Futures*, 165, p. 103514. Available at: https://doi.org/10.1016/j.futures.2024.103514.

Bell, W. (1997) *Foundations of Futures Studies, Volume 1: Human Science for a New Era*. New Brunswick: Transaction Publishers (Foundations of Futures Studies: History, Purposes, and Knowledge).

Bishop, B.J. and Dzidic, P.L. (2014) 'Dealing with Wicked Problems: Conducting a Causal Layered Analysis of Complex Social Psychological Issues', *American Journal of Community Psychology*, 53(1–2), pp. 13–24. Available at: https://doi.org/10.1007/s10464-013-9611-5.

Criado-Perez, C. (2019) *Invisible women: data bias in a world designed for men*. New York: Abrams Press.

Cuesta-García, A., Fernández-Lansac, V. and Crespo, M. (2023) 'Barriers to access intimate partner violence services in female Romanian immigrants in Spain: A Delphi study', *Journal of Community Psychology*, 51(1), pp. 297–318. Available at: https://doi.org/10.1002/jcop.22904.

Flood, S. *et al.* (2023) 'Imagining climate resilient futures: A layered Delphi panel approach', *Futures*, 147, p. 103100. Available at: https://doi.org/10.1016/j.futures.2023.103100.

Gordon, T.J. (1996) 'The delphi method. The millennium project', *Futures Research Methodology—V3. 0* [Preprint].

Hurley, K. (2008) 'Is that a future we want? An ecofeminist exploration of images of the future in contemporary film', *Futures*, 40(4), pp. 346–359. Available at: https://doi.org/10.1016/j.futures.2007.08.007.

Inayatullah, S. (1998) 'Causal layered analysis: Poststructuralism as method', *Futures*, 30(8), pp. 815–829. Available at: https://doi.org/10.1016/S0016-3287(98)00086-X.

Inayatullah, S., Milojevic, I. and Hung, S. (2022) 'Walking Together: Gender Equality Futures 2042 in the Asia-Pacific Region', *Journal of Futures Studies*, 27(2), pp. 56–60. Available at: https://doi.org/10.6531/JFS.202212_27(2).0006.

Kaboli, S.A. (2024) 'Futulab 1&2 Causal Layered Analysis.' Lecture. University of Turku, 20 November.

Kaboli, S.A. and Tapio, P. (2018) 'How late-modern nomads imagine tomorrow? A Causal Layered Analysis practice to explore the images of the future of young adults', *Futures*, 96, pp. 32–43. Available at: https://doi.org/10.1016/j.futures.2017.11.004.

Melander, L. (2018) 'Scenario development in transport studies: Methodological considerations and reflections on delphi studies', *Futures*, 96, pp. 68–78. Available at: https://doi.org/10.1016/j.futures.2017.11.007.

Popper, R. (2008) 'How are foresight methods selected?', *Foresight*. Edited by M. Butter et al., 10(6), pp. 62–89. Available at: https://doi.org/10.1108/14636680810918586.

Revez, A. *et al.* (2020) 'Beyond Forecasting: Using a Modified Delphi Method to Build Upon Participatory Action Research in Developing Principles for a Just and Inclusive Energy Transition', *International Journal of Qualitative Methods*, 19, p. 1609406920903218. Available at: https://doi.org/10.1177/1609406920903218.

Riedy, C. (2008) 'An Integral extension of causal layered analysis', *Futures*, 40(2), pp. 150–159. Available at: https://doi.org/10.1016/j.futures.2007.11.009.

Seuring, S. and Müller, M. (2008) 'Core issues in sustainable supply chain management – a Delphi study', *Business Strategy and the Environment*, 17(8), pp. 455–466. Available at: https://doi.org/10.1002/bse.607.

Shevellar, L. (2011) '"We have to go back to stories": Causal Layered Analysis and the community development gateaux', *Community Development*, 42(1), pp. 3–15. Available at: https://doi.org/10.1080/15575331003611599.

Slaughter, R.A. (1996) 'Critical futures study as an educational strategy', in *New thinking for a new millennium*. New York: Routledge, pp. 137–153.

Tapio, P. *et al.* (2017) 'Pump, boiler, cell or turbine? Six mixed scenarios of energy futures in farms', *Futures*, 88, pp. 30–42. Available at: https://doi.org/10.1016/j.futures.2017.03.003.

Tapio, P. (2024) 'FUTULAB1 Introduction to Futures Research Methods. DELPHI.' Lecture. University of Turku, 13 November.

Varho, V. and Huutoniemi, K. (2014) 'Envisioning solutions: Expert deliberation on environmental futures', in *Transdisciplinary Sustainability Studies: A Heuristic Approach*, pp. 140–157.

Von der Gracht, H.A. (2008) 'The Delphi Technique for Futures Research', in C. Jahns (ed.) *The future of logistics: scenarios for 2025*. 1st edn. Wiesbaden: Gabler (Gabler Edition Wissenschaft. Einkauf, Logistik und Supply Chain Management), pp. 21–68.

AI Disclosure

In this essay, the only AI tool that I used was the basic version of Grammarly for a spelling check.

Backcasting and Extrapolation: Two Sides of the Same Coin?

Tobias Rogasch

Turku School of Economics, University of Turku

Abstract

Backcasting and Extrapolation are two methods of futures studies that can be used for a similar goal: the development of a process aimed towards action in order to reach a certain condition, with each method starting from an opposite end, backcasting from a point in the future where the goal is accomplished and extrapolation in the conditions of the present. Giving a short definition of the methods and a fragmentary overview on their application in futures research, this essay tries to give a short summary of the methods in general. It concludes with an exploration of the possibility to combine both methods and follows the question if a hybrid method could yield valuable results for decision-making in a joined application.

Introduction

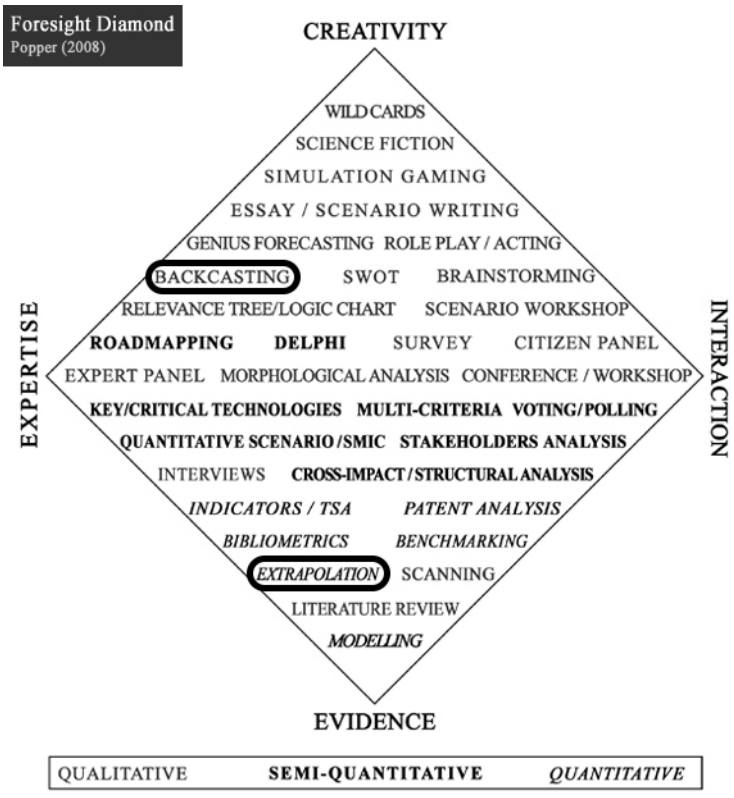


Figure 1. *Foresight Diamond (Popper, 2008), Backcasting and Extrapolation highlighted.*

The multidisciplinary field of Futures Studies analyzes futures with various methodologies to explore possible, probable, and preferable futures. Among these methodologies, backcasting and extrapolation are two methods on opposite ends on the horizontal axis of Popper´s foresight diamond (Figure 1, Popper, 2008). Backcasting is found in the spectrum of creativity, while extrapolation is positioned near the pinnacle

of the evidence spectrum, although both methods are seeded in the spectrum of expertise. While backcasting can be used to devise pathways towards a desirable future by starting with a clearly defined vision of a preferred future, often in a participatory context, extrapolation aims on depicting trends and developments based on historical data. Although both methods aim to inform and influence long-term decision-making, they differ in their basic orientation. Backcasting is rather normative, while extrapolation is considered descriptive. (Popper, 2008).

After a short (3., 4.) is given. The methods will then be compared focusing on their methodology and their application to different problems of futures research. In the end, an attempt of a critical examination of probable strengths and weaknesses drawing from recent research and comparing the methodological approaches of both methods is undertaken, highlighting the roles of both methods in shaping policy, business strategy, and futures research (5.). Drawing from this comparison a reflection (6.) of the results and indications follows. In the conclusion (7.), an attempt is made to propose a hybrid of both methods, provided that the backcasting vision can be formulated in a measurable manner. This train of thought will lead to a reasoning in a favor of a complementary combination of both methods for strategic decision-making under certain premises. The fundamental difference in the basic frame and positioning of the methods will not be treated as an irreconcilable issue but rather a possibility to find common ground for a complementary application.

Backcasting

Backcasting outlines a desirable future defined as clearly as possible as an endpoint and then traces the steps to attain this desired future backwards to the present to determine what actions need to be undertaken to achieve this desired future. (Robinson, 1990) Considering the scope of this essay, the method will be treated in its broadest form, as the choice of a certain methodology of backcasting should rather be limited to its application case and not this abstract enquiry.

Definition

Backcasting is, as Vergragt and Quist (2011) point out, considered a normative futures research method. As a first step, it begins with defining a desirable or sustainable future. It then works backward to identify the steps required to achieve that normative future, frequently through a participatory approach. Backcasting emerged in response to the limitations of forecasting, which assumes future trends will evolve based on present trajectories. (Vergragt, Quist, 2011). As Robinson (1990) describes, backcasting "*starts with how a desired future can be attained"*. This method has become particularly relevant in the context of sustainability studies, as stakeholders aims to radically alter the status quo to reach environmental, social, and/or economic goals (Vergragt, Quist, 2011). Backcasting explores preferable futures and their underlying values, emphasizing the desired outcomes. Unlike forecasting, which is focused on projecting probable trends, backcasting is action-oriented and assumes that the future is not predetermined but can be shaped through deliberate decisions (Robinson, 1990). The backcasting process typically involves the following six stages taken from Robinson, 1990 and slightly simplified in regard of the scope of this essay:

1. Step: The objectives, scope and the purpose of the analysis is determined as well as the number of scenarios that will be used.

2. Step: The specific goals, constraints and targets as well as possible variables are being set.

3. Step: The present system is described, and existing processes are outlined

4. Step: The specific outside variables and inputs to the scenario analysis are developed.

5. Step: The approach of scenarios generation is chosen, the mid- and endpoints of the future processes are analyzed, the scenarios are developed while considering their internal consistency.

6. Step: The impact of the scenarios is analyzed, the results are compared and an analysis regarding consistency is repeated. (Robinson, 1990).

Backcasting can gather both qualitative and quantitative data and can draw from several scenarios (Vergragt&Quist, 2011). The process of backcasting can involve diverse participatory processes to define future visions as well as the collection of current trend data to assess the feasibility of different pathways (Quist, Vergragt, 2006). In the context of participatory backcasting, backcasting is often used in the creation of scenarios during a workshop and is then combined with other methods (Examples following under 3.2).

The results of backcasting often take the form of actionable roadmaps or strategic plans aimed at guiding stakeholders toward achieving the envisioned future. These outcomes can influence policy, technology development, and social practices in many possible ways. There is a large variety in backcasting studies and methodologies used to create the necessary steps to be undertaken to achieve the formulated vision. Considering the scope of this essay, the method will be treated in its broadest form, as the choice of a certain methodology of backcasting should rather be limited to its application case and not this abstract enquiry. However, a few examples of methodological choices will be given in the next section (3.2). To conclude, backcasting can be rather described as a philosophy or an umbrella that encompasses different combinations of methods to create a process or plan, while giving a general framework to the undertaken approach.

Application Cases

Backcasting has been widely applied in sustainability transitions. For example, backcasting has been used in areas such as energy system planning, climate change mitigation, and urban sustainability and city planning (Vergragt, Quist, 2011). The method of backcasting is also widely applied in policy development, for example in the fields of social justice as well as on agricultural and ecological issues. There are numerous different approaches on how to reach the desired states through backcasting, many with participatory approaches. (Vergragt, Quist, 2011). One recent example of one of those methods is the Backcasting Wheel by Bengston et. al, 2020. It is aimed at providing a participatory process for working back from a preferred future to the present through different steps in a group, starting with the goal, defining its key dimension and working through opportunities and obstacles to reach defined actions to be undertaken (Bengston et al., 2020). Other notable Participatory variants named by Vergraft and Quist (2011) include “second-order backcasting” which is characterized by the possibility of making real time choices about desirable futures and getting nearly instantaneous feedback about the consequences of their choices in an expert’s workshop. Additionally, “Community Foresight”, an inclusive bottom-up foresight process characterized by citizen participation and “Story and Simulation” approach that combines workshops with narrative stories and mathematical model results in an iterative procedure are named as prominent examples of projects using participatory backcasting together with other methods. (Vergragt, Quist, 2011).

Another prominent use case in the field of ecology and sustainability is the use of backcasting in the case of food systems, for example used by Remans et al., 2024. In this context the qualitative nature of backcasting has been highlighted. Due to the qualitative nature of backcasting, it is deemed necessary to carefully consider practices and power dynamics among the participants during the research as well as a careful monitoring of shifts in power dynamics. The integration of both those aspects into backcasting can than increase the usefulness of its results. (Remans et al., 2024).

Extrapolation

Extrapolation in the broadest sense is a quantitative futures research method that projects future outcomes by extending mathematical patterns observed in historical data and then subjects them to analysis (Popper, 2008).

Definition

Extrapolation is a statistical method used to depict values beyond a given set of known accumulated historic data, extending the trends observed within the data to forecast future results, usually represented through graphs and functions (Trivedi, 2024). According to Andersson (1973), trend extrapolation in its simplest form is used through linear functions to demonstrate growth. Extrapolation is primarily used to explore probable futures. The focus lies on what is supposed to happen based on current trends. This method assumes that the future will largely reflect the past, making it particularly useful for forecasting economic conditions, population growth, or technological adoption rates, due to the possibility to describe growth in these areas with exponential curves and the interdependence of this growth on existing data sets and set variables. (Andersson, 1973). As Trivedi explains, extrapolation "extends the trend lines of existing data points into the future" and thus relies heavily on quantitative numerical data, such as time series, demographic trends, or economic indicators (Trivedi, 2024). Extrapolation. The results are typically numerical projections that estimate future values for the chosen variables of interest. These prognoses may include growth rates, environmental changes, technological advancements or economic developments or ecological growth cycles. Extrapolation forecasts are often used in foresight for policy planning, business strategy, and resource management. (Andersson, 1973). Extrapolation is one of the most commonly used methods in the endeavor of forecasting (Armstrong, 1985). While extrapolation describes the statistical technique, forecasting is the broader, comprehensive process in which the extrapolation effort is embedded (Hyndman & Athanasopoulos, 2021).

Extrapolation in the most general sense typically involves the following stages:

1. Data Collection: Historical data is gathered from sources or through own research.

2. Model Selection: A statistical model to fit the historical data is chosen or developed.

3. Extrapolation: Future values are predicted by extending the available data.

4. Validation: The results are tested through comparison with known or alternative data.

4.2 Application Cases

Extrapolation is widely applied in fields like economics, demography, business forecasting and climate science due to its descriptive features concerning developments in long-term trends (Anderson, 1973). For instance, technology foresight often employs the method (Tsai et al., 2023).

Recent research has explored how extrapolation is applied across various fields:

1. Demographic Trends: In demographic studies, extrapolation is regularly used to predict future population growth and migration patterns. A recent review by Moriarty (2023) highlights the utility of extrapolation in forecasting population dynamics, despite challenges in accounting for unforeseen societal shifts.

2. Energy Forecasting: Extrapolation is used in energy forecasting, particularly in predicting future energy demands and production patterns (Vlahović, Vujošević, 1987).

3. Technological Forecasting: Businesses rely on extrapolation to predict market trends and the adoption of new technologies. (Tsai et al., 2023).

4. Ecological Forecasting: In ecological science, extrapolation plays a key role in projecting animal population and quality of soil. However, Miller et al. (2024) emphasize the challenges of extrapolating ecological trends, especially when predicting biodiversity loss or deforestation rates: "*Extrapolation is best viewed not as an end point, but rather as part of a cycle involving the application and subsequent revision of what is known. By examining the conditions under which extrapolation fails or succeeds, ecologists are likely to gain a better understanding of ecological patterns and underlying processes.*" However, Tsai et al. (2023)

caution that extrapolation can be limited by unpredictable events or technological disruptions that defy historical patterns.

Comparison

Although backcasting and extrapolation are fundamentally different approaches towards futures research, their basic outlines are open to comparison as both methods share the same basic goal.

Methodological Differences

As described, backcasting and extrapolation find themselves at two different ends of the futures diamond (Figure 1). Backcasting is normative by nature, aiming to guide decision-making towards a preferred future relying heavily on subjective values, world views and intentions of the relevant stakeholders. Extrapolation is considered rather predictive, projecting probable futures based on a certain set of historical data, being less relying on the stakeholders' values and intentions. Biases in extrapolation find themselves influencing the research rather at a secondary level, when the choice of parameters that will be used is made. As such, backcasting tends to be more qualitative and vision-driven, while extrapolation is more quantitative and data-driven.

Application to Different Problems

Backcasting often addresses complex, transformative challenges, such as sustainability transitions, being highly politically and ideology-driven, while extrapolation excels in forecasting probable outcomes in limited or clearly defined systems, like economics or demographic growth and leaning more into the direction of "traditional" empirical science.

Strengths and Weaknesses

A strength of backcasting lies in its ability to provide actionable pathways to achieve a desired future. However, it may be criticized for relying on subjective future visions that are difficult to realize. In addition, it could be argued that backcasting lacks a critical reflection of its underlying political views and biases. Extrapolation, on the other hand, is highly effective for projecting future trends based on gathered data sets. But it may miss disruptive changes or discontinuities that deviate from past patterns or that are not representable through empirical data. Arguably, both methods can be heavily influenced by the biases of their stakeholders. An open disclosure and reflection of theses biases can strongly influence the credibility of research conducted with one or both methods.

Reflection

Assessment

Both methods offer valuable insights into future outcomes, but their limitations should be acknowledged. In the contrast between the methods also lies the opportunity to use both in a combined way to further both their convincing appeal as well as the traceability and transparency when used in policy and decision-making. As Miller et al. (2024) put it, a conceptual model represents a testable hypothesis. With extrapolation, the robustness of underlying relationships of the conceptual model can be assessed. This assessment opens numerous opportunities for learning, for example through data patterns or the comparison of several models that use a common data set. The findings attained by advanced statistical techniques and

visualized with sophisticated graphical tools allow researchers to tease apart complex relationships and describe spatial patterns more accurately. (Miller et al., 2024).

Backcasting provides a strategic framework for transformative change but may overlook practical constraints, while extrapolation is strong in forecasting incremental changes yet struggles with disruptive or non-linear developments. In academia, both methods are widely used for research in sustainability, economics, and technology. In business, extrapolation is critical for market forecasting. However, backcasting is increasingly employed in corporate social responsibility and long-term strategy development. For governments, both methods can inform policy planning. Backcasting is often used for sustainability policies and extrapolation for economic or environmental forecasts.

As repeated ad nauseam, prediction of the future is impossible, and the forecaster can only be wrong (Vlahović& Vujošević, 1987). Still, the point has been made for quantifying the uncertainty of the future through probabilistic forecasts that define an appropriate probability confidence interval of the forecast values (Vlahović& Vujošević, 1987). While Armstrong argued in favor of the adequateness of rather simple extrapolation methods to estimate trend and seasonal factors because they would provide accuracy equivalent to more complex methods at a lower cost while being more understandable (Armstrong, 1984), newer research has also shown the value of more complex and hybrid approaches. In several studies, the evaluation of the methods in use has shown that hybrid models produce more accurate forecasts than models based on individual methods (Tsai et al., 2023). This improvement of the accuracy of forecasting through the potential of hybrid models in futures research has been reflected in the rising popularity of the development and application of hybrid models in technology forecasting. (Tsai et al., 2023). Supporting the argument of Armstrong, according to Pan et. al (2024) complex extrapolation can generate less accurate forecasts and the reliance on to complex data sets and functions can obscure the relevance and preciseness of the forecasts created through extrapolation. So, arguments exist for both sides, one propagating rather simple extrapolation research while the other advocates for complex and combined approaches. Still, it is worthy to be noted that, while advocating simplicity through "Occam's Razor" and quoting William of Occam, who said "one should not introduce complexities unless absolutely necessary", Armstrong still pledged for the use of more than one method (Armstrong, 1984). Andersson (1973) highlights the conditionality of all types of long-term forecasts. According to him, forecasts do not tell us what will happen, but what will happen if something else happens thus highlighting the conditional nature of predictions due to their dependency on initial conditions. He further explains that only through the fulfillment of the initial conditions the predicted event can follow. The initial conditions describe the initial state of the system and in case of an open system also the possible influence of other systems. A special interest for futures studies arises from systems that could be influenced by man, as conditional forecasts can show possible ways of action as well as possible consequences of those actions and thus can facilitate the decision on the best way to proceed. The same is true for trend extrapolation, as they are also conditional. The permanence of trends depends on certain basic conditions as well. A hypothesis of the permanence of a trend during the time of extrapolation is only robust, when it has been tested under different conditions and not solely in one system during a long period of time. (Andersson, 1973).

Breaking these arguments down, research that makes valuable use of extrapolation needs to understand and break down the functions of a system and reflect them in its parameters while being aware of their conditionality and interrelations and keeping in mind that a permanent trend development is rather the exception than the rule. Still, extrapolation remains a useful tool for decision-making if these pitfalls are accounted for.

Suitability for a Master Thesis

Both methods are highly suitable for a master thesis in futures studies in general, depending on the topic. As I have not clearly defined the topic of my thesis yet, the choice of method has not been made. The topics I have been contemplating cover questions of organization and governance, either in the European

Union or on the level of a national state, like Germany. I have considered discussion questions of constitutional law, new community models or developing more efficient ways of state administration. All these topics could be presented through a backcasting approach for the long-term future. A vision could be formulated through backcasting for the long-term future. This vision could be put into contrast with historical data, like the number of people in service of the state and the amount of money spend for retirement and salaries, further put into perspective with demographic data, so the possibility to use both methods for certain argument is present. The data on the current situation could be visualized for the short-term future through trend extrapolation. The results could then be compared to a vision of the long-term future and the necessary steps developed through backcasting that would need to be undertaken. In conclusion, actionable steps could be deducted from this comparison.

Conclusion

Backcasting and extrapolation are two common methodologies in futures studies, each with distinct approaches, strengths, and limitations. While backcasting provides normative guidance for achieving a desired future, extrapolation offers a predictive model grounded in historical data. Both methods are valuable for different types of foresight work and offer complementary perspectives on future planning, policy development, and business strategy. Their continued application across diverse fields underscores their relevance in shaping future scenarios. In using a hybrid approach of backcasting and extrapolation in certain areas, a convincing and holistic tool for futures research could be gained. To obtain such a tool through a hybrid approach, clear and quantifiable goalsetting is crucial. The basic idea of a hybrid method is based on the prerequisite that the starting point of backcasting yields a clear vision and reveals the underlying values represented in the backcasting approach and then reflects those values in the devised actions. On the other hand, extrapolation is grounded on the hard facts of gathered data, which creates a ground of hard facts and traceable factors, although the risks and pitfalls of this approach are also noted. However, if a defined vision done through backcasting can be translated in quantifiable terms or quantifiable steps, a fruitful combination of both methods becomes possible. Through gathering data in the present on the chosen backcasting topic or goal, the empirical basis of the necessary steps to reach the formulated vision can be defined and the data gathered. By using Extrapolation on this gathered data with flexible parameters, an empirical frame of possible actions based on a measurable set of historical and present data can be created. In this data backed frame or “window of possibility”, feasible steps towards the normative backcasting vision of the future could be derived. These steps of action would be grounded on the quantitative data gained through extrapolation. The back bonding of the necessary steps to reach the formulated vision could yield a robust basis for decision-makers. Such an approach could create rather robust and cogent plans of possible actions, without attempting to predict anything. In conclusion, while both methods are not actually two different sides of the same coin, as the basic natures of extrapolation in foresight and the philosophy of backcasting are contrary, the framework of backcasting allows to be combined and complemented with extrapolation endeavors, possibly resulting in quite robust, multifaceted research.

References

Andersson, G. (1973). Methods in futures studies: A view from the theory of science. *Technological Forecasting and Social Change*, 5(3), 305–319. https://doi.org/10.1016/0040-1625(73)90009-7.

Armstrong, J. S. (1984). Forecasting by Extrapolation: Conclusions from 25 Years of Research. *Interfaces,* 14(6), 52–66. https://doi.org/10.1287/inte.14.6.52.

Armstrong, J. S. (1985). *Long-range forecasting from crystal ball to computer*. Wiley, https://jscottarmstrong.com/LONG-RANGE%20FORECASTING%20book.pdf.

Bengston, D. N., Westphal, L. M., & Dockry, M. J. (2020). Back from the Future: The Backcasting Wheel for Mapping a Pathway to a Preferred Future. *World Futures Review*, 12(3), 194675672092972. https://doi.org/10.1177/1946756720929724.

Bibri, S. E. (2020). A methodological framework for futures studies: integrating normative backcasting approaches and descriptive case study design for strategic data-driven smart sustainable city planning. *Energy Informatics*, 3(1). https://doi.org/10.1186/s42162-020-00133-5.

Dreborg, K. H. (1996). Essence of backcasting. *Futures*, 28(9), 813–828. https://doi.org/10.1016/s0016-3287(96)00044-4.

Fildes, R. (1992). The evaluation of extrapolative forecasting methods. *International Journal of Forecasting*, 8(1), 81–98. https://doi.org/10.1016/0169-2070(92)90009-x.

Hyndman, R.J., & Athanasopoulos, G. (2021) *Forecasting: principles and practice*, 3rd edition, OTexts: Melbourne, Australia. OTexts.com/fpp3. Accessed on 28.01.2025.

Höjer, M., & Mattsson, L.-G. (2000). Determinism and backcasting in future studies. *Futures*, 32(7), 613–634. https://doi.org/10.1016/s0016-3287(00)00012-4.

Kishita, Y., Höjer, M., & Quist, J. (2024). Consolidating backcasting: A design framework towards a users' guide. *Technological Forecasting and Social Change*, 202, 123285. https://doi.org/10.1016/j.techfore.2024.123285.

Miller, J. R., Turner, M. G., Smithwick, E. A. H., Dent, C. L., & Stanley, E. H. (2004). Spatial Extrapolation: The Science of Predicting Ecological Patterns and Processes. *BioScience*, 54(4), 310. https://doi.org/10.1641/0006-3568(2004)054[0310:setsop]2.0.co;2.

Moriarty, P. (2023). Modern Methods of Prediction. *Encyclopedia*, 3(2), 520–529. https://doi.org/10.3390/encyclopedia3020037.

Pan, G.-G., Shiu, Y.-M., & Wu, T.-C. (2024). Extrapolation and option-implied kurtosis in volatility forecasting. *Pacific-Basin Finance Journal*, 84, 102286–102286. https://doi.org/10.1016/j.pacfin.2024.102286.

Popper, R. (2008). How are foresight methods selected? Foresight, 10(6), 62–89. https://doi.org/10.1108/14636680810918586.

Quist, J., Vergragt, P. (2006). Past and future of backcasting: the shift to stakeholder participation and a proposal for a methodological framework. *Futures* 38, 1027–1045. doi: 10.1016/j.futures.2006.02.010.

Remans, R., Zornetzer, H., Mason-D'Croz, D., Kugler, C., Thornton, P., Pedersen, C., Cattaneo, F., Debjani Samantaray, Brouwer, I. D., Bosch, D., Bekele, T. H., Martinez, S., Ivanova, Y., Sanchez-Choy, J., Mockshell, J., Bergamini, N., Degefie Tibebe, Yodit Balcha, Ebrahim, M., & Misiko, M. (2024). Backcasting supports cross-sectoral collaboration and social-technical innovation bundling: case studies in agri-food systems. *Frontiers in Sustainable Food Systems*, 8. https://doi.org/10.3389/fsufs.2024.1378883.

Robinson, J. (2003). Future under glass – a recipe for people who hate to predict. *Futures*, 22 (8), 820–842. https://doi.org/10.1016/0016-3287(90)90018-D.

Trivedi, A. (2024). A Comprehensive Guide to Extrapolation. Analytics Vidhya. https://www.analyticsvidhya.com/blog/2024/08/a-comprehensive-guide-to-extrapolation/.

Tsai, P.-H., Berleant, D., et al., Quantitative technology forecasting: a review of trend extrapolation methods, *International Journal of Innovation and Technology Management* (2023), 20(4):2330002, https://doi.org/10.1142/S0219877023300021.

Vergragt, P. J., Quist, J. (2011). Backcasting for sustainability: Introduction to the special issue. *Technological Forecasting and Social Change*, 78(5), 747–755. https://doi.org/10.1016/j.techfore.2011.03.010.

Vlahović, V. M., & Vujošević, I. M. (1987). Long-term forecasting: a critical review of direct-trend extrapolation methods. *International Journal of Electrical Power & Energy Systems*, 9(1), 2–8. https://doi.org/10.1016/0142-0615(87)90019-6.

AI Statement

When creating the Essay in December I used ChatGPT to create a draft for comparison to my essay, to see if I missed something or made a fundamental mistake, but it turned out to be even of little use for comparison, as it lacked depth. The articles ChatGPT used as references did not exist, although searching for them with Google let me to some interesting papers I could make use of.

FUTULAB3 Participatory Scenario Planning

FUTULAB3 Participatory Scenario Planning (4 cr) course introduces concepts, methods, and practices of making and utilising scenarios. Scenarios are one of the best-known futures studies methods and are used by SMEs, large corporations, regions, third-sector organizations, and international bodies to consider alternative futures and illuminate new ways forward. Students will learn about scenario thinking, its history, and variations of approaches.

The course is formatted as an intensive 'learn by doing' participatory process in which students work in teams to construct and analyse scenarios for a selected case organization. Students will deepen their understanding of the 'classic' two-axes, four-quadrant approach to scenario building. Students will learn how to utilise environmental scanning, the impact/uncertainty matrix, PESTEC (Political, Ecological, Social, Technology, Economic, Cultural) framework, and the futures table to build robust narratives of alternative futures. They will be encouraged to take a critical view of this approach's core assumptions about what scenarios, as rigorously imagined futures, can and cannot do to support organisations in navigating uncertainty. Alternative conceptualisations of scenarios and imagined futures will be discussed

The responsible teachers for this course were University Lecturer **Hanna Heino** and Project Researcher **Amos Taylor**.

The report by **Abius Akwaake, Héléne Fournier, Aino Lähdekorpi** and **Tobias Rogasch** demonstrates excellent content and scope. All concepts are clearly understood and accurately explained. It begins with a strong introduction that effectively sets the stage for the topic. The driving forces are well-supported by relevant references, adding credibility to the analysis. Scenarios are thoughtfully constructed, and the accompanying narratives are engaging and coherent.

While the student stories are insightful, they could be slightly more concise and better integrated with the broader narratives.

The recommendations provided to the case organisation are clear, actionable, and precisely articulated.

Participatory Scenario Planning for VOAS – How Hybrid Education Impacts Students Behaviour

Abius Akwaake, Héléne Fournier, Aino Lähdekorpi & Tobias Rogasch

Turku School of Economics, University of Turku

Introduction and Background

As part of our Future Scenario Planning course, we carried out an in-depth study for The Student Housing Foundation in Vaasa, VOAS, to anticipate the growing impact of blended learning on student accommodation and identify the best strategies to adopt.

Today, VOAS offers a diversified range of accommodation for students with a major focus on studios but also offering family and shared apartments (VOAS, n.d.). The company receives financial support from ARA, provides study and relaxation areas, and organizes events for its tenants. However, it also faces major challenges, including changing government subsidies, the rise of collaborative housing services, and a limited presence on social networks (Ylimäki, 2025).

The rise of blended learning is transforming students' housing needs, changing their expectations in terms of flexibility, shared spaces, and connectivity. In this context, it is essential for VOAS to adapt its offer in order to remain relevant and competitive. Our analysis explores how these transformations may impact VOAS and what strategic orientations the company could adopt to respond to changes in the student housing market.

This study represents the first stage of our process, during which we identified and analyzed all the key factors likely to influence the development of our scenarios for VOAS. Our focal issue is to understand how the evolution of hybrid learning will shape student accommodation needs and VOAS's positioning in the coming years. We have chosen a time horizon of 15 years, as hybrid learning is an issue that is already transforming student behavior and must be considered in a near-future perspective to ensure VOAS remains competitive and aligned with students' evolving expectations.

Methodology

To analyze the impact of hybrid learning on student housing and propose scenarios adapted to VOAS, we followed Peter Schwartz's (2012) scenario-building methodology. This eight-step approach enabled us to identify key uncertainties and anticipate possible developments in the student housing market.

1. Identifying the central problem: We defined as the central question the impact of hybrid learning on the use of student accommodation, thus influencing the future strategy of VOAS.
2. Identifying key forces in the local environment: We analyzed the current context for VOAS, including the diversification of its housing typologies, the role of public subsidies (ARA), the emergence of shared services (collaborative housing, marketplace), and changes in student needs.
3. Identification of driving forces: We have identified the major factors likely to impact VOAS, including government policies, housing market trends, and student accommodation preferences.
4. Ranking according to importance and uncertainty: We ranked these forces according to their potential impact and the degree of uncertainty surrounding them.

5. Selection of scenario logics: Based on the major uncertainties, we defined structuring axes to build contrasting scenarios.
6. Development of scenarios: We developed four forward-looking scenarios detailing the different possible trajectories for VOAS, based on market developments and student needs. In addition, we fleshed out the scenarios by scenario narratives.
7. Analysis of implications: Each scenario was analyzed to derive relevant strategic recommendations for VOAS.
8. Definition of monitoring indicators: Finally, we identified indicators enabling VOAS to monitor trends and adjust its strategy accordingly.

This methodology enabled us to structure our thinking and come up with robust scenarios, enabling VOAS to anticipate the challenges and opportunities linked to the evolution of the student housing market in a hybrid learning context.

Driving Forces and Uncertainty Matrix

This analysis is the first step in the process that we have examined. We sought to identify and highlight all the forces and drivers that could influence the development of our scenarios for VOAS (Ralston & Wilson, 2006, 87). Political, economic, social, technological, environmental and cultural dynamics play a crucial role in the evolution of the student housing market and waste management practices. Government decisions, economic fluctuations and societal trends directly influence how students choose their accommodation and adopt sustainable behaviors. To identify all the factors influencing the operation of VOAS and the development of our scenarios, we have used the PESTEC Framework as follows:

Driving Forces

Political

Public funding: The government has announced plans to increase tuition fees for international students, requiring them to cover the full cost of their studies. An increase in tuition fees could reduce the number of international students, thereby affecting demand for student accommodation. In addition, the maximum amount of housing allowance Finnish students has been able to get will reduce due to changing students from general housing allowance to student housing supplement. This might create an increasing need for cheaper housing options (even though this might be a bigger problem in Helsinki than anywhere else). (Verbalist Education & Language Network, 2023.)

Continuous policy changes in Finland (New governments, ARA): Finland has experienced frequent changes in government and policies, particularly with the rise of the ARA (Alliance for the People and the Environment) party. These changes often lead to shifts in educational policies, funding, and regulations. Continuous policy changes can create uncertainty and instability in the education sector, affecting how institutions plan and implement hybrid education models. This could influence student behaviors in terms of accommodation choices and waste management practices, as schools and students adapt to new regulations and funding priorities. (Ministry of foreign affairs in Finland, 2023.)

Economical

Competition, **what does the private sector offer:** Increased competition in Finland's private sector drives innovation and diversification in educational services, including hybrid education models. This competition

can lead to more varied and improved accommodation and waste management solutions for students, as private companies strive to offer better services and attract more clients. (Pohjanpalo & Keränen, 2023.)

Impact, role of energy prices (consumption): Rising energy prices in Finland affect the operational costs of educational institutions, influencing their consumption patterns and sustainability practices. Higher energy costs may lead schools to adopt more energy-efficient technologies and practices, impacting student behavior in terms of accommodation choices and waste management. (Clarke, 2023.)

Number of jobs in Vaasa: The job market in Vaasa is good, with a high employment rate and numerous opportunities for both students and graduates. An abundance of job opportunities can influence student behavior, encouraging them to stay in the region post-graduation, which may affect accommodation choices and waste management practices as the population grows. (Vaasa website, 2025.)

Social

Trend to move to bigger cities (eg. Helsinki for jobs): There is a growing trend of people moving from smaller cities and rural areas to larger cities like Helsinki in search of better job opportunities. This migration can lead to increased demand for student accommodations and waste management services in bigger cities, affecting student behavior and local infrastructure. (Investropa, 2025.)

Mental health (crisis): Finland is experiencing a growing mental health crisis, with increasing rates of anxiety, depression, and other mental health issues among students and the general population. This crisis can affect student behavior, leading to higher demand for mental health services, changes in accommodation preferences, and increased focus on sustainable waste management practices as institutions seek to create healthier environments. Young people experience burnout even before starting their studies in universities and face pressure when applying to universities or in working life. Social anxiety became more popular at least partly due to covid, which made people stay home. Finances and climate crises can cause anxiety among young people. (Kiviruusu et al., 2024)

Living standards of Vaasa: Vaasa offers a high quality of life with affordable living costs, good healthcare, and a strong sense of community. Improved living standards can attract more students and professionals to Vaasa, influencing accommodation choices and waste management practices as the population grows. (Vaasa website, n.d.)

Technological

Hybrid learning/number of online classes: The increasing adoption of hybrid learning and online classes in Vaasa offers flexible education options for students. This shift can influence student behavior by changing accommodation preferences and waste management practices as students balance between on-campus and remote learning. (University of Vaasa, n.d.)

Need for innovation to support local engineering industry: The local engineering industry in Vaasa requires continuous innovation to maintain its competitive edge and support sustainable development. This need for innovation can drive changes in student behavior, as educational institutions may focus more on developing skills and technologies that support the local industry, influencing accommodation and waste management practices. (Vaasa website, n.d.)

Evolving and changing modes of education delivery: The continuous evolution of education delivery methods, including hybrid and online learning, is reshaping how students engage with their studies. This shift can influence student behavior by altering accommodation preferences and waste management practices as students balance between on-campus and remote learning environments. The amount of online learning decreased after covid. (Howe & Watson, 2021.)

New technologies (waste, education etc.): Advancements in technology are revolutionizing waste management and education, leading to more efficient and sustainable practices. These new technologies can influence student behavior by promoting eco-friendly waste practices and enhancing learning experiences through innovative educational tools (Alster, 2025).

Environmental

Level of involvement in maintenance and use of buildings and areas: Increased involvement of stakeholders in the maintenance and use of buildings and areas can lead to more sustainable and efficient practices. This involvement can influence student behavior by promoting better waste management and more responsible use of facilities, as students become more engaged in maintaining their environment (Au-yong et al, 2017).

Green living promotion and competition winners: Initiatives promoting green living and recognizing competition winners encourage sustainable practices and innovations in communities. These promotions can influence student behavior by fostering a culture of sustainability, leading to more environmentally conscious choices in accommodation and waste management. (European Commission, 2025.)

Noise and air pollution issues: Increasing levels of noise and air pollution in urban areas pose significant health risks and environmental challenges. These pollution issues can influence student behavior by affecting their choice of accommodation and waste management practices, as they seek healthier living environments (European environment agency, 2020).

Students are more aware of environmental issues and it's important for them: Increasing environmental awareness among students is driving demand for sustainable practices and green living solutions in accommodation. This heightened awareness can influence student behavior, leading to preferences for eco-friendly accommodations and better waste management practices, which VOAS can leverage to enhance their offerings. (Education Finland, 2025.)

Cultural

Type of student (age, studies, country etc.): The demographics of students, including their age, field of study, and country of origin, influence their environmental awareness and behaviors. This diversity can lead to varied preferences for accommodation and waste management practices, as students from different backgrounds bring unique perspectives and priorities to environmental issues. (Libelo & Tracy, 2022.)

Emerging and changing cultures: The cultural landscape is continuously evolving due to globalization, technological advancements, and increased mobility, leading to more diverse and inclusive communities. These cultural shifts can influence student behavior by promoting multiculturalism and inclusivity in accommodation preferences and sustainable practices in waste management. (Ahponen et al., 2014.)

Possible hobbies in Vaasa (cost in culture theatre, sports, etc.): Vaasa offers a wide range of hobbies and activities, from cultural experiences to sports and outdoor adventures, catering to diverse interests and age groups. These varied hobbies can influence student behavior by encouraging them to engage in local activities, fostering a sense of community and well-being. (Vaasa website, n.d.)

Cuts in funding for culture: State funding of culture and art faces cuts. In total next year the state support will be reduced by about 17.4 million euros (Aromaa, 2024). Although the city of Vaasa is still subsidizing its culture (Vaasa website, 2025).

Uncertainty Matrix

After developing each point of the PESTEC framework, we tried to divide each force into an uncertainty matrix. We classified them according to their degree of impact and their degree of uncertainty. The drivers classified as high impact/high uncertainty will be used to structure the scenarios because they will most likely lead to substantially different futures that are important to consider in our context (Ralston & Wilson, 2006, 105; 109).

Figure 1. *PESTEC-based uncertainty matrix.*

Axis Framework for the Scenarios

We identified two axes of uncertainty that encompassed most high impact/high uncertainty drivers and that would create distinctly different scenarios from each other (Ralston & Wilson, 2006, 112). During this process, the question of the impact of hybrid learning on student housing was kept in mind.

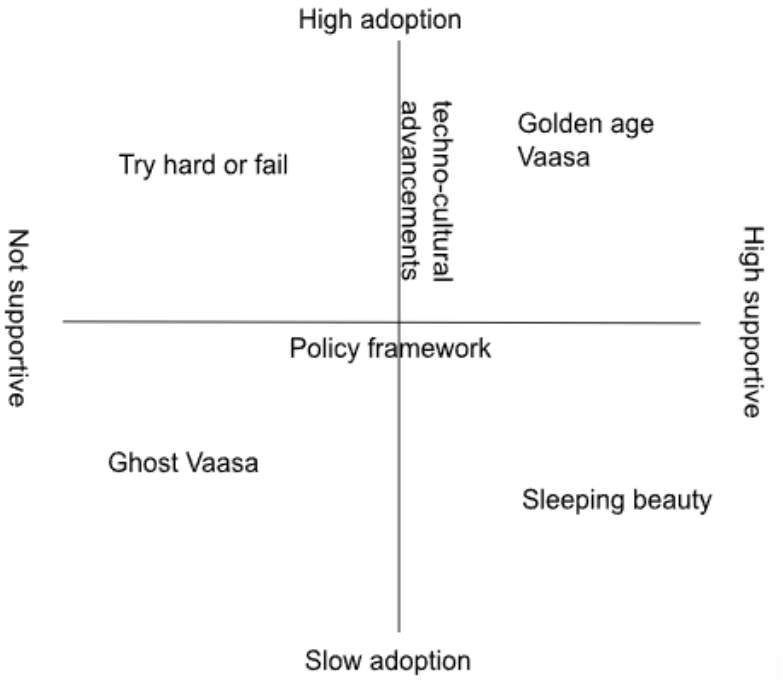


Figure 2. *Axis Framework for the Scenarios.*

The two main drivers we identified were techno-cultural advancements and the supportive policy framework. The way education is delivered is highly dependent on its cultural embedding. This cultural embedding is always influenced by the technological level on which a culture operates. As a result, the development and nature of hybrid learning will be mainly influenced by the technology used and how those technologies are embedded in their cultural environment. The choices of students in relation to hybrid learning will then be influenced by the pace of the rate by which institutions, in our case, the University of Vaasa and by extension VOAS, adopt and integrate technological progress into every day and educational life.

The second main driver we identified was the policy framework that relates to the amount of funding VOAS and the University of Vaasa receive in order to provide their services. Although, students might not necessarily have direct knowledge of those policies, it directly impacts what can be offered to the student, especially regarding housing and hybrid learning, as the technological infrastructure, staff and digital tools are rather expensive. A highly supportive policy framework will always improve attractiveness, while a less supportive framework will lead to numerous issues for students, ranging from affordability issues, quality of education to increased competition.

Scenarios

We developed four scenarios that can be divided into two scenarios leading towards rather negative developments (*Ghost Vaasa, Try Hard or Fail*) and two scenarios following a more positive direction (*Sleeping Beauty, Golden Age Vaasa*) with the last positive one being a rather "ideal state". Each of the Scenarios comes with a unique set of circumstances and challenges that we deemed the most influential concerning the choices made by potential students in the future. In this step, the aim is to describe how the four scenarios might evolve and end up creating alternative futures (Ralston & Wilson, 2006, 125). The Scenario Narratives will be described (4.1.) and additionally, student stories under the developed conditions will be presented (4.2) to underline the consequences of the scenarios.

Scenario Narratives

The scenario narratives were developed in steps of five years, starting in 2030, 2035 and leading to 2040 covering a time frame of 15 years. They describe the gradual development towards an end state that defines the core of the scenario created.

Ghost Vaasa

Ghost Vaasa set in the conditions of a non-supportive policy framework and with a slow adoption of techno-cultural advancements can be considered the most dystopian and negative scenario that would have the most detrimental impact on student behavior and thus VOAS:

2030: Most of the state funding is cut, and policies move away from higher education. VOAS does not have enough funding to spend on community offerings; fewer students opt out of Vaasa due to the high costs. High University fees for education are being introduced.

2035: People start moving away from Vaasa, the infrastructure is eroding. Accommodation is unaffordable for most students. University fees are increasing. No new technologies are being introduced or used in the learning environment, although they exist. No innovation in education delivery takes place, and traditional teaching methods are still practiced. Students from rich backgrounds opt for other options. The standard of living is degrading, and unemployment is rising.

2040: The existing infrastructure is depleted. Policies are stuck in bureaucratic processes. Student apartments and houses are empty – an accelerated rate of lease cancellation, and virtually no services to tenants are being offered. University enrollment declines drastically. The situation could be described as survival rather than living. Advanced technology is inaccessible and unaffordable for students.

Try Hard or Fail

Try Hard or Fail can be described as a competitive and semi-dystopian situation with low policy support levels but faster techno-cultural advancements that increase the competitive pressure on students while the demography develops unfavorably for young people.

2030: Only limited study places can be offered due to cost-cutting, which leads to an increase in competition. Technological progress takes place at a fast pace, but only basic education is still funded by the state.

2035: Education offerings are available online for students, but at a high price. The average age of Vaasa's population is rising which leads to a shifted focus on public funding. Private companies drive innovation by themselves.

2040: The general population is above 60, only richer students can afford the education and living costs. Good infrastructure exists but it is expensive to use. Students must rely on themselves mostly, as social communities rely on personal individual initiatives. Hybrid and online learning are preferred because they are less expensive.

Sleeping Beauty

Sleeping Beauty depicts a scenario that offers good conditions regarding hybrid education and a positive impact on student behavior, as the funding conditions are very supporting. However, due to several reasons, a lot of the potential remains unused.

2030: Education and innovation receive funding, but they are directed towards the basics. Policies are adapting to changes slowly, which also slows the application of funding. Students from Finland and abroad are interested in Vaasa due to subsidies and funded universities. Cultural diversity enriches which brings new ways of thinking for sustainability as well. Students are not showing interest in community offerings by VOAS. New technologies intended but the market has not been welcoming, slow adaptation.

2035: Funding and policies are starting to lack more and more behind new technologies, advancements and changes in the culture. Students are still motivated to study and live in Vaasa due to adequate support. Due to its good financial state students are more interested in other leisure activities than the ones offered by VOAS. Students focus on other things than new technology and innovation. The attitude could be described with “Carpe diem” (Cease the day/moment!).

2040: Transportation within Finland has not changed significantly. Due to long travel time and higher prices students are not interested in living in bigger cities. Technology adoption is slow, and interest is low. However, the students that are not interested in innovation are enjoying their time in Vaasa and taking advantage of the subsidies. Vaasa is popular with Erasmus students.

Golden Age Vaasa

Golden Age Vaasa represents a positive utopian scenario with mostly ideal conditions. The policy framework is highly supportive, and techno-cultural advancements are adopted quickly and constructively.

2030: Vaasa undergoes an educational and technological revolution with substantial public funding. Universities fully integrate digital tools, enabling hybrid learning. VOAS adapts student housing with collaborative spaces and energy-efficient infrastructure.

2035: Hybrid education is the norm in Vaasa, with immersive virtual learning and AI-driven tutoring. Government investment keeps institutions at the forefront of technology. VOAS expands with eco-friendly housing, zero waste initiatives, and student-led sustainability projects.

2040: Vaasa is a model city for hybrid education and sustainability. Universities offer AI-driven courses and connected classrooms, ensuring inclusive and personalized learning. Students housing is fully “ecosmart”, with renewable energy, near zero waste, and free clean-energy public transport. The transportation between the cities in Finland is way faster.

Scenario Stories

The scenario stories are meant to illustrate the conditions of the scenarios. Two main characters were used: Elias, a male student from Finland and Kate, an international student. Depending on the scenario, their conditions, backgrounds, and circumstances may vary.

Ghost Vaasa

By 2040, Vaasa is a shadow of its former self. Despite the rapid advancement of technology elsewhere, the people of Vaasa remain largely indifferent. Bureaucratic stagnation has left policies ineffective, and the near collapse of public services. The local population, mostly older generations and traditionalists, see no reason to change. Empty apartments and abandoned houses litter the city as an increasing number of residents leave. Small businesses and local market activities have reduced, with fewer prospects of customers. The university, once a hub of activity, struggles to retain students, leading to reduced programs and limited academic offerings. The few tech-savvy individuals in the city have been struggling to find like-minded peers. With connectivity slow or unavailable, innovation in Vaasa is an uphill battle and many have left.

Elias a Finnish student is at odds with the town's reluctance to evolve. His dreams of a more connected and dynamic Vaasa were shuttered.

Kate, an international student, is disillusioned as she barely manages to survive. Her dreams of a better future in Finland shattered as she faces an impossible choice – stay in a city that offers no future or return home with nothing to show for her sacrifices. Elias, once optimistic about his future in Vaasa, leaves for Helsinki, where he takes up a low-paying job but at least has stability. Vaasa, now a ghost town, stands as a cautionary tale of what happens when policy stagnates, technological adoption slows, and opportunities vanish.

Try Hard or Fail

Elias stared at his laptop screen, his exhaustion reflecting on the screen. Another night of struggling with outdated digital course material, in a cramped and run-down studio apartment. Just another day of navigating the hybrid education system in Vaasa – a system that did not seem to be designed for success.

The rapid digitalization of education was inevitable, fueled by global competition and technological progress. But in Finland, public funding had failed to keep pace. While basic education still received government support, higher education was left to fend for itself. Universities struggle to adapt. Without adequate funding, they rely on rushed, poorly structured online lectures and recycled content that barely fits the students' needs. International students with deep pockets thrive, effortlessly affording cutting-edge learning tools, premium online resources, and private tutors while not being tied down in one place. Meanwhile, local students like Elias had to piece together their education career through self-initiative. He spent hours scouring forums, downloading trial versions of expensive software, and forming informal study groups in cramped spaces. Housing in Vaasa was another challenge – as the hybrid model blurred the lines between home and school, increasing the strain. With no subsidies, these small, overpriced living spaces become inaccessible to many, as they are rare. The burden of adaptation is on students, not the institutions. Without structured social interaction, friendships and networks forming organically, it's a fragile situation, limited to those who could afford to participate in digital communities or in-person gatherings. The aging Finnish population, mostly between 50 and 60, viewed this shift with indifference, disconnected from the struggles of younger generations.

Expensive private companies filled the gaps where public support failed. Tech firms introduced learning platforms, but at a cost. Streaming services adapted entertainment for digital consumption, but the content

often felt hollow – either too simplistic or poorly formatted. Universities struggled, offering fragmented and unreliable coverage in an attempt to keep up with digital trends.

Elias logged back into his unstable learning portal, determined to fight his way through yet another inadequate digital lecture. He knew he had only two choices: try hard or fail.

Sleeping Beauty

Vaasa has faced the inevitable change, but it has been slow, and the welcome has been more reluctant than tech companies predicted. 15 years ago, Elias was seven years old then, his parents seeded this idea of a possible threat of AI. Since then, Elias has adopted a more down-to-earth lifestyle in terms of technological innovation. When choosing a study place, he was intrigued by the international yet innovation resistant culture of Vaasa. Now as a student in Vaasa he gets to enjoy the high-quality student apartments, thanks to supportive policies and subsidies from the state. Elias plays ice hockey and even if the hobby is costly, students receive subsidies making frequent hockey possible. Elias and his friends have ample choices of free activities and meeting people. Students in Vaasa are well off and spend their free time partying and trying different cultural and sporty activities that before belonged to the upper middle class. Elias is interested in his studies but prioritizes enjoying life over innovation and advancement. Students are laid back and focus on building enjoyable lifestyles. For them life in Helsinki and other bigger cities is unappealing. Despite some disciplines offering hybrid and online learning, the lifestyle and leisure activities keep Elias and his friends in Vaasa.

An English Erasmus student, Kate, has spent the last two months in the winds of Vaasa. She has lived through the adventurous, easygoing Erasmus experience party loving students yearn for. To her, travelling to other places in Finland seems to be time consuming and with rather outdated infrastructure. She was pleasantly surprised by the fancy and comfortable amenities of the universities and accommodation. However, the absence of what some would term quite basic technologies left her confused.

Golden Age Vaasa

In terms of education and student life, Vaasa has undergone a complete transformation over the past 15 years, becoming a pioneer in hybrid learning and sustainable student living. Kate was always eager to study in an innovative environment. Now, as an international student in Vaasa, she experiences a seamless blend of AI-driven virtual learning and interactive in-person classes. Thanks to strong government funding and VOAS's commitment to modern student housing, she lives in a smart, eco-friendly residence equipped with AI-powered study rooms, energy-efficient designs, and digital collaboration spaces.

Kate appreciates how effortlessly technology is integrated into everyday life. Her residence generates its own renewable energy through solar panels and wind turbines, while waste is almost eliminated through automated tracking and recycling systems. With VOAS leading sustainability efforts, student communities are actively engaged in zero-waste initiatives, circular economy projects, and smart consumption tracking. She finds it easy to balance her studies with an active social life, thanks to VOAS's vibrant community events and shared digital hubs that connect students across disciplines and cultures.

Meanwhile, Elias, a Finnish student with family nearby, enjoys the same high-tech learning environment but values the stability of being close to home. He lives in a VOAS apartment that provides a perfect balance between privacy and communal engagement. Hybrid education allows him the flexibility to pursue his passion for ice hockey, which remains accessible thanks to state subsidies supporting student sports and activities. Unlike previous generations who moved to bigger cities like Helsinki, Elias and his friends feel no need to leave Vaasa, as it offers everything they need – a high quality of life, cutting-edge education, and a strong, interconnected student community.

Wind Tunneling

Strategic Decisions

This step includes possible choices, what the organization should do to be flexible when facing the future, and to capitalize on change in its external environment (Ralston & Wilson, 2006, 141). By developing our scenarios, we were able to imagine what kind of difficulties VOAS could face in different alternative futures. We looked at this through our focal issue; how does the evolution of hybrid learning shape the needs for student accommodation. We thought about decisions that VOAS is facing today relating to this evolution.

The first decision we found relevant is: What type of apartments should VOAS build and/or focus on. This is always a relevant question for the company and can highly be affected by hybrid learning. For this question we found three main strategic options: focus on studios especially for young Finnish bachelor students, focus on furnished apartments mainly for international students including family and shared apartments, and lastly create a student hotel. By a student hotel, we mean rooms or small apartments that VOAS owns and maintains, and that can be booked by students and possibly other visitors at the university like a hotel room. This might give VOAS more revenue, if more and more students live outside of Vaasa. A fourth option could be not to build anything new.

These choices are based on the information VOAS gave us, the usual trend in housing for students in Finland and the student population of Vaasa. VOAS said that they are expecting more international families to Vaasa. In some disciplines, for example business and economics, it is popular to move away from one's university town especially during a master's degree program (Anttonen, 2022). If online education increases its popularity, this creates problems for VOAS and calls for new solutions.

The second decision VOAS is facing is what services should be offered. VOAS mentions that the service orientation of housing is one of their strategic focus areas now (Ylimäki, 2025). The services can be related to hybrid and online learning and possibly improve VOAS's competitiveness. The strategic choice for this is whether VOAS should offer virtual classroom equipment such as computers, screens, spaces, and other possible online learning facilitators to reserve. This could attract students to stay within VOAS because it would have a better studying environment than private apartments or alternatives in other towns.

Finally, we found that in order to face the potential effects of hybrid education VOAS should increase flexibility in its contracts and renting due to increased student mobility. The strategic decision to actualize this could be creating a subletting system, a so-called student Airbnb. There might be legal questions and limitations for this, for example, only students might be allowed to be customers of this system. Nevertheless, we think this solution could be feasible and profitable.

Wind Tunneling Strategic Choices

This step involves visualizing threats and opportunities in each scenario and comparing which strategic alternatives could be implemented (Ralston & Wilson, 2006, 141). We tested all the aforementioned strategic choices in each scenario and visualized which choices would produce the most optimal outcomes for VOAS.

Ghost Vaasa

In Ghost Vaasa there would not be need for new apartments. Instead, VOAS should sell some and only keep the most attractive ones. Providing online education is cheaper than traditional modes of education, especially because there are no physical infrastructure costs (Hanson, 2024; Shivam, 2025). Even if technology is not very advanced in this scenario, the currently existing technology enables online education in the future, and due to little funding online education is preferred. Because of this, offering services to

facilitate online learning would be a good strategic approach for VOAS to maintain its attractiveness. In this scenario there would not be many customers for the student Airbnb. However, if it does not create a lot of additional expenses for VOAS, it could be a possibility for the students to try to take advantage of it every now and then.

Try Hard or Fail

In Try Hard or Fail scenario Vaasa is not seen as an inviting student town for all. Vaasa attracts rich students and supports individualistic culture thus VOAS should focus on studio apartments. The harsh circumstances force some students to live elsewhere because of work or other money-related issues. In this case, the decision to create a student hotel is appropriate. Like the student hotel, the student Airbnb would be useful in this scenario. It enables student mobility and living elsewhere, like the student hotel, but in addition it is a way for students to earn some money, which is highly needed in this scenario.

Sleeping Beauty

In Sleeping Beauty scenario, VOAS should focus on studios but also on furnished shared and family apartments. In this scenario, the role of online education is not significant which leads to less student mobility, so the student hotel is not needed. Vaasa is appealing to some international students, especially for exchange students looking for chill and adventurous experiences rather than innovative studying thus furnished apartments are needed. Because of the insignificant amount of online studies, the services to facilitate online learning are also not much needed. However, it could be worth trying the student Airbnb. Students will move around during weekends and holidays and especially international students could be interested in a tourist visit to Vaasa. Like now, in this scenario in 2040, some students may live elsewhere and be customers of the subletting system.

Golden Vaasa

In Golden Vaasa there are many possibilities due to inviting culture, advanced technology and supporting policies and subsidies. Studios and furnished apartments should be built and well maintained to attract Finnish and international students. A hotel could be built for conferences and visitors from other universities. The hotel should include conference rooms, etc. Services to facilitate online learning could be beneficial. The student Airbnb could work well due to increased tourism and attraction towards Vaasa, and still students will occasionally leave Vaasa for weekends or holidays.

To conclude the findings of wind tunneling, focusing on studios and creating a student Airbnb are the options that work in most scenarios. In addition, providing services to facilitate online learning can be beneficial in multiple different futures. An alternative for the student Airbnb could be the student hotel, but this might require more money and infrastructure thus it is not feasible in all scenarios. International students and furnished apartments should not be forgotten when planning the property portfolio.

Recommendations for VOAS

In the decision recommendation step of scenario planning, we need to take into account that the recommendations must integrate flexibility and capability (Ralston & Wilson, 2006, 149). We believe that these recommendations give VOAS alternatives and ideas from which they can choose the best fit.

Optimise VOAS Property Portfolio for Hybrid Learning Needs

Accommodation needs and preferences are fast shifting as prudence in funding circumstances is changing. VOAS must consider taking stock of the composition of the types of housing in its portfolio and balance it with the growing needs of students. The typologies of spaces must be realigned to complement the various scenarios. For illustration purposes, a % figure has been added as an example of maintaining a healthy and balanced portfolio offering. This realignment ensures VOAS adequately meets its housing offerings to accommodate the ever-changing student preferences in the context of the scenarios presented:

(60%) Studio & 1 Bedroom apartments – Catering to students who priorities privacy in hybrid study environments. The majority are Finnish Bachelor students – a growing trend within Finland

(25%) Shared flexible apartments (partially furnished) – Catered to provide shared experiences that enable community and cohesion – These are mainly for exchange students and partially furnished Designed for modular use, enabling conversion into student Airbnb-style accommodations, hotel or extended family housing in response to fluctuating demand.

(10%) family units (partially furnished) – Towards supporting the growing influx of international and PhD students and Researchers with families. These partially furnished spaces help with faster integration and settlement. This falls in the category of shared space.

(5%) Enhanced Co-working spaces – Dedicated areas for digital nomads, hybrid community spaces, and study hubs that blend living and learning environments.

Introduce Flexibility and Variety in VOAS Model of Business

Probabilities in increased hybrid education indicate a decrease in long-term staying needs. VOAS must consider:

- Implement short-term, flexible leasing options to accommodate students who split their time between in-person and online learning. This is more pertinent for Finnish students who would prefer to spend time between school and their family homes or being part of international exchange while they are studying.
- Develop a subletting system, coordinated by VOAS, allowing students the flexibility to rent out their apartments within the student community - under clear terms and conditions. Such a model ensures longevity and extended occupancy while increasing trust relationships between VOAS and the student community, particularly in the absence of adequate subsidies.
- Encourage inter-university student mobility, through VOAS Powered student Airbnb to facilitate easy movement of students across campuses and cities. The model offers both VOAS and students the opportunity to operate and maintain the property portfolio while VOAS collects a small maintenance fee for sustainability.

Diversify VOAS Offering – Hybrid learning & Service Centers

VOAS should consider diversifying beyond accommodation to offer services for education-related activities, ensuring its facilities remain essential and used even in the digital-first world. These include but not limited to:

- Education & conference hubs offering meeting spaces, Student Hotel, hybrid conferencing facilities, co-working environments for students and professionals.
- Hybrid student communities – creating shared digital spaces that integrate technology, networking, and research collaboration.
- Smart living environments – ensuring that all accommodations have high-speed internet, smart study rooms, online learning pods and hybrid-friendly workspaces.

As an immediate plan of action, VOAS must consider to:

- Capitalize on the current subsidy Window
- Recognizing that the implementation of the subsidy cuts has not been initiated, there is a need to stay ahead of these demand shifts. VOAS should identify and develop additional shared apartments and family units while subsidies are still available to supplement its current portfolio.
- Invest in green, sustainable buildings that align with Finland's environmental targets, ensuring long-term operational efficiency.
- Future-proof the student housing model by ensuring multi-use flexibility in all spaces that can shift between student accommodation, short-term rentals, and academia use as needs arise.

Conclusions

VOAS is a well-run foundation offering student accommodation in the city of Vaasa. With the increased pressure on subsidies, funding from the Finnish Government is in decline, coupled with the increased migration of education delivery systems to hybrid mode for most universities, student accommodation requirements are fast shifting. Our brief was to consider how hybrid education impacts the behaviour of students within this context.

In these future scenarios in 2040, we considered the impact of hybrid education on the effective and efficient delivery of student accommodations while maintaining good business operational efficiencies for VOAS. The continuation of professional service delivery to its customers, who are mainly Finnish students, master's students, and international and PhD students with families must remain a priority for VOAS sustainability.

In the age of increased digitalisation and advances in digital twin communities, it is no longer a question of how or if but rather when hybrid education is fully implemented in the University of Vaasa. While we were unable to explicitly predict the extent of behaviour of the students, we were able to identify and navigate the varied spectrum of techno-cultural advancements and policy adoptions as direct impacts on effective delivery and sustainability as imperatives. In our case, we considered the impact of hybrid education on an effective and sustainable good business model for VOAS as they continue to provide exceptional service delivery to its customers.

We believe these recommendations must be considered within VOAS 2040 strategy plan to future proof service delivery and be ahead of the transition curve.

The collaboration and continuous dialogue with all stakeholders, The City of Vaasa, the University of Vaasa the Students and the Community is crucial towards the achievement of a robust strategic plan that is future-focused.

References

Ahponen, P., Harinen, P., Honkasalo, V., Kivijärvi, A., Pyykkönen, M., Ronkainen, J., Souto, A.-M. & Suurpää, L. (2014). New Challenges for Nordic Welfare Services: Emerging Cultural Diversity in Finnish Youth Work. Nordic Journal of Migration Research, 4(1), 30. https://doi.org/10.2478/njmr-2014-0005.

Alster, K. (21.1.2025), 11 most important education trends for 2024 and beyond. Synthesia. https://www.synthesia.io/post/education-trends.

Anttonen, M. (28.9.2022). Pandemia käynnisti erikoisen muuttoliikkeen – moni opiskelija muuttaa nyt opiskelukaupungista pois: “Olen aina ollut perhekeskeinen”. Yle. https://yle.fi/a/74-20000305 (Referenced 2.3.2025).

Aromaa, J. (23.9.2024). Kulttuurin leikkauksen tarkentuivat – teatterit ja orkesterit kantavat suurimman taakan. Yle. https://yle.fi/a/74-20113005 (Referenced 26.1.2025).

Au-Yong, C. P., Ali, A.-S., Ahmad, F. & Chua, S. J. L. (2017). Influences of key stakeholders’ involvement in maintenance management. Property Management, 35(2), 217–231. https://doi.org/10.1108/PM-01-2016-0004.

Clarke, S. (2023). Background report for the economic policy council on carbon pricing Finland. https://talouspolitiikanarviointineuvosto.fi/wp-content/uploads/2023/01/Background-Report-2-Carbon-Pricing-in-Finland-Selina-Clarke.pdf

Education Finland (2025). Education for green transition. https://www.educationfinland.fi/edudev/green-transition

European Commission (15.1.2025). Commission launches competition for 2027 European Green Capital and green leaf applicants. https://environment.ec.europa.eu/news/competition-2027-european-green-capital-launched-2025-01-15_en

European environment agency (2020). Noise pollution is a major problem, both for human health and the environment. https://www.eea.europa.eu/articles/noise-pollution-is-a-major

Hanson, M. (31.8.2024). Cost of Online Education vs. Traditional Education. Education data. https://educationdata.org/cost-of-online-education-vs-traditional-education (Referenced 2.3.2025).

Howe, E. R. & Watson, G. C. (2021). Finding Our Way Through a Pandemic: Teaching in Alternate Modes of Delivery. Frontiers in Education (Lausanne), 6. https://doi.org/10.3389/feduc.2021.661513

Investropa (24.2.2025). 17 strong trends for 2025 in the Finland property market. https://investropa.com/blogs/news/finland-real-estate-trends

Kiviruusu, O., Ranta, K., Lindgren, M., Haravuori, H., Silén, Y., Therman, S., Lehtonen, J., Sares-Jäske, L., Aalto-Setälä, T., Marttunen, M. & Suvisaari, J. (2024). Mental health after the COVID-19 pandemic among Finnish youth: A repeated, cross-sectional, population-based study. The Lancet Psychiatry, 11(6), 451–460. https://doi.org/10.1016/S2215-0366(24)00108-1

Libelo, H. & Tracy, D. S. (2022). Establishing a Relationship Between Demographic Factors and Students’ Environmental Awareness. Journal of Student Research, 11(1). https://doi.org/10.47611/jsrhs.v11i1.2282

Ministry of foreign affairs in Finland. (2023). Theories of change and aggregate indicators for Finland’s development policy. https://um.fi/documents/35732/0/theories-of-change-and-aggregate-indicators-for-finlands-development-policy-2020.pdf/7bc4d7f2-ffc8-5f4d-8382-43193fd887e8?t=1584355537316

Pohjanpalo, L. & Keränen, I. (2023). Competition Law in Finland: Overview. https://www.waselius.fi/wp-content/uploads/2023/11/Competition-Law-in-Finland-Overview.pdf

Ralston, B. & Wilson, I. (2006). The scenario-planning handbook: a practitioner’s guide to developing and using scenarios to direct strategy in today’s uncertain times. Thomson South-Western.

Schwartz, P. (2012). The Art of the Long View: Planning for the Future in an Uncertain World (1st ed.). The Crown Publishing Group.

Shivam, K. (3.1.2025). How Online Learning Can Reduce the Cost of Education. 21K School. https://www.21kschool.com/in/blog/how-online-learning-can-reduce-the-cost-of-education/ (Referenced 2.3.2025).

University of Vaasa (n.d.). Open university, https://www.uwasa.fi/en/education/open

Vaasa website (n.d.). Energy Vaasa – the Nordic hub for energy technology. https://www.vaasa.fi/en/energyvaasa/

Vaasa website (n.d.). Living. https://www.vaasa.fi/en/living/

Vaasa website (n.d.) Vapaa-aika. https://www.vaasa.fi/en/see-and-experience/culture-in-vaasa-and-vaasa-region/museums-of-vaasa/visit/price-list-and-tickets/service-price-list-for-vaasa-city-museums/

Vaasa website (2025). Employment indicators are among the best in the country. https://www.vaasa.fi/en/about-vaasa-and-the-vaasa-region/the-vaasa-region-in-numbers/statistics-employment/

Vaasa website (24.1.2025). Kaupunki jakoi kulttuuriavustukset vuodelle 2025. https://www.vaasa.fi/ajankohtaista/kaupunki-jakoi-kulttuuriavustukset-vuodelle-2025/ (Referenced 25.1.2025).

Verbalist Education & Language Network (27.6.2023). International students in Finland potential tuition fee hike. https://verbalistseducation.com/fr/2023/06/27/international-students-finland/

VOAS (n.d.). Tervetuloa asumaan VOASille! https://voas.fi/ (Referenced 1.3.2025).

Ylimäki, M. (21.1.2025). Introduction about Voas [PowerPoint slides]. Turku School of Economics, University of Turku. https://moodle.utu.fi/pluginfile.php/3664918/mod_resource/content/1/VOAS%20presentation.pdf.

KEKO9001 The Integration and Management of Sustainable Develoment | Kestävän kehityksen integrointi ja hallinta

The Integration and management of Sustainable Development (10 cr) forms the backbone of the Sustainable Development Studies (Minor). The goal of the course is to develop collective expertise and problem-solving ability in issues related to sustainability. To achieve the goals of sustainable development people must agree on important priorities. It is challenging, because sustainability issues are complex and require both systemic thinking and the dismantling of many ways of thinking and background assumptions. To get some experience in dialogue aiming at sustainability, students work in a year-long course in multidisciplinary teams. Each team is assigned a theme that they will explore throughout the year. In 2024–2025, the themes were 1) Marine traffic, 2) Infrastructure, 3) Deep sea mining 4) Artificial light.

During the year, each team writes four essays: ecological, social, economic and cultural sustainability transformation analysis of the topic. For each paper, the team needs to self-organize, agree on a more specific question or a problem, define what they mean with sustainability in this context, divide and carry out research and writing tasks, and to integrate their work into a coherent whole, all within a month.

From the 16 essays written during the academic year 2024-2025, the teachers chose two essays for publication. The selection criteria were the general interest and novelty of the topic, especially in the case of the essay on artificial lighting, as well as the students' deep understanding of the systemic nature of sustainability problems and their connection to our everyday lives. Teachers decided to select for publication the essay “Artificial Light and Insects” written in Finnish by the Artificial light group. The members of the group were **Lina Hurme, Kasperi Inkilä, Minna Latvala, Paula Närhi, Alina Piispa, Sofia Pitkänen & Piia Saaristo**. The second essay to be published was written by a Finnish-speaking group that studied Deep-sea mining, which included **Tuomas Alm, Visa Helenius, Elina Lahdenniemi, Paulus Lindqvist, Marika Nurmikko, Iina Saarinen and Aino Toikka.** The title of the essay was “The Mineral Dependence of Western Consumer Culture”.

The essays are presented by KEKO's coordinator and responsible teacher **Sari Puustinen**.

Artificial Light and Insects

Artificial light refers to a light source created by humans. Artificial light has enabled the essential functions of human activity around the clock. With good reason, we can ask whether artificial light is a result of modernization or vice versa.

Despite many positive effects, the use of artificial light is a growing threat to biodiversity, among other things. The essay examines the effects of artificial light on insects and, through the keystone species role of insects, also on the functioning of ecosystems more broadly. In addition, possible solutions to the ecological challenges caused by artificial light are considered.

Approximately half of all insect species are nocturnal and, through evolution, they have developed many receptors for detecting light, which they use to function. However, the increased amount of artificial light disrupts this activity and affects insects' behavior, movement, foraging, mate selection and reproduction in many ways by disrupting insects' natural sense of direction. Light also exposes them to various predators, and disrupt their reproduction by making it difficult to find a mate.

As a result, artificial light has made it difficult for insects to survive and has also exposed some species to danger. Due to the central role of insects, the harm caused by artificial light to insects also disrupts entire ecosystems in a chain reaction, as they change the structures of the community of organisms and the interactions between species. Reducing the adverse effects caused by artificial light plays a key role in preserving biodiversity. Light pollution can be effectively reduced through careful urban planning that focuses on minimizing lighting in time and space and utilizing more environmentally friendly lighting options. This protects insects and the preservation of entire ecosystems.

This essay was the first one the group wrote. They demonstrated their ability to take a scientific text and translate it into common sense. Even if the reader is not familiar with the topic, the essay provides interesting information on a topic that we rarely think about when we turn on the outdoor lights to enhance our own comfort and sense of security.

The Mineral Dependence of Western Consumer Culture

The group's theme was Deep Sea mining. Despite the daunting subject, or perhaps out of an interest in the unknown, the group spent the year diligently exploring what deep sea mining would entail if it were to be carried out in the world's oceans, and what kind of impacts the mining would have. In their final essay, the group was able to connect mineral extraction to the consumer culture that each of us is a part of today. Our way of life requires environmentally destructive mining, whether it takes place on land or underwater. The options are either to continue our current lifestyle and ruthless waste of natural resources, or to try to achieve a cultural sustainability transformation, in which our way of life would have to be weighed and directed in a new way. The group writes in their essay as follows: “In the pursuit of a sustainable culture, it is essential to recognize how fundamentally worlds of values and meanings set frames for action. These frames, in their current form, have allowed nature to be ignored based on human needs. On the other hand, there are and have been counter movements, and it is not appropriate to write only a positivist history of an unsustainable relationship with nature. From a sustainability perspective, the problem is how to cultivate a mentality that facilitates change from small flows, especially when it requires compromising on the benefits achieved. Perhaps we need to recognize that by reducing consumption, we would not actually have to reduce well-being, but even increase it.”

In this essay, the definition of cultural sustainability was a bit lame, but they had still internalized what cultural sustainability transformation would mean. However, the essay was of particularly high quality overall, including the beautiful and at times even poetic language in which it is written.

Länsimaisen kulutuskulttuurin mineraaliriippuvuus

Tuomas Alm, Visa Helenius, Elina Lahdenniemi, Paulus Lindqvist, Marika Nurmikko, Iina Saarinen & Aino Toikka

Turun yliopisto

Tiivistelmä

Tarkastelemme tässä esseessä kulttuurista kestävyyttä. Käsite kulttuurinen kestävyys on hyvin monitahoinen, ja sen yksiselitteinen määrittely syvän meren louhintaan liittyen on haastavaa. Olemmekin siirtäneet näkökulmaa laajempaan kontekstiin: pohdimme kulttuurista kestävyyttä enemmän kulutuskulttuurin, digitalisaation, yhteiskuntien historian ja luonnonoikeuksien näkökulmasta. Yhteisenä tekijänä edellä mainituille ovat mineraalivarannot, joihin myös syvän meren louhinnan toimintatarkoitus linkittyy.

Nyky-yhteiskunnan taloudellisen järjestelmät perustuvat jatkuvaan kasvuun ja ihmisten kulutustottumuksiin. Erityisesti länsimaissa tämä ajatusmaailma johtaa helposti mainonnan kiihdyttämänä ylikulutukseen, mikä vaatii lisää luonnonresursseja. Toistaiseksi olemme tilanteessa, jossa kiihtyvä digitalisaatio lisää elektronisten laitteiden tarvetta, niiden valmistuksessa tarvittavia mineraaleja ja lopulta lisää sähkö- ja elektroniikkajätettä. Kierrätyksen tehostaminen globaalisti on haasteellista järjestää muun muassa erilaisten kulttuurien ja yhteiskuntajärjestelmien takia.

Erään näkökulman esseeseemme tuo historian vaikutuksen tarkastelu. Mineraalivarannot eri puolilla maailmaa ovat osaltaan johtaneet kolonialismiin, jonka vaikutukset länsimaisissa ajattelutavoissa näkyvät edelleen. Toisaalta eurooppalainen historia ja kulttuurit ovat muokanneet nykyiset talousjärjestelmämme, joiden muuttaminen vaatisi globaalia, läpileikkaavaa transformaatioajattelua. Pohdimme myös oikeustason muutosta, jossa luonnon yksilöille ja yksiköille annettaisiin oikeussubjektin status. Länsimaisen kulutuskulttuurin mineraaliriippuvuudesta irtautuminen ja muuttuminen kestävämmäksi on todennäköisesti pitkä prosessi, joka vaatii uusien ihmissukupolvien kulttuurisia transformaatioita.

Johdanto

Syvänmerenlouhinta (DSM) herättää keskustelua sen mahdollisuuksista ja riskeistä. Kannattajat pitävät sitä ratkaisuna raaka-ainepulaan, kun taas kriitikot varoittavat sen ekologisista seurauksista. Tämä keskustelu kuvastaa laajempaa ongelmaa: kuinka luonnonvarojen hyödyntäminen sovitetaan kestävyyden ja oikeudenmukaisuuden vaatimuksiin. DSM ei ole vain teknologinen tai taloudellinen kysymys, vaan se liittyy myös kulttuurisiin ja oikeudellisiin seikkoihin, jotka ohjaavat luonnonvarojen käyttöä.

Kulttuurinen kestävyys on yksi kestävän kehityksen osa-alueista. Sen katsotaan sisältävän esimerkiksi kielet ja perinteet, mutta myös erilaiset tavat. Kulttuurinen kestävyys on keskeinen näkökulma tarkastelussamme. Se viittaa siihen, kuinka yhteiskunnalliset ja taloudelliset järjestelmät voivat sopeutua kestävyyden vaatimuksiin ilman, että ne heikentävät kulttuurisia arvoja tai yhteisöllisiä rakenteita. DSM toimii esimerkkinä siitä, kuinka luonnonvarojen hyödyntäminen kytkeytyy laajempiin taloudellisiin ja oikeudellisiin rakenteisiin. Siksi luonnonvarojen hallintaa on tarkasteltava oikeudellisista ja kulttuurisista näkökulmista.

Esseemme tavoitteena on analysoida ja selventää luonnonvarojen hallinnan kulttuurisia ja oikeudellisia ulottuvuuksia. Ensimmäinen osa käsittelee talouden ja kulttuurin suhdetta sekä kapitalismin ja kulutuskulttuurin vaikutusta ympäristön käyttöön. Tarkastelemme toisessa osassa historiallisia ajattelutapoja luonnonvarojen hyödyntämisessä ja niiden vaikutusta nykykriiseihin. Kolmannessa osassa analysoimme oikeudellisten rakenteiden roolia kestävän kehityksen tukemisessa hyödyntäen Kaarlo Tuorin oikeuden tasoteoriaa.

Pyrimme osoittamaan, että luonnonvarojen hallinta ei ole vain tekninen tai taloudellinen kysymys, vaan osa laajempaa yhteiskunnallista järjestelmää. DSM toimii tästä esimerkkinä, mutta esseemme pääpaino on taloudellisissa ja oikeudellisissa yhteiskunnallisissa seikoissa sekä niiden uudistamisessa kestävyyden näkökulmasta.

Talous ja kulttuuri

Kapitalismi ja sen yhteys kulutuskulttuuriin

Kapitalismi on talousjärjestelmä, jonka keskeisiä tunnusmerkkejä ovat yksityisomistus, vapaat markkinat ja voiton tavoittelu. Tässä järjestelmässä yksityishenkilöillä ja yrityksillä on oikeus omistaa ja hallita tuotantovälineitä sekä luonnonvaroja. Voiton tavoittelu toimii taloudellisen toiminnan ensisijaisena motiivina, mikä ohjaa tuotantoa, innovaatioita ja markkinoiden laajentumista. Vapaat markkinat mahdollistavat taloudellisen vaihdannan ilman merkittävää hallituksen puuttumista, jolloin kysyntä ja tarjonta määrittävät hinnat ja resurssien allokoinnin eli suuntaamisen. Kilpailu yritysten välillä pyrkii houkuttelemaan asiakkaita paremmilla tuotteilla, edullisemmilla hinnoilla ja houkuttelevammalla markkinoinnilla, mikä edistää innovaatioita ja tehokkuutta. Kapitalismin toimintaan kuuluu olennaisesti myös pääoman kasaantuminen, jossa voitot uudelleeninvestoidaan tuotannon laajentamiseksi, uusien teknologioiden kehittämiseksi ja varallisuuden kasvattamiseksi. Tämä prosessi edellyttää jatkuvaa talouskasvua (Harris & Delanty 2023).

Ylikulutuksen kulttuuri on puolestaan yhteiskunnallinen ilmiö, jossa tavaroiden ja palveluiden hankinta ylittää perustarpeet ja johtaa usein jätteeseen ja negatiivisiin ympäristövaikutuksiin (Stuart, Gunderson & Petersen 2020). Kulutuskeskeisen yhteiskunnan kehitys on kytkeytynyt teollistumiseen ja modernisaatioon erityisesti 1900-luvulla (Marín-Beltrán *et al*. 2021). Suomessa kulutusyhteiskunta alkoi voimistua 1960-luvulla kaupungistumisen, elintason nousun ja television vaikutuksesta (Heinonen 2000). Toisen maailmansodan jälkeinen aika oli merkittävä kulutuksen kasvun kannalta. Kehityksen alkuvaiheissa nähtiin siirtymä perustarpeista haluihin, jota vauhditti lisääntynyt tuotanto ja markkinointi. Kulutusyhteiskunnan synty ei ollut äkillinen muutos, vaan asteittainen prosessi, johon vaikuttivat teknologiset edistysaskeleet, taloudelliset muutokset ja kulttuuriset siirtymät, kapitalismin toimiessa tämän muutoksen taustalla ja sen liikkeellepanevana voimana. (Higgs 2021.)

Kapitalismin perusperiaatteet ovat historiallisesti vaikuttaneet merkittävästi kulutuskeskeisen kulttuurin syntyyn ja leviämiseen. Yksityisomistuksen käsite, kuten John Locke (1632–1704) on esittänyt, kehittyi tarpeenmukaisesta omistamisesta varallisuuden rajattomaan kasaamiseen (Moilanen 2017). Yksityisomistus luo kannusteen maksimoida omaisuuden arvo, mikä kulutusyhteiskunnassa usein ilmenee haluna hankkia yhä enemmän omaisuutta menestyksen ja statuksen mittarina (Rose 1986). Yksityisomistus luo omistamisen tunteen, joka edistää halua hankkia lisää omaisuutta tai kasvattaa sen arvoa. Kapitalistisessa yhteiskunnassa varallisuutta pidetään usein menestyksen merkkinä, mikä ruokkii jatkuvaa hankkimisen halua. Kapitalistisen ideologia vahvistaa näin itsessään halua hankkia jatkuvasti lisää tavaroita ja kulutushyödykkeitä (Rose 1986).

Yritysten näkökulmasta voiton tavoittelu puolestaan ajaa lisäämään myyntiä ja luomaan uusia tarpeita markkinoinnin avulla (Harris & Delanty 2023). Tämä logiikka luo pohjan ylikulutukselle, kun yritykset pyrkivät jatkuvasti laajentamaan markkinaosuuttaan (Robinson 1990). Voiton tavoittelu kapitalismissa on olennainen motivaattori yrityksille lisätä myyntiään (Harris & Delanty, 2023). Voittojen maksimoimiseksi yritykset pyrkivät tuottamaan enemmän, markkinoimaan tehokkaammin ja jopa luomaan uusia haluja kuluttajissa laajentaakseen markkinoitaan ja myyntiään (Harris & Delanty 2023). Tämä johtaa jatkuvaan tuotanto- ja kulutuskiertoon, jossa voiton tavoittelu on keskeinen ajuri (Higgs 2021).

Vapaat markkinat, joilla sääntely on vähäistä, mahdollistavat laajan valikoiman tavaroita ja palveluita helposti saataville, mikä tekee kuluttamisesta kätevää ja houkuttelevaa (Sarwat & Mahmud 2015). Tämä helppo saatavuus ja edullisuus kannustavat kuluttajia ostamaan enemmän, jopa yli välittömien tarpeidensa

(Fook & McNeill 2020). Kilpailu myös pakottaa yritykset erottautumaan ja houkuttelemaan kuluttajia, mikä johtaa jatkuvaan innovaatioon ja uusien tuotteiden lanseeraukseen, luoden jälleen uusia haluja tarpeita kuluttajissa (Guillermo & Alvaro 2018). Markkinointi ja mainonta korostavat näitä uusia ominaisuuksia ja herättävät uusia haluja kuluttajissa, usein luomalla mielikuvia statuksesta, elämäntyylistä ja identiteetistä (Stephen 2016).

Luotto mahdollistaa ostamisen yli omien resurssien, mikä edistää "osta nyt, maksa myöhemmin" -kulttuuria (Cooper 2014). Suunniteltu vanheneminen puolestaan kannustaa uusintaostoihin lyhentämällä tuotteiden käyttöikää (Fook & McNeill, 2020). Finanssiteknologiayritysten ja digitaalisen pankkitoiminnan kasvu on entisestään helpottanut luoton saamista ja ostosten tekemistä, mikä sekin edistää kulutusta (Yue *et al*. 2021).

Pääoman kasvaminen on kapitalismin logiikalle olennainen osa, joka edellyttää jatkuvaa talouskasvua. Pääoman lisääntyminen edellyttää voittojen uudelleeninvestointia tuotannon laajentamiseksi. Tämä laajentuminen johtaa hyödykkeiden ja palveluiden lisääntyneeseen tarjontaan (Sarwat & Mahmud 2015). Jotta tämä kierto voisi jatkua, on oltava riittävästi kysyntää tämän lisääntyneen tuotannon sulautumiseksi, mikä edellyttää korkeampaa kulutustasoa (Rahman *et al*., 2020). Kapitalismin sisäänrakennettu kasvupakko luo paineen jatkuville kulutuksen lisäyksille taloudellisen vakauden ylläpitämiseksi (Rahman *et al*. 2020).

Kapitalismin eri historialliset vaiheet ovat vaikuttaneet kulutuskeskeisyyden kehitykseen eri tavoin. Merkantilismin aikana 1500-luvulta 1700-luvulle ensisijaisena tavoitteena oli kansallisen vaurauden kerääminen kauppaylijäämän avulla, jolloin kulutusta rajoitettiin usein tuotannon maksimoimiseksi (Pincus 2012). Kuitenkin kaupan kasvu ja tavaroiden saatavuus alkoivat vähitellen muuttaa asenteita. Teollisen kapitalismin (1800-luvulta 1900-luvulle) myötä massatuotanto teki tavaroista aiempaa laajemmin saatavilla olevia ja edullisempia, mikä johti kulutuskeskeisyyden merkittävään kasvuun (Heinonen 2000). 1900-luvun kapitalismi synnytti nykyisen kulutusyhteiskunnan, jossa kulutuksesta on tullut identiteetin ja statuksen ilmaisija (Grazia 2005). Historiallinen kehitys osoittaa selvän etenemisen tuotantokeskeisestä järjestelmästä kulutuskeskeiseen malliin.

Kapitalismin perusperiaatteet luovat yhdessä taloudellisen ja sosiaalisen ympäristön, joka ajaa kohti yhä kasvavaa kulutusta. Tämä kehitys on nähtävissä kapitalismin historiallisten vaiheiden läpi, jossa kulutuskeskeisyys on asteittain voimistunut. Ottaen huomioon planeetan rajalliset resurssit, on syytä pohtia kapitalismille korvaavia talouden malleja, jotka edistävät kestävämpää kulutusta ja tuotantoa.

Digitalisaatio ja kulttuuri

Digitaalisen median käsite sai alkunsa jo 1940-luvun loppupuolella informaatiotieteen ikään kuin sivutuotteena, kun Claude Shannon (1916–2001) kehitti aikansa kommunikaatioteknologiaa ja loi perustan muun muassa nykyiselle digitaaliselle piirille ja langattomalle verkolle (Effros & Poor 2017, 29–32). Aikaiset tietokoneet ja digitaaliset tiedonsäilytysmenetelmät kehittyivät 1950- ja 1960-luvuilla. Yhdysvaltojen armeija kehitti vuonna 1969 ARPANET-nimisen internetin kaltaisen digitaalisen kommunikaatioympäristön omiin tarpeisiinsa. Teknologia jatkoi kehittymistä ja 1970- ja 1980-luvuilla henkilökohtaiset tietokoneet yleistyivät, vaikkakin olivat harvinaista teknologiaa kotitalouksissa. Cd-levyt alkoivat yleistymään rakentaen perustaa digitaaliselle multimedialle, jota 1990-luvulla alkanut digitaalinen vallankumous nopeasti haastoi – voimme yrittää muistella MP3-soittimia, ensimmäisiä digitaalisia kameroita ja videopelejä ajautumatta nostalgiaan.

Teknologisen kulttuurin uusi kausi alkoi 2000-luvun alkupuolella, jota Suomi sai luoda ja todistaa läheltä. Nokian loistovuosien aikaan digitaalinen harppaus oli kenties perusteellisin, kun sosiaalinen media ja matkapuhelinteknologia muutti aikaisempaa kommunikaatiokulttuuria merkittävästi. Matkapuhelimet eli kännykät loivat tablettien kanssa uutta kulutuskulttuuria ja ajatusta jatkuvasti kehittyvästä teknologiasta, jota yritysten ja yksittäisten kuluttajien tuli hankkia, mikäli nämä halusivat pysyä ajan hermolla. Tim Berners-

Leen 1990-luvulla kehittämä World Wide Web (WWW) oli nopeasti lähestulkoon kaiken perustana, ja Internetin mahdollisuudet nähtiin utooppisina. Digitaalisen median (sosiaalinen media, videot, musiikki, nettisivut) räjähdysmäinen kuluttaminen loi markkinat digitaaliselle markkinoinnille ja blogeille pakottaen yritykset sinne missä digitaalista mediaa käyttävät ihmiset olivat. Nykyään elämme ajassa, jossa kulttuurista todellisuuttamme rakentaa entistä enemmän digitaalinen media kuten striimauspalvelut, tekoäly, vaikuttajamarkkinointi, sosiaalisen median algoritmit, digitaaliset valuutat ja erilaiset sovellukset ja alustat.

Nykyisestä 2020-luvun mediaympäristöstä käsin on mielekkäämpää ajatella, ettei digitaalinen media enää ole ihmisillä vaan ihmiset digitaalisessa mediassa. Viihteen ja kulttuurin kuluttamisen lisäksi yhteiskunnat kuten Suomi ovat äärimmäisen riippuvaisia digitaalisesta teknologiasta ja sitä varten tarvittavasta infrastruktuurista sekä sen jatkuvasti kehittyvästä luonteesta, joka pakottaa korvaamaan vanhaa uudella.

Mediaekologisen teorian kehittäjä Marshall McLuhan korosti mediaympäristön vaikutusta kulttuuriin jo 1960-luvulla. McLuhanlaisen mediaekologisen teorian lähtökohtana on, että modernissa yhteiskunnassa teknologinen ympäristö ei ole pelkästään kulttuurin tulos vaan vastavuoroisesti muokkaa kulttuuria, jossa ihmiset elävät (Laughey 2007, 33). Mediaekologisesta näkökulmasta digitaalinen media ei siis ole kulttuurista irrallinen tai kulttuuria pelkästään välittävä väline, vaan osa sitä todellisuutta, jossa yksilöt ja ryhmät rakentavat käsitystään maailmasta. McLuhanin maksiimi ”väline on viesti” kiteyttää ajatuksen siitä, kuinka informaation rakentumiselle keskeisempää on sen muoto, jossa se välitetään eikä sen sisältämä viesti (Laughey 2007, 34). Eli mediaa merkittävämpää on, miten median kuljettama viesti materialisoituu maailmassa.

Mediaekologisesta näkökulmasta nykyinen digitaalinen ympäristö ja digitaalisten välineiden, kuten älypuhelinten ostaminen ei ole pelkästään kapitalistisen konsumerismin (”kulutus on eduksi ihmiselle ja taloudelle”) tulos, vaan se myös rakentaa nykyistä kulutuskulttuuria. Kulttuurisen kestävyyden näkökulmasta kulttuurin ja digitalisaation suhdetta tulisi tarkastella yhtenäisenä järjestelmänä, eikä erillisinä tuotteina. Muutos kulttuuriin, tapaan kommunikoida ja kuluttaa olisi siis suoraan muutos digitaaliseen ympäristöömme ja näin myös digitalisaation ja luonnon suhteeseen.

Pilvet ja konkretia – digitaalinen jäte

Siirtyminen paperista digitaaliseen on nähty askeleena kohti kestävämpää tapaa välittää informaatiota. Digitaalinen murros 1990-luvulta lähtien on nopeuttanut informaation liikkumista ja mahdollistanut tasaarvoisemman tiedonhankintaympäristön internetin hakukoneiden myötä. 2000-luvulla kasvanut digitaalinen konvergenssi eli eri medioiden yhteensulautuminen on vähentänyt elektronisen käyttötavaran määrää suhteessa aikaisempaan konkreettiseen mediaympäristöön. Nykyisen digitaalisen median pilvipalvelut korostavat digitalisaatiota laajana positiivisena ilmiönä, jonka ansiosta elämme ikään kuin materiaalittomassa ympäristössä, jossa mediasisältöjä voi striimata näkemättä niiden vaikutusta maailmaan ja ilmastoon.

Digitalisaatio ei kuitenkaan ole tullut luonnon näkökulmasta ilmaiseksi, vaan se materialisoituu jätteenä ja kasvavina päästöinä. Nykyinen digitaalinen kulttuuri aiheuttaa merkittävän osan maapallon päästöistä. Digitalisaatio vaatii kasvavan määrän datakeskuksia, akkuja ja infrastruktuuria. Se tuotti vuoden 2019 ICT -raportin mukaan globaalisti 53,6 miljoonaa tonnia elektroniikkajätettä, mikä tekee digitalisaatiosta kasvavan kestävyysuhan maapallolle. Suurimman osan tuottaa tietokoneteollisuus (75–85 %). Digitalisaatio on integroitu huonosti osaksi globaaleja kierrätysjärjestelmiä ja vain osalla maista on digijätteen kierrättämistä koskeva lainsäädäntö olemassa. Kierrätys muodostaa monia haasteita niissä maissa, joissa ei ole riittäviä mahdollisuuksia kestävään kierrättämiseen, kuten monissa Länsi–Aasian maissa. Niissä elektroniikka kierrätetään muun muassa polttamalla, mikä on ympäristön kannalta epäedullista. (UNEP 2023.)

Digitalisaatio ja luonnonvarat

Digitalisaatio vaatii merkittävän määrän luonnonvaroja, joista osa koostuu mineraaleista. Digitalisoituneen kulttuurin tarvitsemat materiaalit tuotetaan pääosin kaivostoiminnalla ja vain pienessä määrin kierrättämällä. Keskeisiä digitalisaation luomia haasteita ympäristölle luo yhä kasvava kulutus ja globaali digitalisoituminen. Digitalisaatio luo tarvetta kysynnälle ja kysyntä luo tarvetta kriittisille ja monesti kestävyyden kustannuksella hankituille mineraaleille. Tietotekniikan alan (ICT) tuotteilla, joista digitalisaatio on riippuvainen, on usein lyhyt elämänkaari ja niiden kierrättäminen on hankalaa. (Eerola *et al*. 2021.)

Yhdeksi ratkaisuksi digitalisaation kasvattamaan mineraalitarpeeseen on ehdotettu syvänmerenlouhintaa (DSM), johon liittyy monia kulttuurisen, taloudellisen, sosiaalisen ja ekologisen kestävyyden kannalta ongelmallisia ulottuvuuksia. Sen sijaan Eerola *et al*. (2021) korostavat ratkaisuiksi muun muassa panostamista digitalisaatiota vaativien tuotteiden kehitysprosesseihin, jolloin mineraalitarpeet ICT-tuotteissa vähenee. Myös tuotteiden kierrätysprosesseja voisi tehostaa. Keskeisiä vaikutuksia olisivat muutokset kuluttamisessa ja digitaalisten välineiden kierrätys niin, että suhde digituotteisiin muuttuisi. Digitalisaation kierrättämiseen tulisi kehottaa myös esimerkiksi lainsäädännöllä. (Eerola *et al*. 2021.)

Luonnon ja kulttuurin suhde

Kapitalistinen, luontoa hyväksikäyttävä kulutuskulttuuri on johtanut siihen, että sähköistymiseen ja digitalisaatioon vaadittavia mineraaleja pitää lähteä hakemaan jopa merenpohjasta. Syvänmerenlouhinta (DSM) ei kuitenkaan ole kestävän kehityksen kannalta ongelmaton vaihtoehto. Tulisi pohtia, miten luontoa tuhoavaan kulutuskulttuuriin ajautuminen on ollut mahdollista. Pohdimme seuraavaksi tähän johtanutta kulttuuria siltä kannalta, miten se näyttäytyy ihmisen eriytyneen ympäristösuhteen historiassa. Sitten tarkastelemme ympäristösuhdetta uudelleenrakentavan kulttuurin mahdollisuuksia. Käytämme esimerkkinä oikeudellisen kulttuurin murrosta, jonka avulla on tarkoitus hahmottaa mahdollisuutta irtautua tietoisesti ympäristöä tuhoavasta kulttuurista ja muuttaa kulttuurin syvempiä tasoja kestävämmäksi.

Ympäristösuhde länsimaisen kaivostoiminnan historian näkökulmasta

Syvällä kulttuurin kaivannoissa

Tarkastelemme ympäristösuhteen käsitteen avulla lyhyesti viittä keskeistä kulttuurista mentaliteettia, jotka ovat vaikuttaneet länsimaiseen mineraalien käyttöön varhaismodernin ajan alusta (1400-luvulta) alkaen. Käsiteltävät mentaliteetit ovat kristinusko, kolonialismi, valistus, teollistuminen ja ympäristönsuojelu. Nykyisten DSM-yhtiöiden intressit ovat osa globalisoitunutta, mutta pohjimmiltaan länsimaista talouskulttuuripiiriä, joten rajaamme tarkastelun länsimaihin. Epäsuhtaisten valta-asemien seurauksena eurooppalaiset ja pohjoisamerikkalaiset diskurssit ovat merkittävästi muovanneet sitä todellisuutta, jossa DSM nykyään on olemassa.

Luvun teoreettinen pohja kumpuaa Soinin ja Desseinin (2016) hahmottelemasta *sustainability as culture* -mallista ja yhdistää sen historialliseen kehykseen. Historiallinen lähestymistapa on hyödyllinen, sillä syvällä kulttuurissa tapahtuneet muutokset vaikuttavat toimintaan pitkällä aikavälillä, ja ovat siksi ympäristösuhteessa keskeisiä. Ne kytkeytyvät osaksi laajoja merkitysjärjestelmiä, arvostuksia ja käytäntöjä, joissa tapahtuvat muutokset ovat hitaita. Materiaalisen todellisuuden kytkeytymistä mentaliteetteihin taas voi mallintaa ympäristösuhteen käsitteen avulla. Luonnosta muodostetut mielikuvat, merkitykset ja sen ympärille rakentuneet käytännöt vaikuttavat konkreettisesti luontoon kohdistuviin toimiin. Lähestymistapa yhdistää mentaliteettien historiaa ja ympäristöhistoriaa sekä pyrkii hahmottamaan ihmisten, yhteiskuntien, talouden, luonnon ja ilmaston yhteen kietoutumista. Osapuolilla on toimijuus vuorovaikutteisessa suhteessa, jossa ne muokkaavat ja tulevat muokatuksi erilaisissa konteksteissa. (Ruuskanen, Schönach & Väyrynen 2021, 9–14.)

Soini ja Dessein (2016, 6–7) kuvaavat ympäristösuhteen olevan valta-asemista riippuvaista tiedon muodostamista ja niiden heijastumista materiaaliseen maailmaan. *Culture as sustainability* -mallissa ekologinen, sosiaalinen ja taloudellinen sfääri ovat olemassa kulttuurin asettamissa raameissa. Tarkasteltaessa ihmistä ja luontoa toiminnan kautta yhteen kietoutuneina entiteetteinä *culture as sustainability* on mielekäs hahmotelma. Se mahdollistaa suurten mentaliteettien tarkastelun pitkällä aikavälillä. Tämän luvun tavoitteena ei ole tehdä kattavaa tai yksityiskohtaista selvitystä kaikista ilmiöön vaikuttaneista seikoista, vaan kartoittaa DSM:n valossa kiinnostavia historiallisia kehityskulkuja sekä osoittaa historiatieteellisen lähestymistavan mahdollisuuksia nykypäivän kestävyyshaasteita kohdattaessa.

Kaivostoiminta läpi vuosisatojen

Aloittakaamme 1400-luvulta. Keskiajalla kaivostoiminta kehittyi merkittävästi etenkin sulattamisen tekniikoissa ja malmin jalostamisessa. Edistysaskeleet mahdollistivat paitsi tehokkaamman työstämisen, myös metallien varaan rakentuvat kauppayhteydet Euroopan halki. Kaikki halusivat metalleja, ja niiden omistaja oli vauras; monessa paikassa lain mukaan maan hallitsijalla oli oikeus osuuteen kaikesta alueella harjoitettavasta kaivostoiminnasta. (Lynch 2004, 22–24 ja 30.)

Keskiaikainen ja uuden ajan alun luontosuhde oli teologisen maailmankuvan määrittämä. Ihminen ja luonto hahmotettiin erilliseksi, sillä ihminen oli erityisessä suhteessa Jumalaan. Luonnon hyödyntäminen oli paitsi oikeutettua, myös ihmisen päämäärä maallisessa selviytymistaistelussa. Luonnollakin oli siis toimijuus: se nähtiin tarpeellisena ja käyttökelpoisena, mutta myös uhkaavana. (Seaman 2009.) Uskonnon valta-asema ajoi yhteiskuntaa ja määritti sen todellisuutta. Onkin ympäristösuhteen kannalta keskeistä, että juuri kristityt eurooppalaiset olivat niitä, jotka 1400-luvulla alkoivat ottaa haltuunsa maa-alueita kaukana merien takana.

Kolumbuksen matkan oli alkujaan määrä kartoittaa tie Aasian markkinoille ja viedä kristinuskoa mukanaan. Se osuikin vahingossa kirjaimellisesti kulta- ja hopeasuoneen. Konkistadoreiden aloittama länsimaisen kolonialismin historia on pitkälti myös kaivostoiminnan historiaa. Alkuperäiskansoja orjuuttavia kaivoksia perustettiin tiiviiseen tahtiin Amerikan länsirannikkoa pitkin. Niiden kultamalmi lastattiin laivoihin kohti Eurooppaa, ja palaavien laivojen mukana taas saapui saksalaisia asiantuntijoita tehostamaan kaivosten tuotantoa. Mineraalivarat olivat keskeinen syy sille, että eurooppalaiset ottivat väkivaltaisesti 1400- ja 1800-lukujen välillä haltuunsa kaukaisia alueita Amerikan lisäksi myös Afrikasta ja Aasiasta. (Lynch 2004, 19–61.)

Kolonialismin ja kaivostoiminnan historia ovat yhdessä vaikuttaneet länsimaiseen ympäristösuhteeseen. Perinteisesti kolonialismin historiassa keskitytään alkuperäisasukkaisiin kohdistuneeseen väkivaltaan, mutta myös luonto ja mineraalit kaapattiin. Louhinta oli kaukana omista elinympäristöistä ja metallien hyöty emämaissa. Jaottelu vahvisti entisestään kulttuurin ja luonnon eroa. Kolonialismin ja myöhemmin imperialismin jäljet näkyvät edelleen globaalissa kaivostoiminnassa.[1]

Uuden ajan alussa kristinuskon rinnalle tuli mekanistinen maailmankäsitys. Monet tarkastelivat 1600-luvulla maailmaa uudella empiirisellä katseella. Eurooppalaisessa historiankirjoituksessa taas 1700-lukua kutsutaan hyödyn aikakaudeksi. Tuolloin valistusajattelijat kuten Carl von Linne (1707–1778) alkoivat jäsentää ympäröivää maailmaa taksonomisesti. Aikakauden perintönä syntyi instrumentaalinen ympäristökäsitys, joka määritti kaivostoimintaakin. Edistysusko 1800-luvulta alkaen julisti ihmisen olevan luonnosta riippuvainen, mutta myös oikeutettu hallitsemaan sitä tavoitellessaan sivistymistä. (Väyrynen 2021, 381–383; Lynch 2004, 72.)

Teollistumisen alku johdetaan usein höyryvoimaan ja sen tehostamaan kaivostuotantoon. Ensimmäinen kaivostoiminnassa hyödynnettävä höyrypumppu rakennettiin vuonna 1697, ja 80 vuotta myöhemmin siitä tuli valtavirtaa. Metallien tuotanto kasvoi eksponentiaalisesti, ja siten myös niiden kysyntä. Uudet teolliset

[1] Esimerkiksi Chilessä, ensimmäisten espanjalaisten kaivosten lähistöllä tuotetaan edelleen suurin osa maailman kuparista (Government of Canada, 2025).

keksinnöt, koneet ja infrastruktuuri, vaativat metalleja, etenkin rautaa. Teollistumisen tarjoamat tulevaisuuskuvat saivat ihmisen kaivamaan syvemmälle ja syvemmälle. (Lynch 2004, 72–77, 85–86, 178.)

Valistus ja teollistuminen säilyttivät luonnon hyödyntämisen eetoksen ja yhdistivät siihen uusia elementtejä. Missä teologinen maailmankuva oli oikeuttanut luonnon hyödyntämisen Jumalan ihmisille suomilla etuoikeuksilla, mekanistinen maailmankuva ylläpiti hierarkiaa rakentuvalla kehitysuskon ja tieteen saralla. Teollistuminen järjesti maailman uudelleen, ja pönkitti sen metallisilla pitimillä. Materiaalinen maailma rakennettiin metalleista ja merkittävä osa tarpeista perustui niiden jatkuvaan saatavuuteen.

Edellisten mentaliteettien yhtenevyys on siinä, että ihminen ja luonto on niissä muodostettu erillisiksi. Ympäristöliikkeen herääminen 1960-luvulla alkoi kuitenkin kyseenalaistaa tätä kaksinapaisuutta. Tärkeää oli ympäristöhuolien institutionalisoituminen kansallisesti ja kansainvälisesti. Ne heijastivat muuttuvaa ympäristösuhdetta. Ympäristön säilyttämisen ja puolustamisen vuoksi alettiin säätää lakeja 1900-luvulla. (Räsänen, Schönach & Kaarkoski 2021.)

Samaan aikaan kaivosyhtiöt ja kansallisvaltiot käänsivät katseensa merenpohjiin. DSM joutui kuitenkin jo 1980-luvulla asiantuntijoiden ja luonnonsuojelijoiden kritisoimaksi. Haittavaikutukset kaivausten ekosysteemeille ovat yhä suuri osa DSM:n ympärillä käytävää keskustelua (Sparenberg 2019, 844 ja 850–851). Vaikka yleisesti kaivostoiminnan historiassa on esiintynyt myös louhintaa vastustavia ääniä, ne ovat systemaattisesti tulleet vaimennetuksi. Ympäristönsuojelun liike on vielä verrattain tuore: noin 65 vuotta. Tämän takia sen vaikutuksia pitkän aikavälin transformatiivisena voimana on vaikea arvioida. Tähän mennessä se on todistanut olevansa merkittävä kansainvälisellä tasolla.

Historiallisen transformaatioajattelun mahdollisuudet kestävälle kehitykselle

Sparenberg (2019, 843) esittää ajatuksen, jonka mukaan historiaa voidaan käyttää vaihtoehtoisten skenaarioiden mallintamiseksi ja siten haastamaan konventioita sekä vallalla olevan kulttuurin käsityksiä ja odotuksia. Historian tarkastelu tarjoaakin mahdollisuuksia vahvan kestävyyskulttuurin rakentamisessa etenkin, kun keskitytään kulttuuriin. Kulttuuri on tausta, jonka maalaamalla kentällä ekologiset, sosiaaliset sekä taloudelliset tapahtumat, toimijat ja intressit muotoutuvat.

Mineraalien näkeminen välttämättöminä hyödykkeinä on lopulta kulttuurinen dogmi eli opinkappale. Esimerkiksi tultaessa 1900-luvulle lähes koko maailma siirtyi rahan kultakantaan. Hopea, jonka ympärille oli satoja vuosia rakentunut massiivinen operatiivinen ja taloudellinen järjestelmä, menetti merkityksensä (Lynch 2004, 256). Samoin kävi DSM-projekteille 1980-luvulla, kun lientyvä kylmä sota vähensi mineraalien kysyntää (Sparenberg 2019, 842–843). Muutokset suhtautumisessa mineraaleihin voivat tapahtua uusien keksintöjen, poliittisten uhkien tai muuttuvien materiaalisen kulttuurin tarpeiden myötä ilman näennäistä syytä tai päämäärää (Sparenberg 2019, 843–844).

Länsimaisen luontosuhteen näkökulmasta suuria mentaliteetteja on yhdistänyt luonnon hyödyntämiseen pyrkivä eetos. Pitkillä aikaväleillä vaikuttaneet mentaliteetit ovat totuttaneet ihmiset tuohon ajatustapaan. Kestävän kulttuurin tavoittelussa onkin keskeistä tunnistaa, kuinka pohjimmiltaan arvo- ja merkitysmaailmat asettavat toiminnalle raameja. Nämä raamit ovat nykyisessä muodossaan sallineet luonnon sivuuttamisen ihmisten tarpeiden perusteella.

Toisaalta vastaliikkeitäkin on ja on ollut, eikä ole tarkoituksenmukaista kirjoittaa vain positivistista kestämättömän luontosuhteen historiaa. Kestävyysnäkökulmasta ongelma onkin, miten pienistä virroista kasvatetaan muutosta fasilitoiva mentaliteetti, etenkin, kun se edellyttää saavutetuista eduista tinkimistä. Kenties on tunnistettava, että vähentämällä kulutusta ei itse asiassa jouduttaisi hyvinvointia, vaan jopa lisäämään sitä.

Seuraavaksi tarkastelemme, miten oikeus heijastaa käsittelemäämme mineraalien kulutuksen kulttuuria, ja miten oikeuden muutoksilla pystyttäisiin avittamaan kulttuurin transformatiivista muutosta.

Luonnon oikeudet ja oikeussubjektin asema – mahdollisuus oikeudellisen kulttuurin muutokseen

Oikeuden yhteys kulttuuriin

Antiikin Roomasta lähtöisin oleva länsimainen oikeusjärjestelmä levisi maailmalle kolonialismin ja kristinuskon myötä, ja sitä voidaan pitää myös kansainvälisen oikeuden perustana (Herzog 2018, s. 2–3). Tämä länsimainen oikeusjärjestelmää on sekä luonnosta eriytyneen kulttuurin mahdollistaja että seuraus. Luonnon rooli resurssina ja ihmisen omistuksen kohteena on niin sisäänrakennettua oikeudessa, että pelkillä pintatason pykälämuutoksilla muutos ei tule tapahtumaan – tai toisaalta, pintatason muutokset eivät tapahdu ilman syvempää muutosta. Esimerkiksi kierrätyssääntelyn tiukentaminen on nopea toimi, jolla louhinnan kestävyyttä voisi parantaa. Se ei kuitenkaan kyseenalaista tapaa, jolla ihminen kohtelee ympäristöä itsestään erillisenä, ja vaikuttaa kestävyyteen vain pistemäisesti. Syvemmän kulttuurisen ympäristösuhteen muutos voisi tarkoittaa muutosta siihen, että ympäristön arvo muunakin kuin resurssina voitaisiin tunnistaa, ja tähän muutokseen voitaisiin johdatella oikeusjärjestelmän muutoksella.

Oikeuden eri tasoja ja niiden suhdetta kulttuuriin voidaan hahmottaa Kaarlo Tuorin kehittämän oikeuden tasoteorian avulla. Tuorin kriittinen oikeuspositivismi käsittää oikeuden positivistisen pintatason, mutta ottaa huomioon myös syvemmät tasot (Tuori 2016, 147). Kolmitasoisen teorian mukaan oikeuden pintataso koostuu kielellä ilmaistuista normeista, kuten laeista ja tuomioistuinpäätöksistä, jotka muuttuvat nopeasti (Tuori 2016, 154–155). Oikeuden toisella tasolla, oikeuskulttuurilla, tarkoitetaan pintatason taustalla toimivaa juridista logiikkaa ja perustavanlaatuisia periaatteita. (Tuori 2016, 166–170.) Tuorin mukaan voidaan väittää, että kaikissa länsimaisen perinnön oikeuskulttuureissa on lisäksi sama ydin eli yhteinen syvärakenne. Hitaimmin muuttuvaan syvärakenteeseen kuuluvat kaikista fundamentaalisimmat oikeudelliset kategoriat, joita ilman oikeudellinen ajattelu tai argumentaatio ei olisi mahdollista. Näihin sisältyy esimerkiksi oikeussubjektin käsite (Tuori 1998, 3; Tuori 2016, 184–189).

Tuorin teorian avulla voimme ymmärtää kulttuurin, moraalin ja muiden ilmiöiden vaikutukset oikeuteen, kun ne ovat vuorovaikutuksessa oikeuden kanssa sen syvemmillä tasoilla. Tätä ajatusta voidaan soveltaa kulttuuriseen kestävyysmuutokseen, jolloin ideologisten ja poliittisten kulttuurimuutosten voidaan katsoa suodattuvan oikeuteen. Tietoisilla muutoksilla voidaan myös kehittää oikeutta niin, että sen muutokset suodattuvat muuhun kulttuuriin. Näin oikeuden muutoksilla voidaan kehittää ihmisen luontoyhteyttä. Yhtenä esimerkkinä tästä on luonnon oikeuksien lisääminen ja oikeussubjektiopin muokkaamisen mahdollisuus.

Luonnon oikeudet ja toimijuus – syvänmeren oikeudellisen aseman muutos

Ylikulutuksen on osaltaan mahdollistanut luonnon eriyttävä oikeussubjektioppi. Roomalaisesta oikeudesta lähtien oikeussubjektiopin pohjana on ollut jako henkilöihin ja esineisiin. Oikeussubjekti on ihminen tai oikeushenkilö, jolla on ainakin oikeuksia ja mahdollisesti velvollisuuksia. (*Tieteen termipankki*, oikeussubjekti.) Oikeussubjektin käsite on hiljalleen kattanut myös naiset ja muut kuin valkoihoiset sekä oikeushenkilöt, eli esimerkiksi yritykset. Luonto ja muun lajiset eläimet ovat taas perinteisesti olleet erillisiä esineitä, kuten eläimiä, tai kiinteitä esineitä, kuten tietty maaosuus.

Jako on korostanut luonnon eriytyneisyyttä. Oikeuden on vaikea tunnistaa esimerkiksi kaivosalueen eliöiden tai ekosysteemin itsenäistä arvoa. Luonnon ja sen resurssien rooli esineenä on tarkoittanut, että ihmisten oikeus kerätä mineraaleja kulutushyödykkeisiinsä on itsestäänselvyys. Ei ole lakia, joka tämän suoranaisesti mahdollistaa, vaan ennemminkin oikeudessa on tyhjiö, joka on jättänyt luonnon ja eläimet vaille suojaa. Tämä pohjautuu syvempiin periaatteisiin siitä, minkä suojelemiseksi oikeutta luodaan. Perustavanlaatuiset oikeushyvät ovat olleet (etuoikeutettujen) ihmisten oikeuksia. Esimerkiksi oikeus vapauteen, terveyteen ja omaisuuteen. Kun nämä asetetaan vastakkain luonnon kanssa, järjestelmä suosii ihmisiä. (Rochford 2024, 9 ja 13.) Oikeusjärjestelmä on erityisesti painottanut näitä ihmisen taloudellisia oikeuksia,

jotta vapaa, kapitalistinen markkinatalous voisi toimia. (Borras 2016, 127–128.) Vasta viime vuosikymmeninä luonnon ja eläinten hyvinvointi ja vapaus ovat alettu näkemään oikeushyvinä, jota oikeusjärjestelmällä voitaisiin ja olisi oikeudenmukaista suojella. (Rochford 2024, 5).

Selkeää jakoa oikeussubjekteihin ja esineisiin voidaan pitää liian mustavalkoisena, koska nykyään luonnolla ja eläimillä ymmärretään olevan joitakin oikeuksia. On esitetty, että nykyinen järjestelmä vastaisi kimpputeoriaksi kutsuttua ajatusmallia, jonka mukaan oikeussubjekti on oikeussubjekti vasta, kun sillä on suurempi määrä, eli kimpullinen oikeuksia. Perinteisin oikeuksia ja velvollisuuksia omaava aktiivinen oikeussubjekt*i* on täysivaltainen aikuinen. Oikeussubjekti voi olla myös passiivinen eli vain oikeuksia omaava, kuten taapero. (Kurki 2023, 12–14.) Näin vain muutaman oikeuden omaavat oliot eivät siis ole oikeussubjekteja, jolloin luonnon ja eläinten voidaan ajatella olevan esineitä ja silti omaavan oikeuksia. Tällaisten oikeuksien kehittyminen kertoo syvemmästä muutoksesta, mutta se ei erityisesti haasta sisäänrakennettua ihmiset-esineet jakoa.

Ongelmaksi jää, millaisen suojan pelkät muutamat oikeudet antavat, koska vain oikeussubjektit voivat olla osallisia sopimuksissa tai tuomioistuimessa (Borras 2016, 114; Kurki 2023, 17–18). Kysymys onkin, voisiko eläimille ja luonnolle antaa passiivisen oikeussubjektin aseman. Muutos merkitsisi syvempää oikeussubjektiopin uudelleenajattelua, jolloin luonnolle ja eläimille voitaisiin edustajien kautta antaa kyky toimia yhteiskunnassa. Yksi esimerkki rajatulle ekosysteemille annetuista oikeussubjektin asemasta on Uuden-Seelannin Whanganui-joki. Oikeussubjektiaseman myötä Whanganuille nimettiin edunvalvojat, jotka voivat nostaa kanteen joen puolesta ilman, että ihmisille on tarvinnut aiheutua haittaa (Helsingin Sanomat 2018.) Syvänmeren suojelemiseksi varteen otettavana vaihtoehtona olisi ensinnäkin merten oikeuksien kehittäminen, ja sittemmin aseman kehittäminen oikeussubjektin suuntaan.

Oikeussubjektiopin muutoksen integrointi syvänmerenlouhintaa koskevaan kansainväliseen oikeuteen esittää omat ongelmansa, koska kelpoisuus toimia on rajatumpaa. Malminetsintää koskevassa sääntelyssä luonnolla voidaan kuitenkin katsoa olevan jotain oikeuksia; esimerkiksi oikeus siihen, ettei sitä vahingoiteta enemmän kuin on tarpeen (International Seabed Authority 2013). Koska ympäristö ei voi kuitenkaan toimia itsenäisesti, suoja turhalta vahingolta realisoituisi todennäköisesti vain, jos ympäristön vahingoittuminen vahingoittaisi esimerkiksi toista valtiota. Tämän takia muutosta kansainväliselläkin tasolla tulisi pohtia.

Lähimmäksi tätä on päästy YK:n vuoden 2022 valtamerikonferenssissa. Siellä ehdotettiin, että YK tunnistaisi valtameret eläviksi kokonaisuuksia, joilla olisi oikeus elämään, terveyteen ja luonnonmukaiseen kiertokulkuun (Keeling 2022). Tämä jäi vain ehdotukseksi, mutta tällaisten oikeuksien luominen voisi luoda polun myös valtamerten osa-alueiden, kuten syvänmeren, oikeussubjektiaseman myöntämiselle. Tällöin ympäristö voisi saada syvänmeren louhintaa (DSM) koskevissa sopimuksissa paremman neuvotteluaseman ja sen puolesta voitaisiin nostaa kanteita.

DSM:n puolesta argumentoidaan sillä perusteella, että se tarjoaisi sähköistymisen kautta fossiilisia polttoaineita ilmastoystävällisemmän vaihtoehdon. Jos asiaa ei pohdittaisi ihmisten taloudellisten oikeuksien ollessa välikätenä, voisi kuitenkin olla, ettei mineraaleista riippuvaisen yhteiskunnan ylläpito olisi kestävin vaihtoehto. Luonnon itsenäinen asema voisi turvata sen, ettei DSM:ää toteutettaisi voitontavoittelemiseksi ympäristönsuojeluksi naamioituna, vaan että tosiasialliset kestävyysvaikutukset otettaisiin huomioon. Luonnon oikeudellisen aseman parantaminen voisi lisätä painetta sellaisen kulttuurin luomiselle, jossa teknologian kasvavalle kulutukselle ei olisi nykyisen kaltaista tarvetta.

Yhteenveto

Kapitalismin, kulutuskulttuurin ja ympäristökestävyyden välinen suhde korostaa tarvetta muutokseen taloudellisessa ja ekologisessa hallinnassa. Kapitalismin periaatteet ovat juurruttaneet ylikulutuksen syvälle

yhteiskuntaan, lisänneet luonnonvarojen hyväksikäyttöä ja tuoneet syvänmerenlouhinnan keskiöön. Historialliset ideologiat, kuten uskonnolliset opit, kolonialismi ja teollinen kehitys, ovat muovanneet ympäristösuhdetta hyväksikäyttäväksi, oikeuttaen luonnonvarojen käytön talouskasvun nimissä.

Kulttuurinen kestävyys haastaa nämä ajattelutavat, nähden luonnon osana ihmisen kulttuuria, ei vain taloudellisena resurssina. Luonnon oikeuksien juridinen tunnustaminen voi edistää muutosta. Länsimainen oikeustraditio on perinteisesti kohdellut luontoa ihmisen hyödykkeenä, mutta viimeaikaiset edistysaskeleet, kuten ekosysteemien oikeushenkilöstatus, viittaavat merkittävään ajattelutavan muutokseen. Esimerkiksi Uuden-Seelannin Whanganui-joen asema oikeushenkilönä voisi toimia mallina myös syvänmeren ekosysteemien suojelulle.

Kestävyysongelmien, kuten ilmastonmuutoksen ja luonnon monimuotoisuuden heikkenemisen, ratkaiseminen vaatii monitieteisiä lähestymistapoja. Syvänmerenlouhinnan vaikutusten käsittely edellyttää teknisten ratkaisujen lisäksi kulttuurisia ja oikeudellisia uudistuksia, jotka haastavat nykyiset kulutuksen ja omistajuuden paradigmat. Kesäkuussa 2025 järjestettävä YK:n valtamerikonferenssi voi tuoda syvänmerenlouhinnan entistä vahvemmin esiin, kun mineraalien kasvava kysyntä lisää taloudellista painetta hyödyntää merten luonnonvaroja. Keskustelu saattaa keskittyä siihen, miten kansainvälinen sääntely voi tasapainottaa taloudelliset intressit ja ympäristönsuojelun tarpeet.

Talouden ja oikeudellisten järjestelmien uudistaminen on välttämätöntä kestävän kehityksen saavuttamiseksi. Ilman muutoksia ympäristön hyväksikäyttö jatkuu, jonka takia on kysyttävä: olemmeko valmiita muuttamaan järjestelmiämme kestävämmiksi?

Lähteet

Borras, S. (2016). New Transitions from Human Rights to the Environment to the Rights of Nature. *Transnational Environmental Law,* 5(1), 113–143.

Cooper, T. (2011). Planned obsolescence. Teoksessa D. Southerton (Ed.) *Encyclopedia of consumer culture,* 3, 1096–1096. SAGE Publications, Inc., https://doi.org/10.4135/9781412994248.

De Grazia, V. (2005). I*rresistible Empire: America's Advance through Twentieth-Century Europe*. Harvard University Press, https://doi.org/10.2307/j.ctv2jfvcwb.

Eerola, T. (Ed.), Eilu, P. (Ed.), Hanski, J., Horn, S., Judl, J., Karhu, M., Kivikytö-Reponen, P., Lintinen, P. & Långbacka, B. (2021). *Digitalization and natural resources. Geological Survey of Finland. Open File Research Report No. 50/2021,* https://tupa.gtk.fi/raportti/arkisto/50_2021.pdf.

Effros, M. & Poor, H.V. (2017). "Claude Shannon: His Work and its Legacy". *MS Newsletter*, March 2017. https://www.itsoc.org/resources/Shannon-Centenary/shannon-work-legacy-paper.

Fook, L. & McNeill, L. (2020). "Click to Buy: The Impact of Retail Credit on Over-Consumption in the Online Environment". *Sustainability*, 12, 7322.

Government of Canada: Copper. https://natural-resources.canada.ca/minerals-mining/mining-data-statistics-analysis/minerals-metals-facts/copper-facts. Verkkosivu, päivitetty 31.1.2025. [haettu 20.3.2025].

Guillermo, M. & Alvaro, P. (2018). *Innovation and Competition: The Role of the Product Market*. SSRN, Available at SSRN: https://ssrn.com/abstract=3110042 or http://dx.doi.org/10.2139/ssrn.3110042.

Harris, N. & Delanty, G. (2023). What is capitalism? Toward a working definition. *Social Science Information*, 62(3), 323-344. https://doi.org/10.1177/05390184231203878.

Heinonen, V. (2000). Nälkämaasta moderniksi kulutusyhteiskunnaksi. T*ieteessä tapahtuu*, 18(6). Noudettu 24.3.2025 osoitteesta https://journal.fi/tt/article/view/58257.

Helsingin Sanomat (2018). Joki voi hakea apua käräjiltä Uudessa-Seelannissa ja Intiassa – lakitieteen uusi suuntaus tekee luonnosta oikeushenkilön. https://www.hs.fi/tiede/art-2000005904736.html (viitattu 12.3.2025).

Herzog, T. (2018). *A short history of European law: the last two and a half millennia*. Harvard University Press.

Higgs, K. (2021). *A Brief History of Consumer Culture*. MIT press reviewer, julkaistu 21.1.2021. Noudettu 24.3.2025 osoitteesta https://thereader.mitpress.mit.edu/a-brief-history-of-consumer-culture/.

International Seabed Authority (2013). *Decision of the Council of the International Seabed Authority relating to amendments to the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area and related matters*, 22.7.2013, ISBA/19/C/17.

Jahan, S. & Mahmud, A. (2015). “What Is Capitalism?” *Finance & Development*, 52(2), 44–45.

Keeling, T. (2022). “Should the Ovean have legal rights?” *The Revelator, Center for Biological Diversity*. https://therevelator.org/ocean-legal-rights/ (viitattu 15.3.2025).

Kurki, V.A.J. (2023). *Legal Personhood*. Cambridge University Press.

Laughey, D. (2007). *Key Themes in Media Theory*. New York, NY: McGraw Hill Publication.

Lynch, M. (2004). *Mining in World History*. Globalities series. Reaktin Books, London.

Marín-Beltrán, I., Demaria, F., Ofelio, C., Serra, L., Turiel, A., Ripple, W., Mukul, S. & Costa, M. (2021). Scientists' warning against the society of waste. *Science of The Total Environment*, 811, 151359. https://doi.org/10.1016/j.scitotenv.2021.151359.

Mining Technology (2024). Deep-sea mining: Dispute resolution under ISA regulation. https://www.mining-technology.com/features/deep-sea-mining-dispute-resolution-under-isa-regulation/?cf-view&cf-click&cf-minimized&cf-view&cf-closed (viitattu 15.3.2025).

Moilanen, A. (2017). *Omaisuus ja yhteiskunnan alkuperä Locken ja Kantin filosofiassa*. Pro Gradu-tutkielma, Itä-Suomen yliopisto. Noudettu 24.3.2025 osoitteesta https://erepo.uef.fi/server/api/core/bitstreams/245c3448-559d-4f72-8f8a-c8c65e900590/content.

Pincus, S. (2012). Rethinking Mercantilism: Political Economy, the British Empire, and the Atlantic World in the Seventeenth and Eighteenth Centuries. *William and Mary Quarterly*, 69, 3. https://doi.org/10.5309/WILLMARYQUAR.69.1.0003.

Rahman, Z., Khattak, S., Ahmad, M. & Khan, A. (2020). A disaggregated-level analysis of the relationship among energy production, energy consumption and economic growth: Evidence from China. *Energy*, 194, 116836. https://doi.org/10.1016/j.energy.2019.116836.

Robinson, W. (1990). Product Innovation and Start-Up Business Market Share Performance. *Management Science*, 36(10), 1279–1289.

Rochford, F. (2024). *Environmental Personhood: New Trajectories in Law* (1st ed., Vol. 1). Routledge.

Rose, C. (1986). The Comedy of the Commons: Custom, Commerce, and Inherently Public Property. *The University of Chigago Law Review,* 53(3), 711–781.

Ruuskanen, E., Schönach, P. & Väyrynen, K. (2021). Johdanto. Teoksessa *Suomen ympäristöhistoria 1700-luvulta nykyaikaan*. Toim. Esa Ruuskanen, Paula Schönach ja Kari Väyrynen. Vastapaino, Tampere.

Räsänen, T., Schönach, P. & Kaarkoski, M. (2021). Ympäristötietoisuuden ja ympäristöpolitiikan institutionalisoituminen. Teoksessa *Suomen ympäristöhistoria 1700-luvulta nykyaikaan*. Toim. Esa Ruuskanen, Paula Schönach ja Kari Väyrynen. Vastapaino, Tampere.

Seaman, A. (2009). Situating Nature: Exploring Perceptions of Human-Environment Interactions in Mediaeval Western Europe c. AD 800–1550. *Archaeological Review from Cambridge* 24(2), 141–155.

Soini, K. & Dessein, J. (2016). Culture-Sustainability Relation: Towards a Conceptual Framework. *Sustainability* (8)167. DOI: 10.3390/su8020167.

Sparenberg, O. (2019). A historical perspective on deep-sea mining for manganese nodules, 1965–2019. *The Extractive Industries and Society* 6. 842–854. https://doi.org/10.1016/j.exis.2019.04.001.

Stephen, A. (2016). The role of digital and social media marketing in consumer behavior. *Current Opinion in Psychology*, 10, 17–21. https://doi.org/10.1016/j.copsyc.2015.10.016.

Stuart, D., Gunderson, R. & Petersen, B. (2020). Overconsumption as Ideology: Implications for Addressing Global Climate Change. *Nature and Culture*, 15(2), 199–223. Retrieved Mar 31, 2025, from https://doi.org/10.3167/nc.2020.150205.

Tieteen termipankki, “Oikeussubjekti”, https://tieteentermipankki.fi/wiki/Oikeustiede:oikeussubjekti (viitattu 12.3.2024).

Tuori, K. (1998). Oikeuden kahdet kasvot. *Tieteessä tapahtuu*, 16(6). https://journal.fi/tt/article/view/58601.

Tuori, K. (2016). *Critical legal positivism* (1st ed.). Routledge.

United Nations Environment Programme (2023). Sustainable Digitalization and the Triple Planetary Crisis in West Asia. https://wesr.unep.org/sustainable-digitalization-and-the-triple-planetary-crisis-in-west-asia/index.html.

Väyrynen, K. (2021). Suomalaisen ympäristöajattelun suuntaviivoja valistuksen ajalta 2000-luvulle. Teoksessa *Suomen ympäristöhistoria 1700-luvulta nykyaikaan*. Toim. Esa Ruuskanen, Paula Schönach ja Kari Väyrynen. Vastapaino, Tampere.

Wikipedia (n. d.). ”Capitalism”. https://en.wikipedia.org/wiki/Capitalism (viitattu 23.2.2025).

Yue, P., Korkmaz, A., Yin, Z. & Zhou, H. (2021). The rise of digital finance: Financial inclusion or debt trap? *Finance Research Letters*. https://doi.org/10.1016/j.frl.2021.102604.

Keinovalo ja hyönteiset

Alina Piispa, Kasperi Inkilä, Lina Hurme, Minna Latvala, Paula Närhi, Piia Saaristo & Sofia Pitkänen

Abstrakti

Tässä esseessä tarkastelemme keinovalon vaikutuksia hyönteisiin ja hyönteisten avainlajiroolin kautta myös ekosysteemien toimintaan laajemmin. Lisäksi pohdimme mahdollisia ratkaisuja keinovalon aiheuttamiin ekologisiin haasteisiin. Keinovalolla tarkoitetaan ihmisen keinotekoisesti luomaa valonlähdettä, joka mahdollistaa monet yhteiskunnan keskeiset toiminnot, mutta on samalla myös kasvava uhka luonnon monimuotoisuudelle. Noin puolet kaikista hyönteislajeista on yöaktiivisia ja evoluution myötä ne ovat kehittäneet monia valon havaitsemiseen tarkoitettuja reseptoreita, joiden avulla ne toimivat. Lisääntynyt keinovalon määrä kuitenkin häiritsee tätä toimintaa ja vaikuttaa monin tavoin muun muassa hyönteisten käyttäytymiseen, liikkumiseen, ravinnonhakuun, parinvalintaan ja lisääntymiseen. Keinovalon on huomattu sotkevan hyönteisten luontaisen suuntavaiston, altistavan ne erilaisille pedoille, sekä häiritsevän niiden lisääntymistä vaikeuttamalla parinetsintää. Näin ollen keinovalo on vaikeuttanut hyönteisten selviytymistä ja myös altistanut joitain lajeja uhanalaisuudelle. Hyönteisten keskeisen roolin takia keinovalosta aiheutuvat haitat hyönteisille häiritsevät myös ketjureaktiona kokonaisia ekosysteemejä, kun ne muuttavat eliöyhteisön rakenteita ja lajien vuorovaikutussuhteita. Keinovalon aiheuttamien haittavaikutusten vähentäminen on keskeisessä roolissa luonnon monimuotoisuuden säilyttämisessä. Valosaastetta voidaan vähentää tehokkaalla kaupunkisuunnittelulla, joka keskittyy valaistuksen ajalliseen ja paikalliseen minimoimiseen sekä luontoystävällisempien valaistusvaihtoehtojen hyödyntämiseen. Näin suojellaan hyönteisiä, sekä kokonaisten ekosysteemien säilymistä.

Johdanto

Keinovalo on ihmisen keinotekoisesti luoma valonlähde ja kasvava uhka luonnon monimuotoisuudelle. Keinovalon lisääntynyt käyttö on seurausta laajemmasta yhteiskunnallisesta modernisoitumisesta ja digitalisaatiosta. Keinovalon avulla on voitu mahdollistaa muun muassa aikaisempaa monipuolisemmat vapaa-ajanviettomahdollisuudet, sekä työskentely vuorokaudenajasta riippumatta, mutta lisääntynyt keinovalaistus on kuitenkin tuonut mukanaan myös useita haittavaikutuksia.

Keinovalaistus häiritsee luonnollisia syklejä valon ja pimeyden välillä, mikä vaikuttaa laajasti organismeihin ja ekosysteemeihin. Auringonvalo on yksi tärkeimmistä tekijöistä, joka säätelee lähes kaikkien elämänmuotojen kehitystä. Evoluution aikana ihmiset ja eläimet ovat kehittäneet monia valon havaitsemiseen tarkoitettuja reseptoreita, joiden avulla elävät olennot saavat tietoa muun muassa valaistuksen määrästä, laadusta, vuodenaikojen vaihteluista, suunnasta ja pituudesta. Lisääntyneen keinovalaistuksen seurauksena eläinten toimintatavat ja liikehdintä muuttuvat, mikä taas vaikuttaa esimerkiksi muuttoliikkeeseen, lisääntymiseen, pölyttämiseen ja ravinnonhankintaan.

1900-luvulta lähtien keinovalon määrä maapallolla on kasvanut nopeasti, samoin kuin sen vaikutus eri eliölajeihin (Hufnagel & Levente 2022). Kuitenkin vasta viime vuosikymmeninä keinovalon on huomattu tuovan mukanaan elinympäristöämme heikentäviä muutoksia. Samassa yhteydessä on siirrytty käyttämään keinovalosta kuvailevampaa nimeä, valosaaste. Ajankohtaisesti jopa 80 % maailman väestöstä elää valosaasteen alla ja vuosittain maapallon pinta-alasta noin 6 % lisää altistuu sen vaikutuksille. (Desouhant ym. 2018.) Valosaaste on sanana varsin uusi ja tullut tutkimuskentällä tunnetuksi vasta 2000-luvun alkupuolella. Nytkin olemme vasta alkuvaiheessa ja tiedämme edelleen liian vähän valon ja pimeyden vaikutuksesta eri eliöryhmiin ja ekosysteemeihimme.

Kuva 1. *lähde: Financial Times.*

Ymmärrys keinovalon vaikutuksesta hyönteisiin on rajoittunut muutamiin alaryhmiin ja teoreettinen viitekehys aiheesta on vielä heikosti kehittynyt, mikä osaltaan rajoittaa niiden välisen yhteyden tarkastelua (Grubisic & Van Grunsven, 2021). Tässä esseessä tutkimme, miten keinovalo vaikuttaa hyönteisiin ja ekosysteemeihin erityisesti kaupunkiympäristössä ja pohdimme ratkaisuvaihtoehtoja aiheeseen liittyviin epäkohtiin. Rajasimme käsittelyn hyönteisiin, sillä hyönteiset ovat hyvin suuri eliöryhmä, jonka toiminnalla merkittäviä vaikutuksia koko ekosysteemiin. Lisäksi hyönteisten määrä on laskenut erityisesti Euroopassa ja Pohjois-Amerikassa ja useat hyönteislajit ovat uhanalaistuneet (Dornelas & Daskalova 2020). Lisäksi rajasimme keinovalon vaikutusten tarkastelun kaupunkiympäristöihin. Kaupungissa keinovalon määrä on erityisen suuri, mikä mahdollistaa sen vaikutusten kokonaisvaltaisemman tarkastelun. Tässä esseessä siis käsittelemme keinovalon vaikutuksia hyönteisiin tarkastelemalla tarkemmin hyönteislajien uhanalaisuutta, lisääntymistä ja laajempaa yhteyttä ekosysteemeihin.

Keinovalon vaikutus uhanalaisiin hyönteisiin

Hyönteisten määrä on laskenut rajusti ympäri maailmaa. Esimerkiksi pölyttävien hyönteisten, kuten mehiläisten ja kukkakärpästen määrä on laskenut huomattavasti viimeisten vuosikymmenien aikana. Tutkimus toteutettiin iso-Britanniassa ja siinä tutkittiin 353 mehiläis- ja kukkakärpäslajin elinpaikkojen muutoksia vuosien 1980–2013 välillä. Tutkimuksessa huomattiin, että kyseisellä aikavälillä hyönteisten elinpaikoista noin neljännes oli menetetty. Erilaisia hyönteislajeja on neliökilometrillä noin 11 vähemmän kuin vuonna mitä 1980. (Powney ym. 2019.)

Hyönteisten kuolemalle on monia syitä, aina kaupungistumisesta ilmaston lämpenemiseen ja torjunta-aineiden käyttöön, laajamittaiseen tehomaatalouteen, monokulttuuriviljelyyn ja metsien katoon (Eklöf 2021). Owensin ym. (2020) tutkimuksessa ilmeni, että näiden rinnalla myös yöllinen keinovalo on myös yksi syy hyönteisten määrän voimakkaaseen vähenemiseen. Yöllinen keinovalo vaikuttaa monin tavoin hyönteisten luontaiseen käyttäytymiseen (Fabian ym. 2023). Yöllinen keinovalo häiritsee muun muassa hyönteisten ravinnonhakua, kehitystä ja liikkumista. Ravinnonhaun onnistuminen on hyönteisten kehitykselle ja lisääntymiselle elintärkeää. Yöllinen keinovalo saa hyönteiset myös käyttäytymään tavalla, joka vahingoittaa niitä altistamalla ne erilaisille pedoille. (Owens ym. 2020.)

Fabian ym. (2023) tutkimuksessa tutkittiin eri hyönteisten käyttäytymistä yöllisen keinovalon äärellä. Päivänvalossa hyönteinen kääntää selkänsä auringonvalolle, mikä auttaa sitä säilyttämään oikean lentoasennon ja hallitsemaan lentoa. Pimeässä loistava keinovalo aiheuttaa hyönteisissä samanlaisen reaktion kuin auringonvalo, ja näin ollen sekoittaa hyönteisten suuntavaiston. Tämän seurauksena hyönteinen jää kiertämään valonlähdettä, kunnes se lopulta kuolee uupumukseen. (Fabian ym. 2023.)

Kuva 2. *lähde: Helsingin Sanomat.*

Kun keinovalot vähitellen sammuvat, yleensä samaan aikaan auringonnousun kanssa, hengissä selvinneet hyönteiset eivät useinkaan ole onnistuneet saavuttamaan niille elintärkeitä lajityypillisiä yönaikaisia tavoitteitaan. Hyönteiset eivät ole löytäneet mettä, kuljettaneet kasvien siitepölyä, löytäneet parittelukumppania tai ehtineet laskea munia. (Eklöf 2021.) Yölliset keinovalot siis tuhoavat hyönteiskantaa ja ovat näin ollen myös yhteydessä joidenkin hyönteislajien uhanalaistumiseen. (Fabian ym. 2023.)

Keinovalon vaikutukset hyönteisten lisääntymiseen

Erilaisia hyönteislajeja on noin miljoona, joista puolet on yöaktiivisia. Näin ollen hyönteiset ovat eliölajina erityisen herkkiä valosaasteen vaikutuksille. Yöaktiiviset hyönteiset tarvitsevat vuorokaudessa ainakin pari yhtäjaksoista tuntia pimeyttä löytääkseen ruokaa ja kumppanin. Yön rajallinen valo toimii hyönteisille suojana ja tähtien ja kuun heikko valo on tärkeä hyönteisten suunnistuskyvylle ja hormonitoiminnalle. Keinovalon aiheuttamat häiriöt valon ja pimeyden luonnollisessa vaihtelussa uhkaavat kuitenkin etenkin yöhyönteisten olemassaoloa. (Eklöf 2021.)

Yksi keskeisimmistä keinovalon tuottamista vaikutuksista on sen vaikutus hyönteisten väliseen viestintään ja kommunikaatioon. Tämä näkyy muun muassa hyönteisten lisääntymisessä, sillä liian valoisa ympäristö häiritsee lajitoverien houkuttelemista. Valosaaste vaikuttaa häiritsevästi erityisesti sellaisiin hyönteislajeihin, jotka hyödyntävät lajitovereiden houkuttelemisessa omassa ruumiissaan kemiallisesti tuotettua valoa, eli bioluminenssia. Tällaisia hyönteislajeja ovat muun muassa kiiltomadot ja tulikärpäset. (Lyytimäki & Rinne 2013.)

Suomessa kiiltomatoja ja harvinaisempia tuikematoja löytyy pääsääntöisesti Etelä-Suomen alueelta. Kiiltomadot luetaan nimestään huolimatta kovakuoriaisiksi, joista urospuoliset ovat lentokykyisiä. Pimeässä vilkkuva kiiltomatonaaras houkuttelee valollaan uroksia, jotka loistavat naaraisiin verrattuna paljon himmeämmin. Harvinaisemmilla tuikemadoilla valon tuotanto on kiiltomatoon verrattuna heikompaa, joten ne kärsivät herkemmin vähäisestäkin keinovalosta. (Lyytimäki & Rinne 2013.)

Tutkimuksissa keinovalon on huomattu vaikuttavan sekä uros- että naaraskiiltomatoihin, mutta vaikutukset sukupuolten välillä eroavat hieman toisistaan. Keinovalon vaikutus näkyy naaraissa siten, että ne himmentävät yöaikaan ominaista hehkuaan, ja valoaltistuksen pitkittyessä ne todennäköisemmin lopettavat uroksille viestimisen kokonaan. Puolestaan uroskiiltomatojen kohdalla keinovalo heikentää urosten kykyä löytää keinovalolta piiloutuneita naaraita. Aikaisempi tutkimus myös osoittaa, että urokset ovat vähemmän kiinnostuneita naaraista, jotka altistuivat valolle. (Elgert 2023.)

Keinovaloaltistuksen kestolla ja valon aallonpituudella on kuitenkin myös omat vaikutuksensa hyönteisten parittelukäyttäytymiseen. Aikaisempi naaraskiiltomatoihin kohdistuva tutkimus (Elgert ym. 2021) osoittaa, että kiiltomatojen reaktio keinovaloon on olennaisesti riippuvainen valoaltistuksen kestosta. Tutkimuksissa pitkäkestoinen keinovaloaltistus sai naaraat lopettamaan hehkumisen, kun taas lyhyempikestoisella altistuksella todettiin olevan lievempiä vaikutuksia naaraiden reaktioihin (Elgert ym. 2021). Mitä tulee keinovalon aallonpituuteen, pitkällä valon aallonpituudella (punaisella ja keltaisella valolla) ei ole todettu olevan merkittävää vaikutusta kiiltomatojen lisääntymiseen. Sen sijaan lyhyellä aallonpituudella (sinisellä ja valkoisella valolla) todettiin merkittäviä vaikutuksia. (Kivelä ym. 2023.)

Tulikärpästen lisääntymistä tutkineet Owens ja Lewis (2022) nostavat esille, että valosaasteen herättämät reaktiot vaihtelevat myös eri tulikärpäslajien välillä. Lajien välillä tehty vertaileva tutkimus osoittaa, että Pohjois-Amerikassa yleisen Photinus -lajin lisääntyminen kärsii vaihtelevasti keinovalon vaikutuksista. Esimerkiksi Photinus obscurellus -lajin parittelu estyi kokonaan laboratorio olosuhteissa tehdyssä keinovaloaltistuksessa. Sen sijaan kenttäolosuhteissa tehdyissä tutkimuksissa Photinus pyralis ja Photinus marginellus -lajit kokivat vain vähäistä haittaa keinovalon aiheuttamasta valosaasteesta. Tutkimustulosten eroavaisuudet korostavatkin eri lajien välillä olevia hienovaraisia eroja, jotka vaikuttavat tulikärpästen keinovalon aiheuttamaan haavoittuvuuteen. (Owens & Lewis, 2022.)

Keinovalon haittavaikutuksia käsittelevän tutkimuksen ja kirjallisuuden ohella on siis tärkeää kiinnittää huomiota myös haittavaikutusten lieventämiseen ja ennaltaehkäisyyn. Tätä voidaan tehdä kaupunkisuunnittelun keinoin, keskittymällä esimerkiksi keinovalon väriin ja valaisuajan kestoon sekä lokaatioon. (Elgert ym. 2021). Keinovalolle herkkien hyönteislajien lisääntymistä voidaan edesauttaa esimerkiksi vähentämällä valojen käyttöä kriittisimmän lisääntymiskauden ollessa ajankohtainen (Lyytimäki & Rinne 2013). Valosaasteen hallinta, sekä sen laajuuden ja keston vähentäminen hyödyttävät laaja-alaisesti niin kiiltomatojen, tulikärpästen kuin muidenkin ekologisesti, kulttuurisesti ja taloudellisesti merkittävien yöeläinten elämää ja sen jatkuvuutta (Lewis ym. 2024).

Yhteys laajemmin ekosysteemeihin ja ravintoketjuihin

Keinovalon yleistyminen erityisesti urbaaneilla-alueilla, kaupungeissa, teillä ja asuinalueilla muuttaa monien eliöiden luonnollista käyttäytymistä. Keinovalo abioottisena ympäristötekijänä vaikuttaa merkittävästi ja hyvin kokonaisvaltaisesti hyönteisiin. Kuten on jo huomattu, keinovalolla on vaikutuksia muun muassa hyönteisten liikkumiseen, hajaantumiseen, käyttäytymiseen, elinkaareen, parinvalintaan ja lisääntymiseen. Nämä vaikutukset väistämättä säätelevät hyönteisten määrää sekä alueellista jakaumaa. Lisäksi vaikutukset heijastuvat myös laajemmin ekosysteemeihin ja ravintoverkkoihin. Keinovalon aiheuttamat haittavaikutukset häiritsevät muun muassa ekosysteemien toimintaa ja heikentävät biodiversiteettiä. (Hufnagel 2022, 1–5.)

Ekosysteemit koostuvat elollisen ja elottoman luonnon eliölajien sekä populaatioiden eli eliöyhteisön monimutkaisista yhtymäkohdista ja vuorovaikutuksesta. Muutokset yksittäisten eliölajien populaatioissa voivat vaikuttaa laajemmin koko ekosysteemin toimintaan. Ekosysteemin tai eliöyhteisön toiminnan, pysyvyyden tai monimuotoisuuden kannalta keskeisimmässä asemassa olevia lajeja kutsutaan avainlajeiksi. (Wang 2020, 69.) Monet hyönteiset ovat näitä ekosysteemien toiminnalle merkityksellisiä avainlajeja. Lisäksi hyönteiset ovat useiden ravintoketjujen ensimmäisen asteen kuluttajia, jotka ovat puolestaan toisen asteen kuluttajien eli petojen ravintoa. (Gullan & Cranston 2014, 2–6.)

Keinovalosta aiheutuva hyönteispopulaatioiden väheneminen vaikuttaa ravintoketjuihin ja ekosysteemien peto–saalis -suhteisiin, ja sitä kautta suoraan muihin lajeihin (Minnaar 2015, 1). Keinovalo vähentää hyönteispopulaatioita esimerkiksi siten, että hyönteiset joutuvat herkemmin saaliiksi pedoille. Esimerkiksi koiperhoset ovat osassa ekosysteemeistä yksiä tärkeimpiä hyönteislajeja, sillä ne ovat monien yösaalistajien ravintoa. Kaupunkiympäristön valaistuksen on huomattu vaikuttavan esimerkiksi kaunosekoyökkösen (amphipoea oculea) ja Cape Serotine lepakon (neoromicia capensis) väliseen peto–saalis -suhteeseen. Valosaaste kaupunkiekosysteemeissä heikentää kaunosekoyökkösen puolustusreaktiota valaistuissa olosuhteissa, mikä johtaa lepakoiden lisääntyneeseen saalistukseen. Cape Serotine lepakon lisääntynyt hyönteistensaalistusmäärä puolestaan vaikuttavat suoraan ekosysteemin yleiseen tasapainoon, sillä liiallinen petojen määrä vaikuttaa samalla myös muiden saalislajien selviytymismahdollisuuksiin. (Minnaar ym. 2015.)

Monet hyönteiset ovat yöaktiivisia ja niillä on taipumus fototaksiaan eli valoa kohti liikkumiseen. Tämä voi johtaa niiden kuolemaan joko palamisen, uupumisen tai saalistajille altistumisen seurauksena. Kyseisillä tekijöillä on vaikutuksia myös hyönteisiin, jotka ovat tärkeitä pölyttäjiä ja ekosysteemin avaintoimijoita. Keinovalon takia kyseiset ekosysteemille tärkeät hyönteiset saattavat vähentyä huomattavasti mikä puolestaan häiritsee kasvien pölytystä ja koko ravintoketjua. Joidenkin kasvien lisääntymiselle hyönteisten pölytys on välttämättömyys. Lisäksi kasvit ovat ravintoketjujen alkutuotantoa, ja täten hyvin oleellinen osa ekosysteemejä. Lisääntynyt keinovalo siis heikentää ekosysteemien monimuotoisuutta ja vaikuttaa kasvien kasvuun sekä sadontuotantoon. (Katabaro ym. 2022.) Keinovalosta aiheutuvat vaikutukset heijastuvat siis yksittäisten hyönteislajien selviytymismahdollisuuksien kautta välillisesti muiden lajien selviytymiseen ja näin ollen laajemmin myös ekosysteemien toimivuuteen.

Valosaasteen vaikutuksilla hyönteisten käyttäytymiseen, ekologisiin rooleihin ja selviytymiseen on kauaskantoisia negatiivisia seurauksia. Tämä voi johtaa vakaviin ekologisiin epätasapainotiloihin, kuten saalistuksen lisääntymiseen ja pölyttäjien vähenemiseen, mikä taas vaikuttaa kasvien elinvoimaisuuteen ja biomassan kiertoon ekosysteemeissä. Nämä häiriöt voimistavat ekosysteemien epätasapainoa ja korostavat tarvetta toimenpiteille, valosaasteen ja sen haittavaikutusten kontrolloimiseksi. (Katabaro ym. 2022.) Keinovalosta aiheutuvat haitat hyönteisille voivat häiritä kokonaisia ekosysteemejä ja muuttaa eliöyhteisön rakenteita ja lajien vuorovaikutussuhteita. Tekemällä muutoksia keinovalon käytössä ja hyödyntämällä aikaisempaa luontoystävällisempiä valonlähteitä, voidaan parantaa yksittäisten lajien selviytymismahdollisuuksia ja samalla pelastaa useita muita lajeja tai jopa kokonaisia ekosysteemeitä.

Yhteenveto

Keinovalolla on siis monenlaisia haittavaikutuksia niin hyönteisten käyttäytymiseen ja toimintaan, kuin laajemmin koko elinympäristöömme. Merkittävimmät haitat aiheutuvat yöaikaisesta keinovalon käytöstä ja sen ensisijaisena kärsijänä on luonnon monimuotoisuus. Tarpeeton ja liiallinen valojen käyttö on globaali ongelma, joka on lisääntynyt voimakkaasti yhteiskunnan modernisoitumisen myötä. Esimerkiksi Yhdysvalloissa tuhlataan vuosittain yli 3 miljardia dollaria tarpeettoman valonkäytön vuoksi (Wang ym. 2023). Tarpeeton ja huonosti suunniteltu keinovalaistus lisää myös fossiilisen energian käyttöä, ja näin olleen aiheuttaa ilman saastumista ja maapallon lämpenemistä (Desouhant ym. 2018). Näihin lisääntyneen keinovalaistuksen mukana tulleisiin haittavaikutuksiin on kuitenkin havahduttu vasta viime vuosikymmeninä, ja toimet kyseisten haittojen ehkäisemiseksi ovat olleet rajallisia.

Työssämme tarkastelimme keinovalon vaikutuksia eri hyönteislajeihin kuten kiiltomatoihin, tulikärpäsiin, koiperhosiin, mehiläisiin ja kukkakärpäsiin. Yhteenvetona voimme todeta yöllisen keinovalon sotkevan hyönteisten luontaista käyttäytymistä useilla eri tavoilla. Keinovalolla on vaikutuksia muun muassa hyönteisten käyttäytymiseen, liikkumiseen, hajaantumiseen, elinkaareen, parinvalintaan ja lisääntymiseen (Hufnagel 2022 1–5). Vaikutukset ovat heikentäneet hyönteisten selviytymistä ja joissain tapauksissa myös osaltaan altistaneet lajeja uhanalaisuudelle. Keinovalolla on erilaisia vaikutuksia hyönteisiin, riippuen muun muassa sukupuolesta, lajin elinympäristöstä ja peto-saalis-suhteista. Osa hyönteislajeista on haavoittuvaisempia keinovalon vaikutuksille kuin toiset. (Owens & Lewis 2022.) Lisäksi peilasimme keinovalon vaikutuksia hyönteisten kautta laajemmin koko ekosysteemeihin. Keinovalosta aiheutuvat haitat hyönteisille häiritsevät ketjureaktiona kokonaisia ekosysteemejä, kun ne muuttavat eliöyhteisön rakenteita ja lajien vuorovaikutussuhteita.

Lisääntyneen keinovalon ja sen haittavaikutusten takia hyönteispopulaatiot ovat pienentyneet merkittävästi lyhyellä aikavälillä. Se on uhka elinympäristöllemme, sillä monet hyönteislajit ovat ekosysteemien avainlajeja. (Gullan & Cranston 2014, 2–6). Hyönteisten vähenemisen ja käyttäytymisen muutosten on tulevaisuudessa arvioitu vaikuttavan myös ihmisten ruuantuotantoon ja terveyteen. Hyönteisten yksi tärkeä tehtävä on kasvien pölyttäminen, ja sen vähenemisen vuoksi ravintomme vähenee ja yksipuolistuu. Myös luonnon kyky tunnistaa tuholaisia heikkenee, mistä voi tulevaisuudessa seurata terveyshaasteita. Myös erilaisten arbovirusten lisääntyminen on yksi mahdollinen haittavaikutus. (Grubisic & Grunsver 2021.)

Tutkimukset ovat osoittaneet hyönteisten olevan oiva tutkimuskohde, sillä hyönteisten kautta on myös mahdollista tarkastella miten keinovalaistus vaikuttaa kaikkiin eläviin organismeihin. Hyönteisillä on myös luontainen kyky reagoida valon kestoon ja aallonpituuteen. (Desouhant 2018.) Näitä tekijöitä tutkimalla voidaan saada tärkeää tietoa siitä, miten esimerkiksi LED valo vaikuttaa eliöihin, verrattuna muihin valolähteenmuotoihin. Tulosten perusteella voimme vaikuttaa sekä taloudellisesti, että lainsäädännön keinoin käyttämiimme valonlähteisiin. Tulevaisuudessa olisi tärkeää löytää ja käyttää valonlähdettä, joiden haittavaikutukset eliöstölle olisivat mahdollisimman pienet. Kehittyvällä tutkimuksella ja teknologialla on tässä luontoystävällisempien valonlähteiden kehittämisessä tärkeä rooli.

Keinovalon haittavaikutuksia käsittelevän tutkimuksen ja kirjallisuuden ohella olisi myös tärkeää kiinnittää huomiota siihen, miten haittavaikutuksia voidaan tulevaisuudessa ennaltaehkäistä ja lieventää. Kaupunkisuunnittelu on keskeisessä asemassa valosaasteen vähentämisessä. Desouhant ym. (2018) toteavat kaupunkiympäristöjen keinovalon ja julkisen järjestyksen olevan kytköksissä toisiinsa. Näin ollen keinovalaistus on oleellista ottaa huomioon jo suunnitteluvaiheessa.

Kaupunkisuunnittelussa tulisi kiinnittää erityistä huomiota valon aallonpituuteen, valaisuajan kestoon sekä valaisun lokaatioon ja kohdentamiseen. Esimerkiksi keinovaloaltistuksen ajallinen minimoiminen, liikevalotunnistimien hyödyntäminen, vain tärkeiden alueiden valaiseminen ja sellaisten valolähteiden käyttö, jotka pienentävät valon hajaantumista, ovat keskeisiä keinoja valosaasteen haittavaikutuksien ehkäisyssä. (Elgert ym. 2021.) Kivelä ym. (2023) huomasivat tutkimuksessaan myös valaistuksen aallonpituuden, eli sävyn vaikuttavan merkittävästi kiiltomatojen lisääntymiseen. Näin ollen sinertävän ja valkoisen keinovalon sijaan kaupunkiympäristössä tulisikin hyödyntää enenemissä määrin keltaiseen valoon pohjautuvaa valaistusta.

Keinovalon haittavaikutusten vähentämiseksi ehdotamme Grubisicia ja Grunsvenia (2021) mukaillen, että keinovalon käyttöä tulee rajata paikkoihin ja ajankohtiin, joissa sitä todellisuudessa tarvitaan. Lisäksi valaistusta suunniteltaessa tulee kiinnittää huomiota valon väriin ja suunnitellusti suosia aallonpituutta, joka on hyönteisille vähemmän haitallista. Nykyisen tutkimuksen valossa on tärkeää jatkaa valaistuksen kehitystä niin, että valosaasteesta kärsivät kaupunkiympäristöt takaavat niin valon värin, intensiteetin kuin kohdennuksenkin puolesta turvallisen elinympäristön hyönteisten olemassaololle (Lewis ym. 2024). Edellä mainittujen haittavaikutusten vuoksi ehdotamme valosaasteen rajaamista myös lainsäädännön keinoin. Valosaasteen hallinta ja vähentäminen hyödyttävät laaja-alaisesti hyönteisten elämää ja sen jatkuvuutta ja näin ollen takaavat laajemmin myös ekosysteemien toiminnan.

Vaikka valosaaste on yksi merkittävä syy hyönteisten häviämiseen, on hyönteiskannan vähenemisen taustalla myös muita tekijöitä. Näistä mainittakoon ilmastonmuutos, elinympäristöjen häviäminen, torjunta-aineiden käyttö ja vieraslajit. Kiinnittämällä huomiota näihin asioihin, voimme edesauttaa hyönteisiä ja elinympäristöämme selviytymisessä. Lisäksi Desouhantin ym. (2018) mukaan melusaaste on yksi hyönteiskannan vähenemistä aiheuttava tekijä. Asianmukaisella kaupunkisuunnittelulla pystytään vaikuttamaan valosaasteen lisäksi myös melutasoon.

Tulevaisuudessa on myös tärkeää huomioida valosaasteen hyönteiskatoa laajemmat haittavaikutukset. Valosaasteella on todettu hyönteisten lisäksi olevan haitallisia vaikutuksia useihin eri eliölajeihin, kaikilla biologisilla tasoilla aina molekyylitasolta laajemmin koko ekosysteemeihin. Tulevaisuudessa valosaaste myös todennäköisesti muuttaa lajien genetiikkaa. Tämä on mielenkiintoinen ja tärkeä tutkimusaihe, josta on kokemusperäistä tietoa vielä hyvin vähäisesti saatavilla. Olemme vasta alkaneet ymmärtämään erilaisia vaikutusprosesseja ja tarvitsemme jatkossakin lisää tutkimustietoa valosaasteen vaikutuksista ja erityisesti keinoista näiden haittavaikutuksien vähentämiseksi. (Eklöf 2021.) Valosaasteen vähentäminen on tärkeää, sillä pimeyttä suojaamalla voimme suojata myös luonnon monimuotoisuutta.

Lähteet

Desouhant, E., Gomes, E., Mondy, N. & Amat, I. (2019). Mechanistic, ecological, and evolutionary consequences of artificial light at night for insects: review and prospective. Entomologia Experimentalis et Applicata, 167(1), 37-58. DOI:10.1111.eea/12754

Dornelas, M. & Daskalova, G.M. (2020). Nuanced changes in insect abundance. Science. American Association for the Advancement of Science, 368(6489), 368-369. https://www.science.org/doi/pdf/10.1126/science.abb6861.

Eklöf, J. (2021). Maailman ilman pimeää. Atena.

Elgert, C., Lehtonen, T.K., Kaitala, A. & Candolin, U. (2021). The duration of artificial light defines sexual signalling in the common glow-worm. Behavioral Ecology and Sociobiology, 75, 1–8, https://doi.org/10.1007/s00265-021-03093-2.

Elgert, C. (2023). Can you see me? Sexual signalling in an artificially lit world. Faculty of Biological and Environmental Sciences University of Helsinki. [väitöskirja] Helsingin Yliopisto s. 3–23, http://urn.fi/URN:ISBN:978-951-51-8844-1.

Fabian, S.T., Sondhi, Y., Allen, P.E., Theobald, J.C. & Lin, H-T. (2024). Why flying insects gather at artificial light. Nature communications, 15 (1), 689–689, https://doi.org/10.1038/s41467-024-44785-3.

Grubisic, M., & van Grunsven, R. H. (2021). Artificial light at night disrupts species interactions and changes insect communities. Current Opinion in Insect Science, 47, 136–141, https://doi.org/10.1016/j.cois.2021.06.007.

Gullan, P.J. & Cranston, P.S. (2014). The insects: an outline of entomology. John Wiley & Sons.

Hufnagel, L. (Ed.) (2022). Light Pollution. Urbanization and Ecology. London: IntechOpen. http://dx.doi.org/10.5772/intechopen.99648.

Katabaro, J.M., Yan, Y., Hu, T., Yu, Q. & Cheng, X. (2022). A review of the effects of artificial light at night in urban areas on the ecosystem level and the remedial measures. Frontiers in Public Health, 10, 969945. https://doi.org/10.3389/fpubh.2022.969945.

Kivelä, L., Elgert, C., Lehtonen, T.K., & Candolin, U. (2023). The color of artificial light affects mate attraction in the common glow-worm. Science of the Total Environment, 857, 159451. http://dx.doi.org/10.1016/j.scitotenv.2022.159451.

Klink, R.V., Bowler, D.E., Gongalsky, Konstantin B., Swengel, A.B. & Chase. & J.M. (2020). Meta-analysis reveals declines in terrestrial but increases in freshwater insect abundances. Science (American Association for the Advancement of Science), 370 (6523), 417–420. https://www.science.org/doi/10.1126/science.aax9931.

Lewis, S.M., Wong, C.H., Owens, A.C., Fallon, C., Jepsen, S., Thancharoen, A., ... & Reed, J.M. (2020). A global perspective on firefly extinction threats. BioScience, 70(2), 157–167, https://doi.org/10.1093/biosci/biaa026.

Lyytimäki, J. & Rinne, J. (2013) Valon varjopuolet – Valosaaste ympäristöongelmana. Gaudeamus. s. 115–116.

Minnaar, C., Boyles, J.G., Minnaar, I.A., Sole, C.L., & McKechnie, A.E. (2015). Stacking the odds: light pollution may shift the balance in an ancient predator–prey arms race. Journal of applied ecology, 52(2), 522–531. https://doi.org/10.1111/1365-2664.12381

Powney, G.D., Carvell, C., Edwards, M., Morris, R.K.A., Roy, H.E., Woodcock, B.A. & Isaac, N.J.B. (2019). Widespread losses of pollinating insects in Britain. Nature communications, 10(1), 1018–1018. https://doi.org/10.1038/s41467-019-08974-9.

Owens, A.C. & Lewis, S.M. (2018). The impact of artificial light at night on nocturnal insects: a review and synthesis. Ecology and evolution, 8(22), 11337–11358.

Owens, A.C., Cochard, P., Durrant, J., Farnworth, B., Perkin, E.K., & Seymoure, B. (2020). Light pollution is a driver of insect declines. Biological Conservation, 241, 108259. https://doi.org/10.1016/j.biocon.2019.108259.

Powney, G.D., Carvell, C., Edwards, M., Morris, R.K.A., Roy, H.E., Woodcock, B.A. & Isaac, N.J.B. (2019). Widespread losses of pollinating insects in Britain. Nature communications, 10(1), 1018–1018. https://doi.org/10.1038/s41467-019-08974-9.

Wang, Y. (2020). Terrestrial Ecosystems and Biodiversity, Second edition, 1. Milton: CRC Press. https://doi.org/10.1201/9780429445651.

Wang, T., Kaida, N. & Kaida, K. (2023). Effects of outdoor artificial light at night on human health and behavior: A literature review. Environmental Pollution 323(2023) 121321.

TUTU1 Tulevaisuusajattelu ja skenaariot

Tulevaisuusajattelu ja skenaariot (5 op) -opintojakso tarjoaa perustietoa tulevaisuusajattelusta ja ennakoivasta asenteesta. Opintojaksolla tutustutaan tulevaisuudentutkimuksen keskeisiin käsitteisiin ja tulevaisuusajatteluun. Lisäksi opetellaan skenaariotyöskentelyä. Opintojakson suoritettuaan opiskelija tunnistaa ja osaa nimetä oppiaineen keskeiset toimijat, tulevaisuudentutkimuksen keskeiset kansalliset ja kansainväliset yhteisöt ja hyödyntää niiden tuottamaan materiaalia kurssin tulevaisuustyöskentelyssä. Opiskelija ymmärtää tulevaisuustiedon luonteen ja sen, miten tulevaisuudesta saadaan tietoa. Harjoitustyön hyväksytysti suoritettuaan opiskelija osaa soveltaa skenaarioajattelua ja tulevaisuustaulukkomenetelmää tulevaisuuden vaihtoehtojen hahmottamiseen ja pystyy arvioimaan kehitystrendejä.

Tähän julkaisuun valitun kurssityön on arvioinut Tulevaisuudentutkimuksen Verkostoakatemian opettaja Tampereen yliopistossa, lehtori **Markus Pöllänen**.

Tampereen yliopiston TUTU1-opintojakson (Tulevaisuusajattelu ja skenaariot) toteutuksessa oli keväällä 2025 erityispiirteenä ryhmien tekemän tulevaisuusraportin kytkeminen Pirkanmaan tulevaisuustarkasteluun, joka julkaistiin helmikuussa 2025. Opintojakson ensimmäisessä oppimistapahtumassa Pirkanmaan liiton strategiajohtaja **Jari Kolehmainen** kävi esittelemässä tuolloin vielä julkaisemattoman raportin keskeisiä asioita ja viimeisessä tapahtumassa eli esitysseminaarissa Kolehmainen oli mukana kuulijana ja kommentaattorina. Opiskelijoiden ryhmissä tekemiin tulevaisuusraportteihin annettiin lähtökohdaksi kytkeytyminen em. tulevaisuustarkasteluun ja siinä esitettyihin skenaarioihin, mutta kytkeytymisen tapa jätettiin ryhmien päätettäväksi. Käytännössä kaikissa ryhmissä kytkös näkyi mm. maantieteellisen rajautumisena joko Pirkanmaan tai erityisesti tamperelaiseen näkökulmaan. Tähän julkaisuun valitussa, **Pasi Aallon, Aino Kieksin, Marco Rothin** ja **Matleena Töllin**, tulevaisuusraportissa Pirkanmaan tulevaisuustarkastelu toimi pohjana, josta on tarkemmin keskitytty tarkastelemaan Pirkanmaan pelastustoiminnan kehitystä vuoteen 2050 erityisesti tekoälyn hyödyntämisen näkökulmasta.

Työn johdannossa kuvataan kytkeytyminen Pirkanmaan tulevaisuustarkasteluun ja esitellään lyhyesti taustaksi työn keskeiset teemat eli Pirkanmaan pelastustoiminta ja tekoäly määritelmineen sekä työn toteutus. Johdannossa tuodaan myös hyvin esille tämän työn lisäarvo ja ajankohtaisuus sekä kuvataan työn hyödynnettävyyttä.

Työn tavoitteet ja tutkimuskysymykset on määritelty selkeästi. Työn prosessi on kuvattu hyvin, ja tulevaisuustyön kannalta relevantteja käsitteitä on määritelty lähteitä hyödyntäen. Kirjallisten aineistojen lisäksi työssä on hyödynnetty haastattelua, mikä on työn kannalta iso ansio. Ryhmä ei kuitenkaan raportoi tarkemmin esimerkiksi haastattelukysymyksiä tai henkilötiedon käsittelyä. Tekoälyn hyödyntämisen kuvaus (esimerkiksi käytetyt kehotteet) olisi voinut myös olla läpinäkyvämpää. Tekoälyn käyttö on kuitenkin ollut hallittua, kuten raportissa kuvataan ”sisältö pysyy kirjoittajatiimin käsissä, eikä tekoäly muodosta raportin päälinjauksia”.

Työssä on hyvin yhdistetty toimintaympäristön analyysin ja PESTE-tarkastelun ja tulevaisuustaulukon muuttujien kuvausta. PESTE-taulukkoa, jonka ryhmä teki työn aikana, ei esitetä työn osana, mutta se olisi voinut olla mukana esimerkiksi liitteenä. Tulevaisuustaulukon muuttujiin on kytketty hyvin lähdekirjallisuutta. Tulevaisuustaulukko on erittäin kompakti ja siihen on saatu kiteytettyä hyvin sekä muuttujat että niiden arvot, jotka ovat toistensa poissulkevia.

Tulevaisuuskuvien muodostaminen ja perusteet, miksi päädyttiin muodostamaan tulevaisuuskuvat valitulla tavalla, on kuvattu erittäin hyvin. Skenaariossa on puolestaan esitetty kiinnostavat tarinat, ja niissä näkyy selvästi erottuva ajallinen kehityskulku. Polkujen esittäminen visuaalisemmin liitteessä 1 on oiva ratkaisu.

Päätelmät on erittäin kypsästi muotoiltu ja esitetty eri näkökulmia tarkastellen. Päätelmät tuovat esille paitsi oppimista prosessissa, myös tulosten hyödyntämistä ja sitä, mitä jatkoa ajatellen nousee esille.

Työ on kokonaisuutena hyvin viimeistelty ja kirjoitettu. Hyödynnetyt lähteet ovat korkeatasoisia. Raportti tarjoaa kokonaisuudessaan antoisan lukuelämyksen paitsi TUTU1-kurssilla opetettavaan tulevaisuustaulukkomenetelmän soveltamisiin skenaarioprosessissa, myös substanssiteeman – tekoälyn käyttö pelastustoiminnassa – tulevaisuuksiin.

Skenaarioita Pirkanmaan tekoälyavusteisesta pelastustoiminnasta vuoteen 2050

Pasi Aalto, Aino Kieksi, Marco Roth & Matleena Tölli

Tampereen yliopisto

Tiivistelmä

Tämä raportti tarkastelee tekoälyn hyödyntämistä Pirkanmaan hyvinvointialueen pelastustoiminnan palveluissa vuonna 2050. Raportin tavoitteena on tuottaa tulevaisuuslähtöistä tietoa pelastustoiminnan palveluiden kehittämiseksi nopeasti muuttuvassa teknologisessa ja yhteiskunnallisessa toimintaympäristössä. Pelastustoimen historiallinen kehitys ja nykytila Pirkanmaalla toimivat kehyslähtökohtana, johon tekoälyn mukanaan tuomat muutokset suhteutetaan. Tutkimusongelma kiteytyy kysymykseen siitä, miten tekoäly voi tukea, muovata tai mahdollisesti vaarantaa pelastustoimintaa erilaisissa tulevaisuusnäkökulmissa vuoteen 2050 mennessä.

Tutkimus ankkuroituu tulevaisuudentutkimuksen teoreettiseen viitekehykseen, jossa keskeisenä menetelmänä hyödynnettiin morfologista skenaariotyöskentelyä. PESTE-luokittelun avulla tunnistettiin skenaarioaiheeseen liittyviä oleellisia ilmiöitä ja niiden muutoksia. Tulevaisuustaulukon avulla rajattiin puolestaan aiheen kannalta kaikkein keskeisimmät ilmiöt ja tunnistettiin niihin liittyvät vaihtoehtoiset kehitysvaihtoehdot. Näistä muodostettiin neljä toisistaan erottuvaa tulevaisuuskuvaa ja skenaariota vuodelle 2050. Menetelmäpainotus suunniteltiin tukemaan päätöksentekoa siten, että mahdolliset kehityskulut, resurssitarpeet ja strategiset linjaukset voidaan hahmottaa erilaisten tulevaisuuksien valossa.

Teknologiariippuvaisessa pelastustoiminnassa tiukka sääntely, väestön matala luottamus pelastustoimintaa kohtaan ja teknologiaintensiivinen osaaminen luovat tehokkaiksi koettuja, mutta kalliita ja mahdollisesti eriarvoisuutta lisääviä ratkaisuja. *Ihmisestä riippumattomassa pelastustoiminnassa* täysin autonomiset järjestelmät yhdistyvät laajaan sallivaan sääntelyyn ja väestön korkeaan luottamukseen, mikä vapauttaa pelastustoimen lähes kokonaan inhimillisestä työvoimasta ja mahdollistaa kehittyneen resurssienhallinnan. *Pelastustoiminta kaaoksen ja epäluottamuksen varjossa* rakentuu pirstaleisesta sääntelystä, korkeista teknologian kustannuksista ja matalasta luottamuksesta, jolloin AI-sovellusten käyttöönotto vaikeutuu ja ilmastonmuutoksen voimistuvat vaikutukset kuormittavat pelastustoimea. *Pelastustoiminta osana mukautuvaa ekosysteemiä* korostaa puolestaan paikallista sopeutumista, hybridiosaamista ja yhteisöllisyyttä, jolloin AI toimii vain osittain hyödynnettynä tukijärjestelmänä ilmastonmuutoksen ohjatessa kokonaisuutta.

Tutkimuksen keskeiset päätelmät osoittavat, että AI-sääntely ja luottamus viranomaisiin, henkilöstön osaamisvaatimukset, teknologian saatavuus sekä ilmastonmuutoksen tuomat haasteet vaikuttavat merkittävästi pelastustoimen kehitykseen. Toimiva sääntely ja korkea luottamus tukevat tehokasta AI-integraatiota, kun taas epäselvä lainsäädäntö ja matala luottamus voivat hidastaa sen käyttöönottoa. Henkilöstö tarvitsee riittäviä data- ja teknologiaosaamisen valmiuksia, mutta samalla on huolehdittava fyysisistä ja inhimillisistä pelastustaidoista. Teknologian saatavuushaasteet voivat lisätä eriarvoisuutta, sillä kalliit ja kehittyneet ratkaisut eivät ole kaikkien ulottuvilla. Ilmastonmuutos kyseenalaistaa perinteisen reaktiivisen toimintamallin ja korostaa ennakointia sekä vastuullisesti toteutettuja AI-ratkaisuja. Johdonmukainen sääntely, luottamusta vahvistava hallinto ja laaja-alainen osaaminen luovat perustan AI:n onnistuneelle integroinnille pelastustoimintaan. Strateginen ennakointi ja riskienhallinta korostuvat ilmastonmuutoksen edetessä, ja moniammatillinen koulutus on välttämätöntä sekä teknisten että inhimillisten valmiuksien vahvistamiseksi. Kansalaisten luottamuksen rakentaminen edellyttää avointa ja eettistä AI-viestintää.

Alkusanat

Tämä tulevaisuusraportti on toteutettu osana Tulevaisuusajattelu ja skenaariot -kurssia keväällä 2025 ja sen tavoitteena on luoda katsaus tekoälyn hyödyntämisestä Pirkanmaan hyvinvointialueen pelastustoiminnassa vuoteen 2050 mennessä. Aihe on ajankohtainen, sillä tekoäly on nopeasti kehittyvä teknologia, joka tarjoaa merkittäviä mahdollisuuksia julkisten palveluiden tehostamiseen ja kehittämiseen.

Raportissa keskitytään erityisesti Pirkanmaan pelastustoimintaan, jonka kautta tarkastelemme, millä eri tavoilla tekoäly voi tukea ja parantaa toimintaa tulevaisuudessa. Tarkastelun taustalla on laaja-alainen tulevaisuusanalyysi, jonka keskeisiä työkaluja ovat PESTE-analyysi, (Dufva, 2022), sekä tulevaisuustaulukko. Näiden työkalujen avulla olemme muodostaneet skenaarioita ja tulevaisuuskuvia, jotka voivat toimia lähtökohtana päätöksenteolle ja strategiselle suunnittelulle Pirkanmaan hyvinvointialueella.

Raportti tarjoaa kattavan näkemyksen tekoälyn mahdollisuuksista Pirkanmaan pelastustoimessa, mukaan lukien sen vaikutukset pelastushenkilöstön osaamistarpeisiin, riskienhallintaan ja päätöksenteon tueksi. Tavoitteena on tuoda esiin sekä mahdollisuuksia että haasteita, joita tekoälyn hyödyntäminen saattaa tuoda mukanaan.

Haluamme kiittää Pirkanmaan pelastusjohtaja Teemu-Taavetti Toivosta, jonka asiantuntevat näkemykset ja haastattelussa esiin tuomat oivallukset auttoivat meitä paremmin hahmottamaan pelastustoiminnan tulevaisuuden kehityssuuntia. Hänen panoksensa oli raportin laatimisessa erityisen arvokas.

Johdanto

Tässä tulevaisuusraportissa tarkastelemme Pirkanmaan pelastustoiminnan kehitystä vuoteen 2050 saakka, erityisesti tekoälyyn (AI) ja sen hyödyntämiseen kytkeytyvien uusien mahdollisuuksien ja haasteiden näkökulmasta. Tekoäly on megatrendi (Andronikidis ym., 2025) - laajojen, pitkäkestoisten ja globaalisti vaikuttavien kehityskulkujen kokonaisuus (Naisbitt, 1982; Dufva, 2022), jonka vaikutusten ymmärtäminen on keskeistä, kun haluamme ymmärtää, mihin suuntaan yhteiskunta ja julkiset palvelut, kuten pelastustoiminta, ovat menossa.

Tämä työ pohjautuu Pirkanmaan liiton, Pirkanmaan hyvinvointialueen, Tampereen kaupungin ja Tampereen kaupunkiseudun yhdessä toteuttamaan Pirkanmaan tulevaisuustarkasteluun, jossa luotiin neljä ulkoisen toimintaympäristön skenaariota vuoteen 2040. Näissä skenaarioissa tuodaan esiin Pirkanmaata koskevia keskeisiä muutostekijöitä ja niiden mahdollisia kehityskulkuja. Tulevaisuustarkastelussa tekoäly nousee esille erityisesti teknologisen kehityksen ja julkisten palveluiden uudistamisen yhteydessä. Tässä työssä syvennämme näiden yleisten skenaarioiden tarkastelua analysoimalla tekoälyn hyödyntämismahdollisuuksia Pirkanmaan pelastustoiminnassa. Näin jatkamme Pirkanmaan tulevaisuustarkastelussa aloitettua skenaariotyötä ja kohdistamme sen konkreettisesti pelastustoimen näkökulmaan, jotta voimme tuottaa lisäarvoa Pirkanmaan pelastuspalveluiden suunnitteluun ja strategiseen varautumiseen.

Vaikka Suomessa on toteutettu pelastustoimen ennakointia ja skenaariotyötä eri yhteyksissä (Kaukonen, 2008; Ruokonen ym., 2021; Virtanen ym., 2022), näissä tarkasteluissa tekoälyn erityistä roolia pelastustoimen tulevaisuudessa on käsitelty vain rajallisesti. Erityisesti Pirkanmaan näkökulmasta puuttuu yksityiskohtainen skenaarioanalyysi, joka kytkisi AI-teknologian kehityksen ja pelastustoimen tarpeet laajempaan hyvinvointialuetta koskevaan tulevaisuuskeskusteluun. Tämä työ täyttää tämän tutkimusaukon keskittymällä AI-ratkaisujen hyödyntämiseen Pirkanmaan pelastustoiminnassa vuoteen 2050 mennessä, tarjoten uusia näkökulmia varautumiseen ja strategiseen suunnitteluun.

Lähdimme rakentamaan työtä ideoimalla kiinnostavia aiheita. Työn edetessä rajasimme teemaa laajemmasta Pirkanmaan julkisten palvelujen tarkastelusta ensiksi hyvinvointialueen pelastuspalveluihin ja lopulta pelastustoiminnan palveluihin, koska se tarjoaa kiinnostavia ja konkreettisia sovelluskohteita tekoälyn hyödyntämiselle.

Pirkanmaan pelastustoiminta – historiasta nykypäivään

Pirkanmaan pelastustoiminta (kuva 1) on kehittynyt vuosikymmenten saatossa pienimuotoisista, vapaaehtoisuuteen nojaavista palokunnista kohti keskitetysti johdettua julkista palvelua, jonka ytimessä ovat operatiiviset pelastustehtävät. Viimeisen 126 vuoden aikana Tampereen palokunta on muuttunut yhden kunnan palolaitoksesta 34 kunnan laajuiseksi Pirkanmaan pelastuslaitokseksi. Varhaisina vuosikymmeninä toimintaa rajoittivat yksittäisten palokuntien rajalliset voimavarat, mutta asteittainen ohjauksen, resursoinnin ja valmiuden kehittyminen on tehnyt pelastustoiminnasta ammattimaista. Tänä päivänä pelastustoiminta perustuu vahvaan lainsäädännölliseen ja hallinnolliseen pohjaan, jota Suomessa ohjaa sisäministeriö (Pelastustoimi, 2023; Toivonen, 2025).

Vuoden 2023 alusta lähtien pelastuspalvelut ovat olleet osa hyvinvointialuetta, mikä on lisännyt alueellista koordinaatiota ja mahdollistanut kattavamman varautumisen monimutkaisiin uhkiin. Pirkanmaalla pelastustoimen tehtäviä on vuosittain n. 9 200, alueella toimii 63 paloasemaa, joista 16 päivystää ympäri vuorokauden. Näin pyritään turvaamaan riittävä hälytysvalmius maakunnan eri osissa. Operatiivinen pelastustoiminta hoitaa akuutit onnettomuustilanteet ja vastaa esimerkiksi rakennuspalojen, liikenneonnettomuuksien ja vaarallisten aineiden onnettomuuksien torjunnasta. Työ sisältää tilannekuvan jatkuvan arvioinnin sekä tilanne- ja johtokeskuksen ohjaustoimet, joiden avulla varmistetaan tehokas reagointi hätätilanteissa (Toivonen, 2025; Pirkanmaan pelastus- ja ensihoitopalvelut, 2025).

Kuva 1. *Pirkanmaan pelastuspalvelut 2025, pelastustoiminnan palvelut korostettuna.*

Tekoäly

Tekoäly (AI) määritellään usein digitaalisten tietokoneiden tai tietokoneohjattujen robottien kyvyksi suorittaa tehtäviä, joita perinteisesti pidetään ihmisen älykkyyttä vaativina, kuten loogista päättelyä, merkitysten havaitsemista, yleistämistä sekä kokemuksista oppimista (Zhang ym., 2023; Copeland, 2025). Tiukimmissa määritelmissä käsite edustaa tietokoneiden imitaatiota ihmiselle ominaisesta älykkyydestä (Sheikh ym. 2023). Tässä raportissa tekoäly käsitetään koneiden kyvyksi matkia ihmisen älykkyyttä suorittamalla tehtäviä, jotka vaativat oppimista, päättelyä ja ongelmanratkaisua, perustuen usein koneoppimiseen, jonka avulla algoritmit analysoivat suuria tietomääriä, tunnistavat kaavoja ja automatisoivat monimutkaisia tehtäviä (vrt. Zhang ym., 2023; Christou, 2023). Tekoälyyn liittyvät teknologiat ja algoritmien kirjo on hyvin laaja eikä niitä pyritä tässä työssä sen laajemmin määrittelemään. Sen sijaan keskitymme käsittelemään

yleisimmin kapeaksi tekoälyksi miellettyjä sovelluksia sekä niiden määritelmiä (vrt. Christou, 2023). Skenaariotarinoissa osa esimerkeistä saattaa sisältää teknologiaa, jota ei vielä ole olemassa tai ole määritelty sen syvällisemmin tässä raportissa.

Koneoppiminen (Machine Learning, ML) on yksi keskeinen tekoälyn toteutustapa, jossa algoritmi oppii tunnistamaan säännönmukaisuuksia annetun aineiston (alkutilanteen ja halutun lopputuloksen) perusteella ihmisen oppimista imitoivilla tavoilla (Kämäräinen, 2023). Tässä yhteydessä huomioidaan myös laajat kielimallit (Large Language Models, LLM), jotka yhdistävät koneoppimisen ja luonnollisen kielen käsittelyn tilastollisen mallinnuksen keinoin ja mahdollistavat esimerkiksi seuraavan sanan tai tavun ennustamisen tekstissä (Nafar ym., 2024). Asiantuntijajärjestelmät (Expert Systems, ES) tekoälyn kontekstissa kuvaavat tietokonejärjestelmiä, jotka emuloivat syvästi erikoistuneen ihmisen päätöksentekokykyä. Ne on tyypillisesti jaettu tietokantaan, joka sisältää faktoja ja sääntöjä, sekä päättelymoottorin, joka soveltaa niitä uuden tiedon päättelyyn (Jackson, 1999).

Tutkimuksen tavoite ja tutkimusongelma

Tämän skenaariotyön päätavoitteena on kuvailla ja analysoida sitä, millä tavoin tekoälyä voisi hyödyntää Pirkanmaan hyvinvointialueen pelastustoiminnassa vuonna 2050. Keskeisenä pyrkimyksenä on tuottaa tulevaisuuslähtöistä tietoa niistä muutosvoimista, jotka muovaavat pelastustoimen toimintaympäristöä tulevina vuosikymmeninä. Tällä on erityistä merkitystä varautumiselle ja päätöksenteolle, sillä tekoälyn kehitys, AI-sääntelyn tiukkuus tai sallivuus, kansalaisten luottamus viranomaisiin, henkilöstön osaamistarpeiden muutokset sekä ilmastonmuutoksen edellyttämä sopeutuminen voivat kukin luoda merkittäviä epävarmuustekijöitä ja toisaalta avata uusia mahdollisuuksia pelastustoimen strategisessa suunnittelussa.

Näiden muutostekijöiden pohjalta on muotoiltu seuraavat tutkimuskysymykset:

Päätutkimuskysymys:

- Millä tavoin tekoälyä hyödynnetään Pirkanmaan hyvinvointialueen pelastustoiminnassa vuonna 2050?

Alatutkimuskysymykset:

- Miten tekoälyn sääntely ja kansalaisten luottamus viranomaisiin vaikuttavat AI-ratkaisujen käyttöönottoon pelastustoiminnassa?
- Miten henkilöstön osaamistarpeet muuttuvat tekoälyratkaisujen käyttöönoton myötä?
- Miten tekoälyn autonomian aste ja AI-teknologian saatavuus vaikuttavat pelastustoimintaan ja sen tehokkuuteen?
- Miten ilmastonmuutos heijastuu AI:n käyttöön pelastustoimessa?

Kysymyksiin vastaamalla pyrimme luomaan kattavan skenaariokehikon, joka auttaa tunnistamaan pelastustoiminnan kannalta merkittävät kehityslinjat sekä arvioimaan niiden vaikutuksia varautumiseen ja päätöksentekoon. Näin skenaariotyö tarjoaa konkreettisen työkalun Pirkanmaan hyvinvointialueen pelastustoimen strategiseen suunnitteluun ja edesauttaa erilaisiin tulevaisuuksiin varautumista.

Tutkimuksen metodologia ja tutkimusprosessi

Skenaariotyön päämenetelmäksi valikoitui morfologinen skenaariomenetelmä. Menetelmä perustuu erilaisten epävarmuuksien ja niistä nousevien vaihtoehtoisten kehityskulkujen systemaattiseen jäsentämi-

seen ja se mahdollistaa näin selkeästi erottuvien tulevaisuuskuvien rakentamisen. Tässä yhteydessä tulevaisuuskuva ymmärretään yhden mahdollisen, mutta vielä kehityspoluista irrotetun “pysäytyskuvan” tiivistymäksi, kun taas skenaario muodostuu siitä, että samaiselle pysäytyskuvalle kirjoitetaan ajallisesti johdonmukainen kulkureitti (Lätti ym., 2022). Lisäksi hyödynsimme useita muita tulevaisuudentutkimuksen menetelmiä prosessin aikana. Aluksi toteutimme laajahkon kirjallisuuskatsauksen saadaksemme monipuolisen kuvan pelastustoiminnan toimintaympäristön muutosvoimista ja AI-teknologian kehitysnäkymistä sekä tunnistaaksemme ilmiön ympärillä olevia tutkimusaukkoja (Snyder, 2019). Hyödynsimme lisäksi myös PESTE-analyysia, joka ohjasi aihealueiden systemaattista kartoittamista ja auttoi tunnistamaan temaattiset osa-alueet, joista valitsimme keskeiset epävarmuudet morfologista tulevaisuustaulukkoa varten. Tulevaisuustaulukko on taulukkomuotoinen menetelmä, jolla tunnistetaan tutkimuskohteen tärkeimmät epävarmuudet (muuttujat) ja niille vaihtoehtoiset toteutumistavat (arvot) (Lätti ym., 2022).

Systeemiajattelulla (Richmond, 1994; Senge, 1990) on tärkeä rooli näitä menetelmiä yhdistävänä kehikkona, sillä se ohjaa havaitsemaan, miten morfologisessa skenaariomenetelmässä tunnistetut epävarmuudet ovat vuorovaikutuksessa laajemmassa kokonaisuudessa. Systeemiajattelu kannustaa tarkastelemaan ilmiötä dynaamisena verkostona, jossa eri muutostekijät vaikuttavat toisiinsa jatkuvasti (O’Riordan & Hampden-Turner, 2025). Näin varmistetaan, ettei yksittäistä epävarmuutta arvioida erillisenä tekijänä, vaan suhteessa muihin muutostekijöihin, mikä parantaa skenaariotyön syvyyttä ja luotettavuutta.

Työtämme tuki myös Pirkanmaan pelastusjohtajan 1,5 h puolistrukturoitu haastattelu (Toivonen, 2025), jonka aikana käytiin läpi toimintaympäristön muutostekijät, AI-hankkeet ja kriittiset osaamistarpeet. Haastattelu video- ja äänitallennettiin sekä litteroitiin haastateltavan luvalla. Haastattelun analyysissa käytettiin teema-poimintaa (Bell, 1997) ja tulokset trianguloitiin kirjallisuuskatsauksen löydösten kanssa. Näin haastattelu toimi sekä tiedon täydennyksenä että tosielämän havaintoihin ja kokemuksiin ankkuroituna aineistona skenaariotyössä (kts. Bell, 1997). Haastattelun avulla saimme arvokasta tietoa pelastustoiminnan nykytilasta ja syvensimme näkemyksiämme oleellisista muutostekijöistä ja ennakointitarpeista. Lisäksi skenaarioiden kirjoittamisessa hyödynsimme tarinallistamista (Masini, 1994), jotta tulevaisuuskuvat saatiin kiteytettyä ymmärrettäviksi ja vertailukelpoisiksi kokonaisuuksiksi. Raportin aineistonkäsittelyssä ja tekstin rakentamisessa käytimme tekoälysovelluksia avustavina työkaluina. Tekoälyn avulla tiivistimme haastattelusta ja kirjallisuudesta kertynyttä aineistoa, mutta varmistimme inhimillisen harkinnan säilymisen ensisijaisena: tekoälyjalosteiset tekstiosuudet käytiin aina kriittisesti läpi ja sovitettiin työryhmän omaan käsitteelliseen ja teoreettiseen kehikkoon (van Dis ym., 2023).

Tutkimusprosessi eteni vaiheittain kohti skenaarioita ja raportin johtopäätöksiä (kuva 2). Työmme alussa keskityimme *aiheen, tavoitteen ja tutkimuskysymysten* täsmentämiseen. Halusimme selvittää, miten tekoälyä voitaisiin käyttää Pirkanmaan pelastustoiminnassa vuoteen 2050 mennessä. Aikaperspektiiviksi valitsimme vuoden 2050, ja maantieteelliseksi rajaukseksi Pirkanmaan, tarkastellen pelastustoiminnan organisaationäkökulmaa. Tämän jälkeen toteutimme toimintaympäristöanalyysin PESTE-analyysin avulla. PESTE-analyysi on menetelmä, jonka avulla voidaan muodostaa kokonaiskuva organisaation tai ilmiön tulevaisuuteen vaikuttavista poliittisista/regulatiivisista, taloudellisista, sosiaalisista, teknologisista ja ekologisista muutostekijöistä sekä näiden osa-alueiden megatrendeistä, trendeistä, epävarmuuksista, heikoista signaaleista ja villeistä korteista (Dufva, 2022; Lätti ym., 2022). Megatrendit ovat laajoja, pitkäkestoisia ja globaalisti vaikuttavia kehityskulkujen kokonaisuuksia, jotka usein muokkaavat toimintaympäristöä pysyvästi (Dufva, 2022; Naughtin ym., 2024). *Trendit* ovat säännönmukainen kehityssuunta tai ilmiö, joka etenee tiettyyn suuntaan ja joka voi jatkua tulevaisuudessa tavalla, joka on suhteellisen helppo ennakoida (Rubin, 2004; Lätti ym., 2022). *Epävarmuudet* ovat muutostekijöitä, joiden tarkkaa suuntaa tai lopputulosta ei pystytä määrittämään (Lätti ym., 2022). *Heikot signaalit* ovat ensimmäisiä merkkejä orastavasta muutoksesta, joka ei vielä ole vakiintunut trendiksi. Ne haastavat vallitsevia oletuksia, ja niiden tulevaisuuden merkitys voi kasvaa suureksi, jos signaali voimistuu tai yhdistyy muihin nouseviin ilmiöihin (Ansoff, 1975; Lätti ym., 2022). *Villit kortit* ovat yllättäviä, epätodennäköisinä pidettyjä, mutta vaikutuksiltaan erittäin merkittäviä tapahtumia, jotka voivat hetkessä mullistaa ennakoidut kehityskulut (Lätti ym., 2022).

Kuva 2. *Tutkimusprosessin eteneminen.*

Kokosimme kuusi tärkeintä epävarmuutta sisältävää muutostekijää morfologiseen tulevaisuustaulukkoon. Valitsemalla jokaiselle muuttujalle yhden kehitysvaihtoehdon rakensimme neljä *tulevaisuuskuvaa* tekoälyn hyödyntämismahdollisuuksista pelastustoiminnassa Pirkanmaalla; pysäytyskuvia valituista tulevaisuuden hetkistä, jotka tiivistävät keskeiset epävarmuudet ja kehitysvaihtoehdot yhdeksi loogiseksi näkymäksi siitä, millainen maailma voisi olla tiettynä vuonna (Lätti ym., 2022). Lopuksi rakensimme neljä *skenaariota*, kun liitimme tulevaisuuskuviin loogiset ja tarinalliset kehityspolut, jotka kuvaavat, miten ja miksi nykyhetkestä voidaan päätyä kyseiseen tulevaisuuskuvan tilaan (Lätti ym., 2022). J*ohtopäätöksissä* tiivistimme skenaariotyöstä keskeiset päätelmät, arvioimme tavoitteiden saavuttamista ja skenaariotyön hyötyjä päätöksentekoon sekä reflektoimme ryhmämme saamia oppeja ja listasimme tehtäviä, joihin päätöksentekijöiden on ryhdyttävä riippumatta siitä, minkä skenaarion suuntaan tulevaisuus on etenemässä.

Tekoälyn hyödyntäminen tulevaisuusraportissa

Tekoäly on alusta asti ollut vahvasti osa työskentelyämme tulevaisuusraportin parissa; aiheemme tekoälyn hyödyntämisestä tulevaisuudessa tarjosi mahdollisuuden hyödyntää tekoälyä monipuolisesti useissa prosessin vaiheissa. Tässä työssä käytimme apuna ChatGPT:tä sekä Leonardo Ai:ta. Raportin alkuvaiheissa hyödynsimme tekoälyä ensisijaisesti helpottaaksemme omaa työtämme: laaja haastatteluaineisto muunnettiin tiiviiksi tekstiksi, joka oli helpompi hahmottaa. Tullessamme työssämme tulevaisuuskuviin ja skenaarioihin mietimme, kuinka tekoälyä voisi hyödyntää vielä syvemmin. Oli kuitenkin huomioitava, että raportin sisältö pysyy kirjoittajatiimin käsissä, eikä tekoäly muodosta raportin päälinjauksia. Lisäsimme skenaarioihimme tarinallisuutta hyödyntäen tekoälyä muun muassa sanavalintojen ja rakenteen muokkaamiseksi.

Päätimme myös antaa yhden tulevaisuuskuvan muodostamisen tekoälyn tehtäväksi: syötimme ohjelmalle tulevaisuustaulukkomme ja annoimme kontekstiksi “Pirkanmaa vuonna 2050”. Lisäksi luodaksemme tulevaisuuskuvistamme mahdollisimman monipuolisia, valitsimme kaksi arvoa, joiden pohjalta tulevaisuuskuva muodostettiin. Muodostettujen skenaariotarinoiden pohjalta luotiin tekoälyä hyödyntäen myös keinotekoista kuvitusta elävöittämään liitteen 1 graafia. Kuvituksen luomisen prosessissa ChatGPT ohjattiin luomaan tiivis syöte kuvagenerointia varten kunkin skenaariotarinan pohjalta. Luotu syöte korjattiin vastaamaan lähdetarinaa ja annettiin Leonardo Ai -kuvageneraattorille visuaalista toteutusta varten.

Skenaariotyön taustaoletukset

Olemme määrittäneet oletukset, jotka pysyvät samoina kaikissa tarkastelluissa tulevaisuudenkuvissa. Niiden tehtävänä on rajata skenaarioiden ulkopuolelle sellaisia muutostekijöitä, joiden ei lähtökohtaisesti oleteta merkittävästi heilahtelevan tarkasteluajanjaksolla.

1. Pelastustoiminta säilyy keskeisenä julkisen sektorin palveluna
Yhteiskunta ja sen instituutiot säilyvät riittävän vakaina, joten julkisesti ohjattu pelastuslaitos toimii jatkossakin merkittävänä turvallisuuden tuottajana Pirkanmaalla (ks Sisäministeriö, 2018).

2. Monimuotoiset turvallisuushaasteet lisääntyvät
Ilmastonmuutos, kaupungistuminen, sään ääri-ilmiöt ja muut riskit kasvattavat pelastustoiminnan tarvetta ja monimutkaisuutta, lisäten motivaatiota kehittää ja hyödyntää AI-teknologiaa (Valtioneuvosto, 2021).

3. Globaali data- ja alustatalous vaikuttaa AI-teknologian saatavuuteen
Tekoälyratkaisut ovat osin kansainvälisten alustatoimijoiden ja avoimen lähdekoodin kehittäjien varassa, mutta paikallisilla toimijoilla on useita hankinta- ja yhteistyövaihtoehtoja (Comunale, & Manera, 2024).

4. Geopoliittiset konfliktit eivät vaikuta merkittävästi pelastustoimintaan
Mahdollisista ulkoisista kriiseistä huolimatta ei ole odotettavissa, että Pirkanmaan pelastustoimen rakenteet tai toiminta muuttuisivat perustavanlaatuisesti näiden seurauksena (Palokangas, 2024).

5. Väestökehitys jatkuu nykyisten ennusteiden mukaisesti
Pirkanmaalla väkiluku kasvaa nettomaahanmuuton ja kotimaan muuttoliikkeen ansiosta, erityisesti Tampereen seudulla. Väestön ikääntyminen ja monimuotoistuminen muuttavat onnettomuusriskejä, minkä vuoksi pelastustoimen on varauduttava palvelemaan erilaisia kieli- ja ikäryhmiä (Väestöennuste, 2024; Tampereen kaupunkiseutu, 2024).

Nämä taustaoletukset muodostavat perustan, jonka varaan tulevissa luvuissa käsiteltävät muuttujat voivat vaihtoehtoisesti kehittyä.

Muutostekijät ja niiden arvot

Pirkanmaan pelastustoiminnan muutostekijät ja niiden arvot

Valitsimme PESTE-analyysin, asiantuntijahaastattelun (Toivonen, 2025) ja laajahkon kirjallisuuskatsauksen pohjalta kuusi muutostekijää tulevaisuustaulukkoon – AI-sääntely, kansalaisten luottamus viranomaisiin, pelastushenkilöstön osaamispainotus, AI-teknologian autonomian taso ja saatavuus sekä ilmastonmuutos – joilla on suora ja epävarma vaikutus tekoälyn hyödyntämiseen Pirkanmaan pelastustoiminnan tulevaisuudessa. Näiden muuttujien arvoja yhdistelemällä saamme selkeästi toisistaan poikkeavia tulevaisuuskuvia (ks. Lätti ym., 2022). Alla avaamme kunkin muuttujan merkityksen ja perustelemme valittujen arvojen taustat.

AI-sääntely tarkoittaa lakeja, asetuksia ja viranomaisten ohjeistuksia, jotka määrittävät kuinka tiukasti, joustavasti tai eheästi lainsäätäjät (EU, Suomi) ohjaavat tekoälyn kehittämistä ja käyttöä julkisessa palvelussa. AI-sääntelyn tiukkuus tai sallivuus vaikuttaa suoraan siihen, kuinka laajasti tekoälyä voidaan hyödyntää pelastustoiminnassa (kts. Dignum, 2019; Régis ym., 2024; Furey, 2025). *Tiukasti rajoitetussa* sääntelyssä korostuvat henkilötietojen suojan vaatimukset ja läpinäkyvyys (kts. EU AI Act, 2021/206) sekä tuotevastuudirektiivin ja AI-vastuudirektiivin tiukennukset AI-ratkaisuille (Solaiman & Malik, 2025; Rodríguez de Las Heras Ballell, 2025). *Riskiperusteisessa* mallissa valvonta kohdistuu erityisesti korkean riskin sovelluksiin (esim. kriittiset pelastusjärjestelmät), kun taas matalariskiset ratkaisut saavat enemmän vapauksia. Tämä heijastelee elokuussa 2024 voimaan tulleen ja 2 vuoden siirtymäajalla käyttöönotettavan EU:n tekoälysäädöksen riskiluokitteluperusteista näkökulmaa, joka määrittelee monet pelastustoiminnan potentiaaliset tekoälysovellukset korkean riskin kategoriaan, jolloin vaaditaan ennakkotarkastuksia, riskienhallintasuunnitelmia ja jatkuvaa seurantaa (EU AI Act, 2021/206; Piachaud-Moustakis, 2023). *Laajasti salliva* sääntely painottaa innovaatioita, mutta yritykset voivat osoittaa luotettavuutta mm. NIST AI RMF- ja ISO 42001 -standardeilla (Ramos & Ellul, 2024). *Epäselvä tai pirstaleinen* sääntely puolestaan sisältää päällekkäisiä ja ristiriitaisia sääntöjä (esim. eri lainsäädäntötasojen, viranomaisten tai toimialojen välillä). Kokonaisuudesta ei muodostu yhtenäistä ohjausta (Rodríguez de Las Heras Ballell, 2025; Visengeriyeva, 2025).

Tekoälyteknologian saatavuus pelastuspalveluissa kuvaa sitä, miten helposti tekoälyteknologia on pelastuspalveluihin saatavilla. Saatavuuteen vaikuttaviksi tekijöiksi on valittu sen kustannustaso ja mahdolliset tekijänoikeudet eli IPR (Intellectual Property Rights). Arvoista *korkea hinta ja rajoitettu tarjonta* viittaa tilanteeseen, jossa markkinoilla on vain harvoja toimittajia, joiden tuotteet ovat vahvasti IPR suojattu ja

niiden kustannukset ovat korkeat. Tällöin teknologia on saatavilla vain harvoille tai valituille organisaatioille. *Kohtuuhintaiset suljetun lähteen ratkaisut* -arvo viittaa tilanteeseen, jossa markkinoilla on useita palveluntarjoajia, mikä on ajanut kustannustasoa alas, mutta teknologia on ainakin osittain vahvasti IPR suojattua tai salaista. *Avoimen lähteen edulliset teknologiat* arvo kattaa markkinatilanteen, jossa avoimen lähteen teknologiat ovat hallitsevassa asemassa ja tekoälypalvelujen tuottaminen on edullista. Arvoista viimeiseksi on valittu *Täysin ilmainen palvelu*, mikä kuvaa tilannetta, jossa markkinoilla on yksi tai useampi täysin ilmainen palveluntarjoaja. Usein näissä tilanteissa hinta maksetaan jossain muussa muodossa, kuin rahassa, esimerkiksi datankeruulla tai huomiolla esimerkiksi mainoksia katsomalla. Arvo kattaa edeltävän lisäksi tilanteen, jossa jokin organisaatio tarjoaa palveluaan hyväntekeväisyytenä Pirkanmaan pelastuspalveluille.

Pelastuspalveluiden järjestelmien autonomisuus muuttujalla pyritään kuvaamaan sitä, miten tavoitteen, toiminnan ja niiden yhdistelmän itsenäiseen valintaan kykenevät järjestelmät kytkeytyvät pelastuspalveluiden toimiin (Gyagenda & Roth, 2023). Käsite autonomia liittyy robotiikan, automaation ja tekoälyn kontekstissa järjestelmän kykyyn havainnoida ympäristöään, tehdä itsenäisiä päätöksiä ja toteuttaa niitä esimerkiksi liikkeen, objektin manipulaation tai kommunikaation kautta. Lisäksi autonomiaan voidaan liittää järjestelmän kyky mukautua oppimalla ja toimia itseriittoisesti myös vaikeasti ennustettavissa ja muuttuvissa ympäristöissä pitkilläkin aikajänteillä (Kunze ym., 2018). Arvoista *ihmisohjauksella* tarkoitetaan sitä, että yllä kuvatut tehtävät tapahtuvat lähes täysin ihmisen toimesta joitain yksinkertaisempaa automaatiota vaativia tehtäviä lukuun ottamatta. *Osittaisella autonomialla* puolestaan viitataan järjestelmään, joka kykenee kaikista yksinkertaisempiin tehtäviin itsenäisesti, mutta tarvitsee usein ihmisen puuttumista toimiakseen oikein. Kun järjestelmän autonomiaa kasvatetaan laajaksi, niin se kykenee toimimaan itsenäisesti myös vaikeasti ennustettavissa ja muuttuvissa olosuhteissa, mutta kuitenkin ihmisen valvomana ja osittain ohjaamana. *Täydessä autonomiassa* puhutaan täysin yllä mainitut kriteerit täyttävä järjestelmä, jonka toimintaan ihmisen ei tarvitse puuttua lainkaan, paitsi niissä vaiheissa, kun järjestelmää asennetaan, huolletaan tai poistetaan käytöstä.

Kansalaisten luottamus viranomaisiin kuvaa sitä, miten vahvasti väestö uskoo pelastustoiminnan ja muiden julkisten toimijoiden toimivan avoimesti, tehokkaasti ja oikeudenmukaisesti. Pelastustoiminta – etenkin tekoälyä hyödyntävät ratkaisut, kuten autonomiset laitteet tai algoritminen päätöksenteko – edellyttää kansalaisten hyväksyntää ja luottamusta. *Matala luottamus* kuvaa tilannetta, jossa kansalaiset kokevat viranomaiset byrokraattisina, tehottomina tai jopa epäluotettavina. Tällöin julkisten palveluiden teknologisten ratkaisujen hyväksyntä on heikkoa ja uusien teknologioiden käyttöönotto voi kohdata vastustusta. *Kohtalainen luottamus* kuvastaa tilannetta, jossa suurin osa kansalaisista pitää viranomaistoimintaa varovaisen luotettavana. He edellyttävät viranomaisilta kuitenkin selkeää avoimuutta AI-järjestelmien käyttöön liittyen. *Korkea luottamus* kuvaa tilannetta, jossa Pirkanmaan pelastustoimintaan suhtaudutaan myönteisesti ja AI:n käyttöönotossa nähdään positiivisia vaikutuksia. *Polarisoitunut luottamus* kuvaa tilannetta, jossa osa kansalaisista arvostaa ja luottaa pelastustoimintaan, kun osa on vahvasti epäluuloinen. Tilanne voi jakaa yhteiskunnan eri leireihin (esim. nuoret vs. iäkkäät, konservatiivit vs liberaalit, kaupunki vs. maaseutu). Jakolinjat hankaloittavat uusien järjestelmien käyttöönottoa (Aoki, 2020; van Kolfschooten & van Oirschot, 2024; Imamguluyev, 2024; Sun, 2024).

Pelastushenkilöstön osaamispainotus viittaa siihen, millaista työtä pelastajat tekevät tekoälyn tukemassa ympäristössä: korostuuko fyysinen pelastaminen, teknologian hallinta vai sekä että? *Perinteisten pelastustaitojen painotus* korostaa käytännön pelastustoimintaa, perinteistä pelastuskoulutusta ja fyysisiä pelastustaitoja (Lynch, 2006); tekoäly on vain taustalla avustavana järjestelmänä. *Teknologiaintensiivinen painotus* kuvaa tulevaisuutta, jossa suurin osa työtehtävistä edellyttää digitaalisia ja tekoälyyn liittyviä taitoja. Operatiiviset tehtävät tukeutuvat vahvasti robotiikkaan, data-analytiikkaan ja järjestelmien ohjaamiseen, joihin myös pelastustoiminnan ammattilaisten osaaminen selkeästi painottuvat. Tekoälyvalmiudet kuuluvat jokaisen pelastajan taitopakettiin ja pelastajaksi pääsee ilman fyysisiä kuntotestejä (vrt. Zhang ym., 2022; Ghaffarian ym., 2023; Frankland, 2024). *Hybridiosaamisessa* henkilöstöllä on sekä vahvat pe-

rinteiset fyysiset pelastustaidot että työhön tarvittavat teknologiset kyvyt (esim. drone-lennätys, data-analytiikka). Hyvä teknologian peruskoulutus ja jatkuva täydennyskoulutus liittyy kahteen jälkimmäiseen arvoon. Pirkanmaan kaltaiset alueet, jossa on vahvaa teknologiakoulutusta, ovat tällaisissa kehityssuunnissa vahvoilla (Shiohira, 2021; Toivonen, 2025).

Ilmastonmuutoksen vaikutukset muuttuja lisää tulevaisuustaulukkoon PESTE-analyysin ympäristönäkökulman, sillä ilmastonmuutos on muutostekijä, jonka myös Pirkanmaan pelastuspäällikkö Teemu-Taavetti Toivonen nosti useasti esiin haastattelussa. Asiantuntijaselvityksen mukaan merkittävimmät ilmastonmuutoksen aiheuttamat riskit Pirkanmaalla ovat vesiin ja vesien hallintaan liittyvät riskit: rankkasateet, hulevesi- ja vesistötulvat, myrskyt, biologiset riskit, taudit ja tuholaiset sekä ekosysteemimuutokset (Kettunen 2025). Muuttujan arvoiksi valittiin kolme erilaista tilannetta. *Ei ilmastovaikutuksia tai hyvin pienet vaikutukset* kuvaa tilannetta, jossa Pirkanmaan pelastustoiminnassa ei ole tarpeen kiinnittää huomiota ilmastonmuutokseen vaikutuksiin. *Hallittu siirtymä* kuvaa tilannetta, jossa ilmastonmuutos etenee ja aiheuttaa lisähaasteita pelastustoimelle, mutta muutoksiin sopeudutaan ja niitä hallitaan. Viimeinen arvo *voimistuvat vaikutukset* kuvaa tilannetta, jossa Pirkanmaa kohtaa odottamattoman luonnonkatastrofin tai ilmastokriisin, joka pakottaa reagoimaan ja mullistaa yhteiskunnan. Arvot antavat monipuolisia näkökulmia tulevaisuuskuviin ja mahdollistavat toisistaan poikkeavat skenaariot.

Tulevaisuustaulukko

Taulukko 1 kokoaa kuusi keskeistä muuttujaa, jotka määrittävät tekoälyn hyödyntämistä Pirkanmaan pelastuspalveluissa vuonna 2050. Jokaisella muuttujalla on kolme tai neljä toisensa poissulkevaa arvoa, jotka kuvaavat erilaisia kehityspolkuja. Esimerkiksi AI-sääntelyn kohdalla sääntely voi olla tiukasti rajattua, riskiperusteista, laajasti sallivaa tai epäselvää, kun taas kansalaisten luottamus viranomaisiin voi vaihdella matalasta korkeaan tai olla polarisoitunutta. Muut taulukon muuttujat kuvaavat kukin omalla tavallaan resurssien, osaamisen ja toimintamallien kehittymisen vaihtoehtoja. Yhdistämällä eri muuttujien arvoja voidaan muodostaa useita erilaisia tulevaisuuskuvia Pirkanmaan pelastuspalveluiden toiminnasta tekoälyn aikakaudella.

Taulukko 1. *Tekoälyn hyödyntäminen Pirkanmaan pelastustoiminnassa v. 2050 -tulevaisuustaulukko*

Muuttuja	Arvo A	Arvo B	Arvo C	Arvo D
AI-sääntely	Tiukasti rajoitettu	Riskiperusteinen sääntely	Laajasti salliva	Epäselvä tai pirstaleinen
Tekoälyteknologian saatavuus pelastuspalveluissa	Korkea hinta ja rajoitettu tarjonta	Kohtuuhintaiset, suljetun lähteen teknologiat	Avoimen lähteen, matalien kustannusten teknologiat	Täysin ilmainen palvelu
Pelastuspalveluiden käyttämien järjestelmien autonomisuus	Täysi autonomia	Laaja autonomia	Matala-asteinen autonomia	Ihmisohjaus keskiössä
Kansalaisten luottamus viranomaisiin	Matala	Kohtalainen	Korkea	Polarisoitunut
Pelastushenkilöstön osaamispainotus	Perinteiset pelastustaidot	Hybridiosaaminen	Teknologia-intensiivinen	
Ilmastonmuutoksen vaikutukset	Ei vaikutuksia / Hyvin pienet vaikutukset	Hallittu siirtymä	Voimistuvat vaikutukset	

Tulevaisuuskuvat ja skenaariotarinat

Tulevaisuuskuvista syntyy skenaarioita, kun hahmotamme, miten jokainen tulevaisuuskuva – mahdollinen tulevaisuuden tila - voisi rakentua käytännössä. Tämän uskottavan rakentumisreitin rakentamisessa on huomioitava muuttujien väliset vuorovaikutuskytkennät, joissa yhden tapahtuman vaikutukset ketjuuntuvat toisen ja kolmannen asteen seurauksina. Ilmiöt eivät tapahdu eristyksissä, vaan niitä on ymmärrettävä kokonaisuutena (Byrne, 2024). Siksi on tärkeää tunnistaa oleelliset monihaaraiset syy-seurausjatkumot, jotka ketjuuntuvat laajemmiksi vaikutuksiksi eri osa-alueilla (ks Ahvenainen & Janasik, 2022). Yksittäinen tekijä ei yksin määrää kehitystä, vaan useiden tekijöiden samanaikainen vuorovaikutus synnyttää lopputuloksen (Marwala & Hurwitz, 2017). Lisäksi skenaarioiden rakentamisessa on tärkeää ymmärtää kontingenssi – vaihtoehtoisia polkuja voi aina avautua yllättävien valintojen tai tapahtumien seurauksena (Blount ym., 2018).

Lähtökohtana tulevaisuuskuville ja skenaarioille olivat pelastustoimen edellä mainitut muuttujat, joille valittiin useita kehitysvaihtoehtoja. Niistä yksi kerrallaan valitsemalla syntyi neljä erilaista tulevaisuuskuvaa (ks liite 2), jotka kumpuavat menneisyyden ja nykyhetken ymmärryksestä, tiedoista, arvoista, toiveista ja peloista (Lätti et al., 2022) ja rakensimme niihin mahdollisimman koherentit polut (vrt. Kahn, 1967; Masini, 1994; Bishop, 1994). Tulevaisuuskuviin ja skenaarioihin otimme neljä erilaista lähestymistapaa:

1. **Utopistinen skenaario**, joka kuvaa pitkälle automatisoitunutta ja onnistunutta tulevaisuutta.
2. **Dystooppinen skenaario**, joka piirtää esiin kaaoksen ja epäluottamuksen varjon.
3. **Nopan heitolla tuotettu skenaario**, jossa keskeiset muuttujat valikoituivat satunnaisesti, jotta saatiin mukaan yllättävämpiäkin kehityskulkuja.
4. **AI-skenaario**, jota ohjasi ChatGPT:n generoima tulevaisuuskuva valituista muuttujista sekä valmiiksi annetuista arvoista: ilmastonmuutoksen voimistuvat vaikutukset sekä tekoälyteknologian korkea hinta ja matala saatavuus.

Tämä tutkimuksellinen valinta – yksi “ihannetila”, yksi “kauhuskenaario”, yksi “satunnaisesti valittu” ja yksi “tekoälyn antama” – perustuu tulevaisuudentutkimuksen ajatukseen monipuolisesta tarkastelusta: jotta varautuminen olisi kattavaa, on hyödyllistä luoda sekä ääripäiden että yllättävien ratkaisujen näkökulmia. Näin vältymme keskittymästä liian ennalta arvattaviin polkuihin. Kahdessa jälkimmäisessä skenaariossa varmistimme valittujen arvojen yhteensopivuuden.

Liitteessä 1 on tiivistettynä kunkin skenaariotarinaan liittyvä keskeinen tapahtumaketju aikajanalla vuodesta 2025 vuoteen 2050. Kuva havainnollistaa, millaisia valintoja ja vaikutuksia eri vuosikymmenillä esiintyy, ja millä tavoin skenaariot päätyvät omiin tulevaisuuskuviinsa. Seuraavissa alaluvuissa esitetään nämä neljä skenaariotarinaa, joista jokainen päättyy omaan tulevaisuuskuvaansa. Taustalla on analyysi niistä epävarmuuksista, jotka vaikuttavat keskeisesti pelastustoimen kehitykseen. Näin skenaariot helpottavat varautumista tulevaan, sillä ne ohjaavat huomaamaan, kuinka erisuuntaiset, mutta mahdolliset tapahtumat edellyttävät erilaisia toimenpiteitä niin pelastustoimelta kuin sen sidosryhmiltäkin.

Teknologiariippuvainen pelastustoiminta (nopanheitto)

Vuonna 2025 Pirkanmaan pelastuslaitoksessa keskustellaan yhä enemmän ilmastonmuutoksen vaikutuksista. Tulvat, helleaallot ja metsäpalot ovat yleistyneet Suomessa, mutta viranomaiset vakuuttavat, että muutoksiin on varauduttu. Teknologian käyttöä pelastustoimessa lisätään asteittain, mutta tiukka AI-sääntely rajoittaa täysautonomisten järjestelmien käyttöönottoa. Datan keruu on saatu onneksi automatisoitua, mikä mahdollistaa uusien turvallisuusuhkien ennakoinnin. Kansalaisten luottamus viranomaisiin on kuitenkin heikentynyt, osin epäselvän viestinnän ja resurssienjaon herättämien kysymysten vuoksi.

Keväällä 2030 Pirkanmaa kohtaa historiallisen luonnonkatastrofin. Poikkeuksellisen sateisen talven jälkeen sulamisvedet ja rankkasateet aiheuttavat laajoja tulvia, jotka iskevät erityisesti Nokian, Lempäälän ja Kangasalan alueille. Tampereella Tammerkosken tulvavedet nousevat uhkaavasti, ja viranomaiset käynnistävät ensimmäistä kertaa tekoälyavusteisen evakuointisuunnitelman. Tekoäly analysoi maastonmuodot ja liikennevirrat, minkä perusteella evakuointireitit suunnitellaan nopeasti. Pelastustoimi hyödyntää drooneja ja sensoriverkostoja, mutta järjestelmien autonomia on rajallinen. Sen takia päätökset tehdään edelleen ihmisten toimesta, mutta tekoälyn suositukset ohjaavat toimintaa. Kriisi saadaan hallintaan, eikä se johda täyteen katastrofiin, mutta monet kansalaiset jäävät silti ilman nopeaa apua. Sosiaalisessa mediassa leviää väitteitä, että resursseja on kohdennettu väärin. Samalla tekoälypäätösten luotettavuus ja vastuunjako herättää keskustelua.

Vuonna 2036 tulvien jäljet ovat edelleen näkyvissä. Infrastruktuuria on korjattu, mutta pienemmät kunnat ovat joutuneet kantamaan suurimman taakan. Pelastustoiminta käyttää yhä enemmän teknologiaa, mutta resurssipula ja korkea hinta rajoittavat uusimman kaluston hankintaa. Viranomaiset ovat kehittäneet uudenlaisen kriisiviestintämallin, jossa tekoäly kohdistaa viestintää eri ryhmille. Vaikka tämä parantaa tiedotusta, moni kokee sen keinotekoisena ja epäluuloisuus etenkin tekoälypäätöksiin jatkuu. Tässä vaiheessa kansalaiset alkavat itse ottaa enemmän vastuuta. Erilaiset paikalliset pelastusverkostot syntyvät erillään virallisesta pelastusjärjestelmästä ja ihmiset kehittävät omia teknologiaratkaisujaan, kuten ennakkovaroitusjärjestelmiä, hätätilanteita varten. Tämä vähentää viranomaisten kuormitusta, mutta myös syventää jakautumista – osa ihmisistä ei enää usko, että valtio pystyy huolehtimaan heistä hätätilanteessa.

Vuoteen 2045 mennessä pelastustoimi on onnistunut rakentamaan uuden toimintamallin, jossa kansalaisyhteisöt ja viranomaiset toimivat rinnakkain. AI-järjestelmät auttavat analysoimaan uhkia hyödyntäen laajamittaista automaattista datankeruuta, mutta varsinaiset pelastustoimet ovat jaettuja virallisten ja epävirallisten toimijoiden välillä. Viranomaiset tekevät yhteistyötä yliopistojen ja teknologiayritysten kanssa, jotta resurssipulaa voidaan tasata. Itseajavat ajoneuvot otetaan osaksi pelastustoimintaa, sillä ne mahdollistavat nopeamman liikkumisen kriisialueilla. Uudet, hajautetut tekoälyjärjestelmät mahdollistavat pelastustoimenpiteiden laajemman kattavuuden myös syrjäseuduilla.

Kun vuosi 2050 koittaa, Pirkanmaan pelastustoiminta on teknologiaintensiivistä ja tekoälypohjaiset järjestelmät ovat keskeisessä roolissa. Droonit ja kartoittavat onnettomuusalueita reaaliajassa ja tekoäly analysoi riskitilanteita ennakoiden pelastusresurssien tarpeen automaattisesti. Autonomiset ajoneuvot kuljettavat pelastushenkilöstöä ja tarvikkeita, kun taas tekoälyohjatut robotit tukevat pelastustoimintaa vaarallisimmissa tilanteissa.

Korkeat kustannukset sekä rajallinen teknologian saatavuus luovat epätasa-arvoa, joka näkyy erityisesti syrjäseudulla. Moni pelkää jäävänsä ilman laadukasta apua, kun pelastusresurssit jakautuvat epätasaisesti. Samalla osa kansalaisista nojaa viranomaisvetoiseen, AI-pohjaiseen järjestelmään, joka ohjaa datasan perustuen, kun taas toiset turvautuvat paikallisyhteisöihin ja hajautettuihin pelastusverkkoihin. Vaikka järjestelmä ennakoi ja torjuu uhkia aiempaa tehokkaammin, sen luotettavuus ja oikeudenmukaisuus herättävät kysymyksiä. Erityisesti ilmastonmuutoksen hallitun siirtymän edetessä yhä syvemmälle pelastustoimen ammattilaisten työhön ja kansalaisten arkeen.

Ihmisestä riippumaton pelastustoiminta (utopistinen)

Vuoden 2025 aikana Suomen kansa huomaa nykyisen hallituksen ajamien sosiaali- ja terveysalan leikkausten vaikutukset ja hyvinvointialueiden alijäämäisen budjetin heihin itseensä ja läheisiinsä. Tämä aloittaa laajamittaisen siirtymän yleisessä mielipiteessä, josta syntyy ihmiskunnan historialle tyypilliseen tapaan muutos vastakkaiseen suuntaan ja vuoden 2027 eduskuntavaalien jälkeen muodostunut hallitus on arvoiltaan nykyistä kauempana keskimääräisestä ja ohjaa entistä enemmän rahoitusta hyvinvointialueiden

käyttöön paikkaamaan leikkausten aiheuttamaa haittaa. 2020-luvun lopulla tunnistetaan enimmäkseen ihmiskäsin tapahtuvan pelastustoiminnan olevan kestämättömällä pohjalla ikääntyvän väestörakenteen kasvavien tarpeiden ja heikon skaalautuvuuden takia.

Kovaa tahtia kehittyvästä teknologiasta etsitään 2030-luvun alussa ratkaisua pelastustoimen haasteisiin ja lopulta se löydetään koneoppivan algoritmin integroinnista pelastustoimea ohjaaviin järjestelmiin ja ensihoidossa ryhdytään hyödyntämään isoja kielimalleja hoidontarpeenarviointiin ja asiantuntijajärjestelmiä diagnostiikkaan. Vuosikymmenen lopussa pelastushenkilöstö voi jo huokaista helpotuksesta, kun vieläkin riittämättömiä työtunteja onnistutaan ohjaamaan oikeisiin paikkoihin ja työn kuormittavuutta on onnistuttu laskemaan automatisoidulla päätöksenteolla. Ensihoidossa havaitaan mittavien investointien jälkeen hoidon laadun paranneen huomattavasti, kun hyvin toimivat järjestelmät tukevat alan ammattilaisia työssään ja vähentävät siten työn kuormittavuutta.

2040-luvun alussa pelastustoiminnan henkilöstön helpotuksen huokaus alkaa kuitenkin kääntyä valituksen puolelle, kun alalle investoidut järjestelmät alkavat korvata perinteisiä pelastustaitoja hallitsevaa henkilöstöä. Valitukset kuitenkin hukkuvat pian entistä tyytyväisemmän ja turvallisemman yhteiskunnan ylistyksiin, mikä johtaa seuraavaan mittavaan investointiin, jolla pyritään korvaamaan kalliit ihmiskädet kokonaan paikallisesti tuotetuilla ja edullisilla avoimen lähteen teknologioihin perustuvilla järjestelmillä. Vuosikymmenen lopussa täysin autonomiset järjestelmät läpileikkaavat koko pelastustoimea ja ihminen on siirtynyt fyysistä pelastustyöstä autonomisen järjestelmän observointiin tarpeen mukaan opettamiseen.

Vuonna 2050 Pirkanmaata pidetään malliesimerkkinä siitä, miten pitkälle pelastuspalvelujen automaatio ja tekoälyn salliva sääntely ovat onnistuneet. Läpinäkyvä, hyvin testattu teknologia on laskenut kustannuksia ja parantanut avunantokykyä, mikä on nostanut kansalaisten luottamuksen korkealle. Halvat avoimen lähteen sammutusjärjestelmät ovat yleistyneet rakentamisessa, ambulanssit ajavat itsenäisesti ja ensihoitopalvelut toimivat pitkälti autonomisesti. Ihmiset ovat siirtyneet lähinnä hallinnollisiin tai kehitystehtäviin, kun varsinainen pelastustyö on robottien ja tekoälyn vastuulla. Koska ilmastonmuutoksen vaikutukset ovat jääneet vähäisiksi, resursseja on ohjattu innovointiin – ja kapeasti säännelty teknologia toimii tehokkaasti ilman merkittäviä riskejä.

Pelastustoiminta kaaoksen ja epäluottamuksen varjossa (dystoppinen)

Helmikuussa 2025 Pirkanmaan pelastustoimi aloittaa kapeaksi tekoälyksi miellettyjen sovellusten kokeilut varovaisen optimismin vallassa. EU:n uusi tekoälyasetus antaa suuntaviivoja, mutta epäselvä tai pirstaleinen sääntely jättää käytännön vastuut hämäriksi. Pelastustoimi investoi korkean hinnan ja rajoitetun saatavuuden järjestelmiin toiveikkaasti, vaikka osa kokeneista palomiehistä suhtautuu skeptisesti “koneen tekemiin päätöksiin”. Samalla henkilöstön peruskoulutuksessa korostetaan yhä perinteisten pelastustaitojen painotusta, sillä kukaan ei halua luopua ihmisen tekemästä riskinarviosta.

Vuonna 2029 sattuu ensimmäinen suuren kohun aiheuttava onnettomuus. Tekoälypohjainen hätäkeskusjärjestelmä tulkitsee tulipalon “pieneksi riskiksi” ja jättää hälyttämättä riittävästi yksiköitä. Mediassa puhutaan “koneen kylmyydestä”, ja keskustelu vastuukysymyksistä syttyy. Matala luottamus viranomaisiin nousee jälleen puheenaiheeksi, eikä epäselvä tai pirstaleinen sääntely tarjoa selkeää tahoa, jonka niskoille virhe voidaan sälyttää.

Ilmastonmuutoksen vaikutusten voimistuessa 2030-luvulla toistuvat metsäpalot, myrskyt ja tulvat ruuhkauttavat pelastustoimen resurssit. Tekoälyä on pakko hyödyntää, mutta sen korkea hinta ja rajallinen saatavuus lisäävät eriarvoisuutta; vain suurimmat asemat saavat uusinta teknologiaa. Henkilöstön sisällä kehittyy kuilu. Vanhemmat luottavat omiin perinteisiin taitoihinsa, kun taas nuorempi väki uskoo tekoälyn nopeuteen. Täysautonomiset robottijärjestelmät näyttävät lupaavilta, kunnes käy ilmi, että sen pienetkin häiriöt voivat johtaa vakaviin onnettomuuksiin.

Vuonna 2037 “Kaaosmyrskyksi” nimetty myrsky katkaisee sähköt laajoilta alueilta, ja tekoälyyn tukeutuva evakuointijärjestelmä sekoaa ristiriitaisista säätiedoista. Asukkaat saavat useita, toisilleen vastakkaisia kehotuksia. Pelastuslaitos yrittää korjata tilannetta perinteisin keinoin, mutta vahinko on jo tapahtunut. Yhä useampi kysyy, miksi kalliisiin järjestelmiin sijoitetaan, jos ihmiskontrolli kuitenkin ratkaisee.

2040-luvulle tultaessa luonnonkatastrofit moninkertaistuvat. Täysautonomiset pelastusrobotit ilmestyvät joillekin asemille, mutta niitä ei osata valvoa tai korjata, kun lakeja ei ole päivitetty vastaamaan reaalista toimintaa. Virheelliset evakuoinnit ja sammutukset rapauttavat kansalaisten entisestäänkin matalaa luottamusta. Yhä useampi valitsee luottaa mieluummin konkareiden suuntavaistoon kuin “konepäätökseen”.

Vuoteen 2050 mennessä osassa Pirkanmaata epäluottamus on kasvanut syväksi, kun teknologia on kallista ja sen käyttöä ohjaava sääntely on epäselvää ja pirstaleista. Suuronnettomuuksien ja luonnonkatastrofien määrä on moninkertaistunut ilmastonmuutoksen edetessä, eikä yhteiskunnalla ole selkeää visiota älykkäiden järjestelmien vastuukysymyksistä. Varakkaat tahot pystyvät hankkimaan huippukalliita pelastusrobotteja, kun taas useimmat kunnat joutuvat turvautumaan vanhoihin menetelmiin. Tekoäly on läpäissyt pelastuspalvelut hätäilmoituksista onnettomuuspaikan operointiin, mutta tekninen täysi autonomia törmää epäselviin lakeihin ja toistuviin järjestelmävirheisiin. Pelastushenkilöstö kaipaa selkeitä toimintamalleja, mutta virheiden korjaaminen on lainsäädännön puutteiden vuoksi vaikeaa. Kansalaisten matala viranomaisluottamus on pysynyt ennallaan, ja monet turvautuvat mieluummin perinteisiin pelastustaitoihin kuin epävarmoihin innovaatioihin.

Pelastustoiminta osana mukautuvaa ekosysteemiä (tekoäly)

Vuonna 2025 Pirkanmaa on kansallisen ja kansainvälisen trendin mukaisesti kehittämässä pelastustoimintaansa tuloksellisemmaksi ja tehokkaammaksi teknologian kehitys edellä. Ilmastonmuutos luo kuitenkin haasteita kehitykselle tuoden pelastustoimelle lisää tehtäviä esimerkiksi tulvien ja myrskyjen vuoksi.

Vuonna 2030 pelastustoiminta painii edelleen resurssipulan ja määrärahojen riittämättömyyden kanssa. Nyt suuremmaksi ongelmaksi on kuitenkin muodostunut sään ääri-ilmiöiden voimakas lisääntyminen. Odotettua nopeampi ilmaston lämpeneminen on saanut jäätiköt sulamaan vauhdilla, ja sulaminen on aiheuttanut huomattavia häiriöitä Atlantin valtameren merivirroissa. Muutos näkyy Suomessa lisääntyneinä myrskyinä ja muina katastrofeina. Jatkuvat sähkökatkot vaikeuttavat teknologian ylläpitoa ja kehittämistä pelastustoiminnassa ja pakottavat turvautumaan perinteisiin pelastuskeinoihin.

Vuonna 2035 merivirtojen muutos on tuonut Suomeen pitkät, kuumat kesät ja sateiset talvet (kts. Madan ym., 2024). Ruoan tuotanto kärsii Pirkanmaalla, sillä pitkät kuivuusjaksot tekevät tavanomaisesta viljelystä mahdotonta. Sateiset talvet puolestaan aiheuttavat Pirkanmaan suurten järvien tulvimisen ja myrskytuulten aiheuttamat tuhot venyttävät pelastustoimen kapasiteetin äärimmilleen. Pelastustoimi yrittää parhaansa mukaan hallita tilannetta, mutta sähkön puute vaikeuttaa kommunikaatiota ja pakottaa ihmiset turvautumaan toistensa apuun. Pirkanmaalaiset ovat tyytymättömiä päättäjien toimintaan, mutta kriisi myös yhdistää kansaa ja pakottaa luottamaan toinen toisiinsa.

Vuonna 2040 pirkanmaalaiset kamppailevat edelleen globaalin kriisin kanssa, kuten myös muu Suomi ja Eurooppa. Eduskunta yhdessä hallituksen kanssa yrittää pitää maan yhtenäisenä, mutta rahan ja energianpuutteen takia viestintä alueiden välillä on vaikeaa ja maakunnat on jätetty pitkälti selviämään kriiseistä omin voimin. Pirkanmaasta onkin muodostunut sisään päin kääntynyt yhteisö, joka nojaa ihmisvoimaan ja yhdessä selviytymiseen. Eurooppaa runtelevien luonnonkatastrofien takia globaalin energian ja ruoan saatavuus on ollut jo pitkään heikkoa, ja Pirkanmaalla kehitetään toimivia muotoja tuottaa ruokaa paikallisesti omalle yhteisölle. Myös energiaa pyritään tuottamaan kestävästi auringosta sekä tuulesta. Talvisin rankkasateiden vesimassat ohjataan hallitusti pois asutusten läheltä ja hyödynnetään ruoan tuotannossa.

Vuoteen 2045 mennessä muuttuviin elinolosuhteisiin aletaan tottua. Väestönkehitys jatkuu ennusteen mukaisesti ja alueella on alettu kouluttaa väestöä muuttuneiden osaamistarpeiden mukaisesti. Uudet rakennukset suunnitellaan vaikeat sääolosuhteet ja muuttuvat lämpötilat kestäviksi. Ruokaa ja energiaa aletaan tuottaa naapurustojen omiin tarpeisiin. Pelastajat keskittyvät ennakoimaan tulevia luonnonkatastrofeja uusin keinoin, jotta väestö voi edelleen asua Pirkanmaalla.

Vuonna 2050 Pirkanmaa on sopeutunut muuttuviin luonnonilmiöihin ja elää lähes omavaraisena. Selviytyminen ei perustu nopeasti kehittyvään teknologiaan ja tekoälyn hyödyntämiseen vaan uusiin innovaatioihin ja paikalliseen osaamiseen. Ruokaa tuotetaan taloihin rakennetuissa kasvihuoneissa, jotka toimivat aurinkoenergialla ja sadevedellä. Kansalaisten luottamus vallankäyttäjiä kohtaan on heikko, mutta usko yhteisöjen voimaan on lisääntynyt ja paikallinen päätöksenteko on mahdollistanut sopeutumisen ja uudenlaisen elämäntyylin Pirkanmaalla. Pelastuspalvelut ovat edelleen julkisia ja kaikille kuuluvia, mutta niitä ylläpidetään yhteisön voimin ja enimmäkseen ihmisten organisointiin perustuen. Tuleviin luonnonilmiöihin varaudutaan seuraamalla tarkasti lintujen ja eläinten liikkeitä, sekä kouluttamalla pelastajista ekosysteemin tavat ymmärtäviä hybridiosaajia.

Skenaarioiden yhteenveto

Skenaariotyön neljä erilaista tulevaisuuskuvaa osoittavat, miten Pirkanmaan pelastustoimen tekoälyavusteinen kehitys voi suuntautua seuraavan 25 vuoden aikana. *Teknologiariippuvainen pelastustoiminta* -skenaariossa AI:n käyttö tehostuu, mutta matalaksi jäävä luottamus ja korkeat kustannukset jarruttavat kehitystä. *Ihmisestä riippumaton pelastustoiminta* -skenaariossa teknologia ja täysautonomiset järjestelmät hallitsevat pelastustoimintaa, ja väestön korkea luottamus mahdollistavat laajan AI-integraation. *Pelastustoiminta kaaoksen ja epäluottamuksen varjossa* -skenaariossa puolestaan lainsäädännön pirstaleisuus ja matala luottamus rapauttavat pelastustoimen legitimiteettiä, vaikka käytössä on muodollisesti kehittynyttä AI-teknologiaa. *Pelastustoiminta osana mukautuvaa ekosysteemiä* -skenaariossa yhteiskunnan sopeutuminen ilmastonmuutoksen kriiseihin perustuu enemmän inhimilliseen osaamiseen ja yhteisöllisyyteen, kuin teknologiseen kehitykseen, vaikka AI onkin taustalla tukemassa päätöksentekoa.

Teknologiariippuvainen pelastustoiminta ja Mukautuva ekosysteemi -skenaariot ovat luonteeltaan exploratiivisia “what-if”-skenaarioita, kun taas Ihmisestä riippumaton pelastustoiminta (utopia) ja Kaaoksen varjossa (dystopia) edustavat normatiivisia visioita – toivottavaa ja vältettävää ääripäätä (vrt. Börjeson ym., 2006). Ennustavia skenaarioita emme työssä tavoitelleet, sillä analyysin painopiste oli vaihtoehtoisten kehityspolkujen laajuudessa, ei todennäköisyysarvioissa.

Kaikki skenaariot korostavat, että AI-sääntely, kansalaisten asenteet ja henkilöstön osaaminen ratkaisevat pelastustoiminnan tulevaisuuden kehityskulun. Vaikka mikään skenaario ei välttämättä toteudu sellaisenaan, ne auttavat tunnistamaan päätösten ja teknologisten valintojen mahdollisia seurauksia sekä hahmottamaan, millaisiin epävarmuustekijöihin Pirkanmaan pelastustoimen on syytä varautua.

Päätelmät

Tavoitteen toteutuminen ja keskeiset päätelmät

Tämän skenaariotyön tavoitteena oli selvittää, miten tekoälyä voitaisiin hyödyntää Pirkanmaan pelastustoiminnassa vuoteen 2050 mennessä. Tavoite saavutettiin, sillä tutkimus rajasi selkeät epävarmuustekijät ja rakensi niistä uskottavia tulevaisuuskuvia, joita voidaan hyödyntää sekä strategisessa suunnittelussa että riskienhallinnassa. Tavoitteeseen vastaaminen jäsentyi erityisesti AI-sääntelyn, kansalaisten luottamuksen ja pelastushenkilöstön osaamispainotuksen kautta. Skenaariotyön muuttujat, pääepävarmuudet ja tarkasteluhorisontti synkronoitiin Pirkanmaan tulevaisuustarkastelun neljään ulkoisen toimintaympäristön skenaarioon, jotta johtopäätökset asettuvat maakunnan yhteiseen ennakointikehykseen.

Tulokset osoittavat, että pelastustoimen teknologisen kehityksen laajuuteen vaikuttavat olennaisesti sekä sääntelyn selkeys että väestön asennoituminen viranomaisiin. Mikäli sääntely on yhtenäistä ja kansalaisten luottamus korkeaa, AI-ratkaisuja voidaan integroida laajasti. Sitä vastoin epäselvä lainsäädäntö ja epäluuloisuus vähentävät tekoälysovellusten hyväksyttävyyttä ja hidastavat niiden käyttöönottoa. Henkilöstön osaamisen muuttuminen korostui teknologiaintensiivisessä mallissa, jossa AI-osaamisella on yhä keskeisempi rooli. Kaikki skenaariot viittaavat siihen, että pelastajien koulutus vaatii vähintään perustason datan ja järjestelmävalvonnan taitoja, joskin kahdessa skenaariossa fyysiset pelastus- ja varautumistaidot säilyvät kaikkein tärkeimpinä, mutta huolehdittava myös riittävistä fyysisten ja inhimillisten pelastustaitojen säilymisestä. Huipputason teknologioiden hinta ja jakautuminen voivat aiheuttaa eriarvoisuutta eri alueiden sekä väestöryhmien välillä, mikä korostaa paitsi pelastustoimen, myös yhteiskunnan laajempaa vastuuta niiden oikeudenmukaisesta saatavuudesta. Lisäksi ilmastonmuutos haastaa pelastustoiminnan peruslogiikkaa: reaktiivisesta toimintamallista on siirryttävä entistä enemmän ennakoivaan riskikartoitukseen, sillä ilmastonmuutoksen mukanaan tuomat äärisääilmiöt koettelevat sekä teknisiä että organisatorisia ratkaisuja, ja niiden varautumisrakenteet on mitoitettava entistä kestävämmiksi.

Hyöty päätöksentekoon, tehtävälista päättäjille ja keskeiset opit

Skenaariomenetelmän hyöty näkyi erityisesti menetelmän kyvyssä hahmottaa sama ilmiö (AI:n käyttö pelastustoimessa) eri näkökulmista ja valottaa, millaisia toimenpiteitä olisi harkittava uhkiin varautumisessa ja myönteisten kehityskulkujen vahvistamisessa niin poliittisella, sosiaalisella kuin teknisellä tasolla. Skenaariotyö auttaa pelastustoiminnan avaintoimijoita ja sidosryhmiä tunnistamaan erilaisia kehityskulkuja, resursoimaan strategisesti sekä arvioimaan päätösten vaikutuksia pidemmällä aikavälillä. Se tukee myös monitoimijayhteistyötä, kun voidaan tarkastella, miten AI:n, ilmastonmuutoksen ja yhteiskunnallisten muutosten yhteisvaikutukset muovaavat pelastustoiminnan tehtäväkenttää.

Raportin tuloksia voi hyödyntää päätöksenteossa esimerkiksi valmistelemalla pelastustoimen strategisia linjauksia eri skenaarioihin nojaten, jolloin kullekin toivotulle kehityspolulle voidaan määrittää varautumissuunnitelmat ja resurssien kohdentaminen. Skenaariot tarjoavat myös päätöksentekijöille kattavan näkökulman siihen, miten vaihtoehtoiset lainsäädännölliset ja teknologiset ratkaisut voisivat vaikuttaa riskienhallintaan, kansalaisten kokemuksiin turvallisuudesta ja henkilöstön koulutukseen. Eri tulevaisuuskuviin varautuminen tukee lisäksi sopeutumista ilmastonmuutoksen mukanaan tuomiin onnettomuusriskeihin. Lisäksi oli skenaario mikä tahansa, niin meidän on *selkeytettävä AI-sääntelyä*, sillä johdonmukainen lainsäädäntö tukee tekoälysovellusten sujuvaa käyttöönottoa ja laajempaa hyväksyttävyyttä. Samalla kansalaisten *luottamusta on vahvistettava* avoimen viestinnän, läpinäkyvien eettisten periaatteiden ja konkreettisten esimerkkien avulla, jotta AI-hyödyntäminen koetaan turvalliseksi. Henkilöstön *osaamista on kehitettävä* vähintään perustasolla datan, järjestelmävalvonnan ja teknologian saralla, unohtamatta jatkuvaa harjoittelua fyysisten pelastustaitojen ylläpitämiseksi. Myös *ilmastonmuutoksen riskeihin on varauduttava* ennakoivan suunnittelun, infrastruktuurin vahvistamisen ja modernien teknologioiden hyödyntämisen kautta. Kaikkien näiden toimien onnistuminen edellyttää laaja-alaista yhteistyötä niin kuntien, viranomaisten, yksityissektorin kuin asukkaidenkin välillä.

Ryhmän oppimisen kannalta keskeistä oli havaita, kuinka skenaariomenetelmä auttaa jäsentämään tulevaisuuden epävarmuuksia ja korostaa systeemisen tarkastelun tärkeyttä; pelastustoimi ei ole irrallinen toimija, vaan kietoutuu tiiviisti esimerkiksi teknologiaan, lainsäädäntöön ja kansalaisten arvoihin. Lisäksi tekoälyn vastuullinen hyödyntäminen vaatii monitieteistä otetta, johon sisältyy niin juridiset, teknologiset, eettiset kuin sosiaalisetkin näkökulmat. Lisäksi työn aikana syvensimme ymmärrystämme moraalisten ja eettisten tekijöiden merkityksestä AI-sovellusten suunnittelussa sekä kansalaisten asenteiden vaikutuksesta julkisen sektorin legitimiteettiin. Myös ilmastonmuutoksen kaltaiset laaja-alaiset muutosvoimat havaittiin erityisen tärkeiksi varautumisrakenteiden ja resurssitarpeiden suunnittelussa, sillä ne voivat voimakkaasti ohjata pelastustoimen tulevaisuuden prioriteetteja ja toimintamalleja.

Jatkotutkimus ja seuraavat askeleet

Skenaariotyön pohjalta nousee esiin useita jatkotutkimusaiheita. Ensiksi olisi kiinnostavaa kvantifioida eri skenaarioiden kustannus- ja resurssivaikutukset, jotta voidaan entistä tarkemmin arvioida AI:n integroinnin tehokkuutta ja vaikuttavuutta. Toiseksi kansalaisten luottamuksen kehittymistä tekoälyä hyödyntävään pelastustoimeen voisi tarkastella pitkittäistutkimuksella, jossa kartoitetaan sekä asenteita että kokemuksia tekoälyavusteisesta turvallisuustoiminnasta. Kolmantena on tärkeää syventää ymmärrystä AI:n ja ilmastonmuutoksen yhteisvaikutuksista, esimerkiksi mallintamalla, miten lisääntyvät sään ääri-ilmiöt haastavat tietojärjestelmien kestävyyden ja miten nopeasti kehittyvä teknologia voisi puolestaan tukea ilmastoriskien hallintaa.

Skenaarioista saatujen tulosten perusteella seuraava askel on strategisten ja operatiivisten linjausten laatiminen: miten eri organisaatiot – mm. pelastustoimi, hyvinvointialueet, kunnat ja valtion viranomaiset – voivat yhdessä varautua vaihtoehtoisiin tulevaisuuspolkuihin. Näin Pirkanmaan pelastustoimi pystyy jatkossa hyödyntämään tekoälyä tarkoituksenmukaisesti, eettisesti ja vaikuttavasti, olipa vallitseva kehityssuunta millainen tahansa.

Lähteet

Ahvenainen, M. & Janasik, N. (2022). Kausaalinen päättely ja Bayes-verkot ennakoinnin apuvälineenä. Teoksessa Aalto, Hanna-Kaisa – Heikkilä, Katariina – Keski-Pukkila, Pasi – Mäki, Maija & Pöllänen, Markus (toim.) Tulevaisuudentutkimus tutuksi – Perusteita ja menetelmiä. Tulevaisuudentutkimuksen Verkostoakatemian julkaisuja, 1, 2022.

Andronikidis, A., Kouskoura, A., Kalliontzi, E. & Bakouros, I. (2025). Foresight study for addressing megatrends in information and communication technology (ICT). Journal of Innovation and Entrepreneurship, 14(1), 5–12.

Ansoff, I. (1975). Managing Strategic Surprise by Response to Weak Signals. California Management Review, vol. XVIII no. 2, pp. 21–33.

Aoki, N. (2020). An experimental study of public trust in AI chatbots in the public sector. Government Information Quarterly, 37(4), 101490.

Bell, W. (1997). Foundations of Futures Studies: Human Science for a New Era (Volume 1): History, Purposes, and Knowledge. In New Brunswick, NJ: Transaction.

Bishop, P. (1994). From anticipation to action: A handbook of strategic prospective. Futures : The Journal of Policy, Planning and Futures Studies, 26(4), 453–455.

Blount, Z. D., Lenski, R. E. & Losos, J. B. (2018). Contingency and determinism in evolution: Replaying life's tape. Science (American Association for the Advancement of Science), 362(6415)

Börjeson, L., Höjer, M., Dreborg, K.-H., Ekvall, T. & Finnveden, G. (2006). Scenario types and techniques: Towards a user's guide. Futures : The Journal of Policy, Planning and Futures Studies, 38(7), 723–739.

Byrne, D. S. (2024). Scenarios – using the complexity frame of reference to inform the construction of available futures in the possibility space. Frontiers in Complex Systems, 2.

Christou, P. (2023). How to Use Artificial Intelligence (AI) as a Resource, Methodological and Analysis Tool in Qualitative Research? *Qualitative Report*, *28*(7), 1968–1980.

Comunale, M. & Manera, A. (2024). The Economic Impacts and the Regulation of AI: A Review of the Academic Literature and Policy Actions. IMF Working Paper WP/24/65.

Copeland B.J. (2025). Artificial intelligence https://www.britannica.com/technology/artificial-intelligence Dignum, V. (2019). Responsible Artificial Intelligence: How to Develop and Use AI in a Responsible Way (1st ed. 2019.). Springer International Publishing AG.

Dufva, M. (2022). Toimintaympäristön analyysi: PESTE ja sen variaatiot. Tulevaisuudentutkimus, 105. Teoksessa Aalto, Hanna-Kaisa – Heikkilä, Katariina – Keski-Pukkila, Pasi – Mäki, Maija & Pöllänen, Markus (toim.) Tulevaisuudentutkimus tutuksi – Perusteita ja menetelmiä. Tulevaisuudentutkimuksen Verkostoakatemian julkaisuja, 1, 2022.

Frankland, J. (2024). The synergy of AI and clinical paramedic expertise. Journal of Paramedic Practice : The Clinical Monthly for Emergency Care Professionals, 16(2), 60–62.

Furey, P. (2025). Generative artificial intelligence part 1: exploring ethical considerations. Journal of Paramedic Practice: The Clinical Monthly for Emergency Care Professionals, 17(1),1-7.

Ghaffarian, S., Taghikhah, F. R. & Maier, H. R. (2023). Explainable artificial intelligence in disaster risk management: Achievements and prospective futures. International Journal of Disaster Risk Reduction, 98, 104123-. https://doi.org/10.1016/j.ijdrr.2023.104123

Gyagenda N. & Roth, H. (2023) A Quantitative Autonomy Quantification Framework for Fully Autonomous Robotic Systems. https://doi.org/10.48550/arXiv.2311.01939

Imamguluyev, R. (2024). Artificial Intelligence 2050: Predictions, Challenges, and Innovations. International Journal of Research Publication and Reviews, 5(9), 2933–2945.

Jackson, P. (1999) Introduction to Expert Systems pp. 2

Kahn, H. & Wiener, A. J. (1967). The Next Thirty-Three Years: A Framework for Speculation. Daedalus (Cambridge, Mass.), 96(3), 705–732.

Kaukonen, E. (toim.). (2008). Pelastustoimen tulevaisuuden ennakoinnin skenaariot: Pelastustoimen tulevaisuusluotausraadin osaraportti 2. Pelastusopisto. (Tutkimusraportit 3/2008).

Kettunen A. (2025) Ilmastonmuutokseen sopeutuminen ja varautuminen. www.tampere.fi/sopeutuminen

van Kolfschooten, Hannah & van Oirschot, Janneke (2024). The EU Artificial Intelligence Act: Implications for healthcare, Health Policy, Volume 149, 105152, ISSN 0168-8510.

Kunze L., Hawes N., Duckett T., Hanheide, M. & Krajník T. (2018). Artificial Intelligence for Long-Term Robot Autonomy: A Survey. https://doi.org/10.48550/arXiv.1807.05196

Kämäräinen, J. (2023). Koneoppimisen perusteet. https://researchportal.tuni.fi/en/publications/koneoppimisen-perusteet

Lynch, A. (2006). Opening Pandora's Box on operational competency: has the Fire and Rescue Service lost focus on core competencies? In Fire (Tunbridge Wells) (Vol. 98, Number 1208, pp. 5–). Pavilion Publishing and Media Ltd.

Lätti, R., Malho, M., Rowley, C. & Frilander, O. (2022). Skenaarioiden rakentaminen tulevaisuustaulukkomenetelmällä. Teoksessa Aalto, Hanna-Kaisa – Heikkilä, Katariina – Keski-Pukkila, Pasi – Mäki, Maija & Pöllänen, Markus (toim.) Tulevaisuudentutkimus tutuksi – Perusteita ja menetelmiä. Tulevaisuudentutkimuksen Verkostoakatemian julkaisuja, 1, 2022.

Madan, G., Gjermundsen, A., Iversen, S. C. & LaCasce, J. H. (2024). The weakening AMOC under extreme climate change. Climate Dynamics, 62(2), 1291–1309.

Marwala, T. & Hurwitz, E. (2017). Causality. In: Artificial Intelligence and Economic Theory: Skynet in the Market. Advanced Information and Knowledge Processing. Springer, Cham.

Masini, E. (1994). Why futures studies? (Repr.). Grey Seal.

Nafar, A., Venable, K. B. & Korjamshidi, P. (2024). Reasoning over Uncertain Text by Generative Large Language Models https://doi.org/10.48550/arXiv.2402.09614

Naisbitt, J. (1982). Megatrends: Ten new directions transforming our lives. Warner Books.

Naughtin, C. K., Schleiger, E., Bratanova, A., Terhorst, A. & Hajkowicz, S. (2024). Forty years in the making: A systematic review of the megatrends literature. Futures : The Journal of Policy, Planning and Futures Studies, 157, 103329.

OECD (2008). Public-Private Partnerships: In Pursuit of Risk Sharing and Value for Money (1. Aufl.). OECD Paris. https://doi.org/10.1787/9789264046733-en

O'Riordan, L & Hampden-Turner, C. (2025). The Möbius Paradigm: A transformative approach for integrating stakehold-er perspectives when navigating dilemmas in complex operating environments. International Journal of Corporate Social Responsibility, 10(1), 1–19.

Palokangas, M. (2024). Synteesi varautumisen, valmiuden ja nykyaikaisen sodankäynnin keskinäissuhteista. Teoksessa M. Palokangas (toim.), Sodan usvaa III: Varautuminen, valmius ja nykyaikainen sodankäynti (Julkaisusarja 2: Tutkimusselosteita nro 32). Maanpuolustuskorkeakoulu.

Pelastustoimi (2023). Tampereen palokunnasta Pirkanmaan pelastuslaitokseksi - 125 toiminnan vuotta. Saatavissa: https://pelastustoimi.fi/-/tampereen-palokunnasta-pirkanmaan-pelastuslaitokseksi-125-toiminnan-vuotta

Piachaud-Moustakis, B. (2023). The EU AI Act. Pharmaceutical Technology Europe, 35(11), 8–9.

Pirkanmaan pelastus- ja ensihoitopalvelut (2025). Pirkanmaan hyvinvointialueen pelastus- ja ensihoitopalvelut -diaesitys. Pirkanmaan hyvinvointialue.

Ramos, S. & Ellul, J. (2024). Blockchain for Artificial Intelligence (AI): enhancing compliance with the EU AI Act through distributed ledger technology. A cybersecurity perspective. International Cybersecurity Law Review, 5(1), 1–20.

Régis, C., Denis, J.-L., Axente, M. L. & Kishimoto, A. (2024). Human-Centered AI : A Multidisciplinary Perspective for Policy-Makers, Auditors, and Users. (1st ed.). CRC Press LLC.

Richmond, B. (1994). Systems Dynamics/Systems Thinking: Let's Just Get on With It. In International Systems Dynamics Conference. Sterling, Scotland.

Rodríguez de Las Heras Ballell, T. (2025). Mapping Generative AI rules and liability scenarios in the AI Act, and in the proposed EU liability rules for AI liability. Cambridge Forum on AI: Law and Governance;1:e5.

Rubin, Anita (2004) Trendianalyysi tulevaisuudentutkimuksen menetelmänä. https://tulevaisuus.fi/menetelmat/toimintaympariston-muutosten-tarkastelu/trendianalyysi-tulevaisuudentutkimuksen-menetelma. haettu 24.2.2025.

Ruokonen, H., Ranta, T., Haanpää, S., Koivisto, A., Aro, T., Tunkkari, I., Kauppinen, J., Heikkala, J. & Kolehmainen, J. (2021). Sammuvaa, kytevää vai liekehtivää? Sopimuspalokuntatoiminnan vaihtoehtoiset tulevaisuuskuvat vuoteen 2035. Suomen Palopäällystöliitto.

Shiohira, K. (2021). Understanding the Impact of Artificial Intelligence on Skills Development. Education 2030. In UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training. UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training.

Sheikh, H., Prins, C. & Schrijvers, E. (2023) Artificial Intelligence: Definition and Background https://link.springer.com/chapter/10.1007/978-3-031-21448-6_2

Senge, P. (1990). The Fifth Discipline, the Art and Practice of the Learning Organization. New York: Double-day/Currency.

Sisäministeriö (2018). Suomesta maailman turvallisin maa: Sisäministeriön tulevaisuuskatsaus. Sisäministeriö, Helsinki.

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. Journal of Business Research, 104, 333–339

Sun, X. (2024) "The Application of Artificial Intelligence in Education", Transactions on Computer Science and Intelligent Systems Research, 5, pp. 953–959.

Tampereen kaupunkiseutu (2024). Väestö 2040 – Tulevaisuustarkastelu. 28.11.2024.

Toivonen, T-T. (2025). Pirkanmaan hyvinvointialueen pelastusjohtajan haastattelu 4.2.2025.

Valtioneuvosto (2021). Valtioneuvoston selonteko sisäisestä turvallisuudesta. Valtioneuvoston julkaisuja 2021:48.

van Dis, E. A. M., Bollen, J., Zuidema, W., van Rooij, R. & Bockting, C. L. (2023). ChatGPT: five priorities for research. Nature (London), 614(7947), 224–226.

van Kolfschooten H. & van Oirschot, J. (2024) The EU Artificial Intelligence Act (2024): Implications for healthcare, Health Policy, Volume 149, 105152, ISSN 0168-8510.

Virtanen, T., Halmela, A., Jaakkola, L., Pulkkinen, M. & Tolonen, R. (2022). Pelastustoimen palvelukokonaisuuksien kuvaaminen: Hankkeen loppuraportti. Sisäministeriön julkaisuja 2022:17. Sisäministeriö.

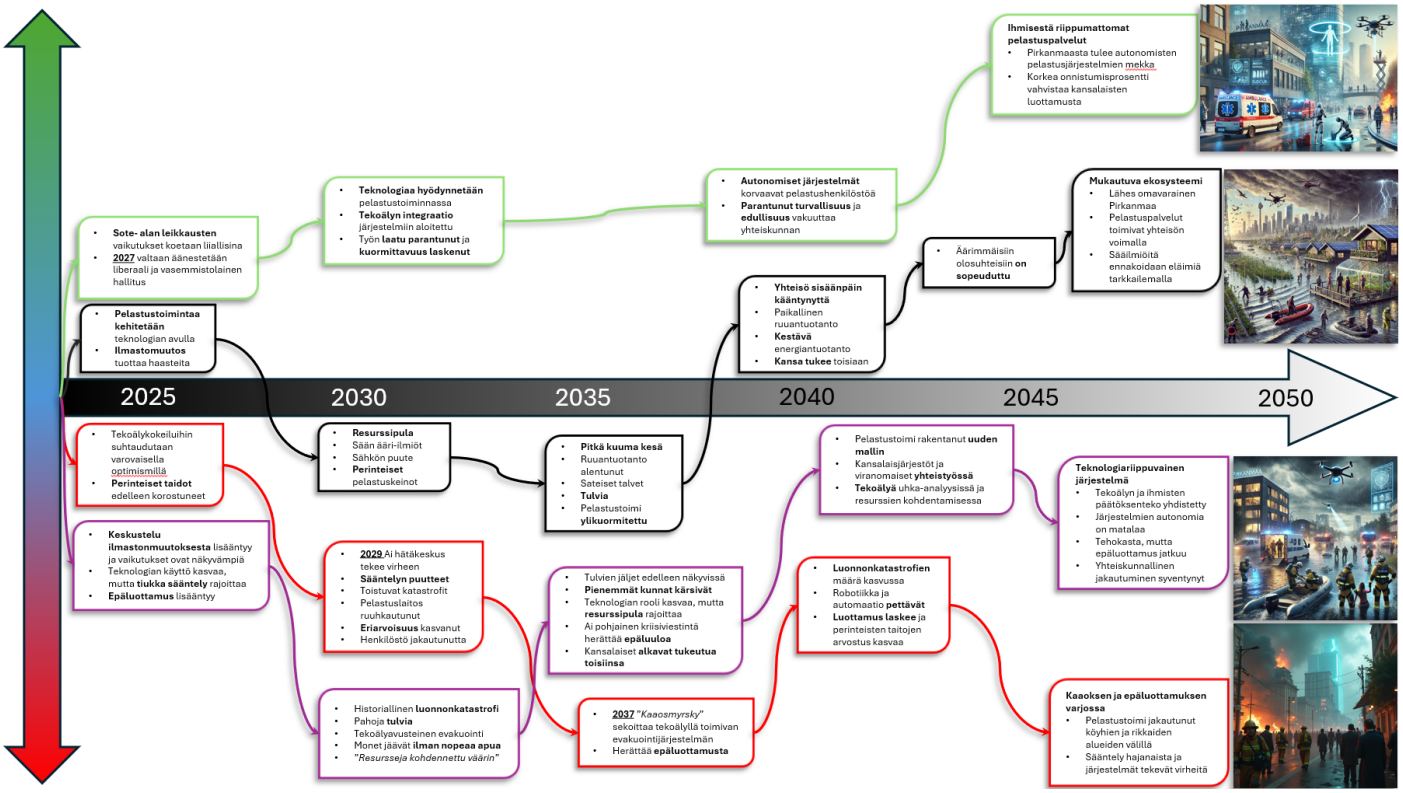
Visengeriyeva, L. (2025). What Is the EU AI Act? O'Reilly Media, Inc.

Väestöennuste (2024). Väestöennuste 31.12.2024. Tilastokeskus.

Zhang, S., Yao, J., Wang, R., Liu, Z., Ma, C., Wang, Y. & Zhao, Y. (2022). Design of intelligent fire-fighting robot based on multi-sensor fusion and experimental study on fire scene patrol. Robotics and Autonomous Systems, 154, 104122.

Zhang, B., Zhu, J. & Su, H. (2023). Toward the third-generation artificial intelligence. Science China Information Sciences, 66(2), 1–19.

Liite 1. Graafi nykyhetkestä lähtevistä ja tulevaisuuskuviin päättyvistä skenaarioista. Pystyakseli kuvaa tilanteen toivottavuutta.



Liite 2. Tulevaisuuskuvat

Teknologiariippuvainen järjestelmä (nopan heitto)

Muuttujien arvot:

- AI-sääntely: Tiukasti säännelty
- Kansalaisten luottamus viranomaisiin: Matala
- Pelastushenkilöstön osaaminen: Teknologiaintensiivinen
- Järjestelmien autonomisuus: Matala-asteinen autonomia
- Teknologian saatavuus: Korkea hinta, rajoitettu tarjonta
- Ilmastonmuutoksen vaikutukset: Hallittu siirtymä

Pelastustoimintaa tukeutuu vahvasti kehittyneeseen tekoälyyn ja autonomisiin järjestelmiin, mutta kansalaisten luottamus viranomaisiin on matala. Teknologiaintensiivinen henkilöstö hyödyntää drooneja ja tekoälyavusteisia ratkaisuja, mutta päätökset ovat edelleen ihmisten tehtävänä. Korkeat kustannukset ja rajoitettu teknologian saatavuus ovat johtaneet epätasaiseen resurssien jakautumiseen, mikä vaikeuttaa palveluiden toimintaa erityisesti syrjäseuduilla. Ilmastonmuutoksen hallittu siirtymä tuo ennakoitavia haasteita, mutta pelastusjärjestelmän luotettavuus ja toimivuus herättävät kysymyksiä.

Ihmisestä riippumaton pelastustoiminta (utopia)

Muuttujien arvot:

- AI-sääntely: Laajasti sallivaa

- Kansalaisten luottamus viranomaisiin: Korkea
- Pelastushenkilöstön osaaminen: Teknologiaintensiivinen painotus
- Järjestelmien autonomisuus: Täysi autonomia
- Teknologian saatavuus: Avoimen lähteen ja matalien kustannusten teknologiat
- Ilmastonmuutoksen vaikutukset: Ei vaikutuksia tai ne ovat hyvin pienet

Ihminen toimii tässä tulevaisuuskuvassa vain hallinnollisella tasolla ja kaikki pelastustoiminta tapahtuu täysin autonomisien järjestelmien ansiosta. Halvat avoimen lähteen sammutusjärjestelmät ovat yleistyneet rakentamisessa, ambulanssit ajavat itseään ja ensihoitopalvelutkin osaavat hoitaa lähes kaiken itsenäisesti. Järjestelmät toimivat hyvin ja kansalaisten luottamus on korkea, mikä on myös johtanut siihen, että tekoälyn sääntely on hyvin vähäistä. Ilmastonmuutoksen vaikutukset ovat jääneet vähäisiksi ja vähäiset resurssit on voitu ohjata kehitykseen.

Pelastustoiminta kaaoksen ja epäluottamuksen varjossa (dystopia)

Muuttujien arvot:

- AI-sääntely: Epäselvä tai pirstaleinen sääntely
- Kansalaisten luottamus viranomaisiin: Matala luottamus
- Pelastushenkilöstön osaamispainotus: Perinteisten pelastustaitojen painotus
- Pelastuspalvelun järjestelmien autonomisuus: Täysi autonomia
- Tekoälyteknologian saatavuus: Korkea hinta, rajoitettu tarjonta
- Ilmastonmuutoksen vaikutukset: Voimistuvat vaikutukset

Tässä tulevaisuuskuvassa vuonna 2050 Pirkanmaan hyvinvointialueen pelastustoimi operoi ennennäkemättömän haasteellisessa ympäristössä. Tekoäly on periaatteessa läpäissyt pelastuspalvelujen kaikki tasot – aina hätäilmoitusten vastaanotosta onnettomuuspaikan operointiin – mutta sen hyödyntäminen tapahtuu sirpaleisen sääntelyn ja kansalaisten heikon luottamuksen ilmapiirissä. Pelastuslaitoksen järjestelmät kykenevät teknisesti lähes täyteen autonomiaan, mutta epäselvät lait ja ohjeistukset rajoittavat niiden käyttöä. Lisäksi autonomiset järjestelmät tekevät virheitä kriittisissä tilanteissa, ja lainsäädäntö ei tue virheiden korjaamista. Samaan aikaan ilmastonmuutoksen voimistuvat vaikutukset ovat moninkertaistaneet suuronnettomuudet ja luonnonkatastrofit, mikä pakottaa pelastustoiminnan organisaatiota etsimään keinoja vastata kasvaviin tarpeisiin. Korkea teknologian hinta ja rajallinen saatavuus merkitsevät, että vain pienellä osalla pelastusyksiköistä on käytössään uusinta teknologiaa - ja henkilöstön koulutuksessa painottuvat yhä perinteiset pelastustaidot, mikä luo kuilun huippumodernin teknologian ja sen käyttäjien osaamisen välille. Samaan aikaan suuryritykset tai varakkaat toimijat voivat hankkia täysautonomisia pelastusjärjestelmiä, mikä osaltaan syventää kansalaisten luottamuskriisiä viranomaisia kohtaan.

Pelastustoiminta osana mukautuvaa ekosysteemiä (ChatGPT)

Muuttujien arvot:

- AI-sääntely: Epäselvä tai pirstaleinen sääntely
- Kansalaisten luottamus viranomaisiin: Kohtalainen luottamus
- Pelastushenkilöstön osaamispainotus: Hybridiosaaminen
- Pelastuspalvelun järjestelmien autonomisuus: Ihmisohjaus keskiössä
- Tekoälyteknologian saatavuus: Teknologian korkea hinta ja rajoitettu tarjonta
- Ilmastonmuutoksen vaikutukset: Voimistuvat vaikutukset

Vaikka monet suuret kaupungit maailmalla ovat romahtaneet ilmastokriisin myötä, Tampere on yksi harvoista, joka on pystynyt mukautumaan. Se ei ole enää vain kaupunki, vaan elävä ekosysteemi, jossa ihmiset ja luonto elävät rinnakkain. Pirkanmaa ei ole teknologisesti edistyksellinen, mutta se on inhimillisesti kehittynyt. Sen vahvuus ei ole superkehittyneessä tekoälyssä, vaan siinä, että ihmiset ovat löytäneet tapoja elää kestävästi ja harmonisesti muuttuneessa maailmassa.

TUTU4 Tulevaisuudentutkimuksen menetelmien soveltaminen

Tulevaisuudentutkimuksen menetelmien soveltaminen (5 op) -opintojakson tavoitteena on tulevaisuusajattelun syventäminen ja tulevaisuusnäkökulman soveltaminen tutkimuskohteeseen. Opinto-jaksolla perehdytään tulevaisuudentutkimuksen menetelmiin ja työskentelytapoihin sekä tieteelliseen argumentaatioon ja tutkimuksenteon perusteisiin itsenäisen harjoitustyön avulla. Opintojakson suoritettuaan opiskelija osaa soveltaa valitsemaansa tulevaisuudentutkimuksen menetelmää omassa tutkimuksessaan sekä kykenee kriittisesti arvioimaan tutustumansa menetelmän vahvuuksia ja heikkouksia.

Opintojaksolta tähän julkaisuun valitut harjoitustyöt on arvioinut Tulevaisuudentutkimuksen Verkostoakatemian opettaja, koulutuspäällikkö **Hanna-Kaisa Aalto**.

Elsa Työläjärvi on harjoituksessaan onnistunut kaikissa oppimistavoitteissa erinomaisin tiedoin. Harjoituksen tekniset ja sisällölliset vaatimukset, kuten laajuus, rajaus, jäsentely, ongelmakeskeisyys, kokonaisvaltaisuus ja omaperäisyys ovat kohdallaan. Kysessä on hieno tasapainoinen kokonaisuus. Kirjoittaja on erinomaisen menetelmäosaamisen kasvattamisen lisäksi sisäistänyt aiheesta käytyä keskustelua ja kriittisesti tuonut esiin omaa näkemystään kehittämistarpeista. Harjoituksen syvyys erilaisine nyansseineen on poikkeavaa. Todella poikkeuksellisella tavalla sisäistettyä ymmärrystä kompleksisista asioista erittäin tärkeän teeman äärellä. Huippuharjoitus!

Ellimaija Virtanen on tehnyt aineistoanalyysin. Aineistoanalyyseista jää usein kirjoituspöytäharjoituksena mekanistinen vaikutelma. Virtasen harjoitus on kuitenkin erittäin kiinnostava ja onnistunut kokonaisuus. Kirjoittaja nostaa hienolla tavalla keskiöön turhankin tuntemattoman mallin ja analysoi sitä monipuolisesti ja kriittisesti. Kirjoittaja on jo pitkällä omassa tulevaisuusajattelussaan ja tekstissä on kyetty yhdistämään myös omaa ajattelua, vaikka pääasiallinen keskustelu käydään taitavasti aineiston kanssa. Erinomainen harjoitus!

Causal Layered Analysis osana kompleksisten yhteiskunnallisten haasteiden ratkaisua

Elsa Työläjärvi

Turun Yliopisto

Johdanto

Tulevaisuudentutkimuksen tavoitteet ja suhde yhteiskunnallisten ongelmien ratkaisuun

Tässä harjoitustyössä tarkastelen Sohail Inayatullahin kehittämää Causal Layered Analysis (CLA) -menetelmää ja erityisesti sen potentiaalia kompleksisten yhteiskunnallisten haasteiden ratkaisemisessa, joista esimerkkinä hyödynnän mielenterveyskriisiä Suomessa. Rajaan tarkasteluni menetelmän arvioinnissa laajoihin yhteiskunnallisiin ilmiöihin, koska edut ja haasteet ovat usein monin tavoin kontekstisidonnaisia. Esittelen aiheen ensin pintapuolisesti, minkä jälkeen siirryn valitun tutkimusmenetelmän tarkempaan esittelyyn. Seuraavaksi käyn läpi CLAn vahvuuksia ja heikkouksia rajauksen kontekstissa, sekä pohdin menetelmän soveltumista antamani esimerkin tarkasteluun. Tarkoituksena ei ole kuitenkaan käyttää menetelmää, vaan arvioida kriittisesti sen potentiaalia käyttökelpoisten ratkaisujen tarjoamiseen. Lopuksi tiivistän keskeisimmät havainnot ja esitän menetelmän toimivan hyvin kompleksisten yhteiskunnallisten ongelmien tarkasteluun ja etenkin pitkäjänteisten, useita osapuolia tyydyttävien ratkaisujen löytämiseen.

Tulevaisuudentutkimksella voidaan katsoa olevan useita erilaisia rooleja, tavoitteita, tehtäviä ja sovelluskohteita. Näihin lukeutuvat muun muassa inhimillisen elämän kuvailu tulevaisuuden näkökulmasta, yhteiskunnan kehityssuuntien tarkastelu, vaihtoehtoisten päätöksenteon ketjujen muodostaminen sekä vaihtoehtoisten tulevaisuuksien arviointi (Rubin n.d.a). Tulevaisuudentutkimuksen tehtävien lista on moninainen, joten myös niiden täyttämiseen vaaditaan monenlaisia tutkimusmenetelmiä. Valittu menetelmä vaikuttaa siihen, millaista tietoa tutkimuksen avulla voidaan saada. Osa menetelmistä soveltuu paremmin tiettyjen aiheiden tarkasteluun, mutta toisaalta monia aiheita voi olla hyvä tarkastella useilla eri menetelmillä useiden näkökulmien huomioimiseksi. Yhden menetelmän avulla harvoin saadaan kokonaisvaltaista kuvaa aiheesta. Tiedostamalla käytetyn menetelmän heikkoudet ja rajoitteet voidaan kuitenki kasvattaa menetelmästä saatavaa hyötyä, ennakoida mahdollisia vinoumia tai sokeita pisteitä ja tehdä valistuneempia päätöksiä siitä, mitä muita menetelmiä tutkimusprosessiin olisi järkevää yhdistää.

Vaikka yhden menetelmän tuottama kuva aiheesta on usein rajallinen, yksi CLAn vahvuuksista on erilaisten tutkimusperinteiden yhdisteleminen joustavalla tavalla. CLAlle on ominaista vuoropuhelu erilaisten tietämisen tapojen välillä, jolloin saadaan huomioitua useita näkökulmia yhden menetelmän avulla. CLAn tarkoituksena ei ole arvottaa tiettyä tietämisen tapaa muiden yläpuolelle, vaan luoda tilaa moninaisuudelle ja auttaa näkemään jotain arvokasta kaikissa näkemyksissä. Menetelmän kehittäjä Sohail Inayatullah on saanut vaikutteita opintojensa aikana muun muassa poststrukturalismista, kriittisestä perinteestä, empiristeiltä, toimintatutkimuksesta ja tulkitsevasta tietämisen tavasta. CLAn keskeisin tavoite ei ole suoraan tulevaisuuden ennakointi, vaan vaihtoehtoisten tulevaisuuksien mahdollistaminen ilmiöiden dekonstruktion kautta. Siten se soveltuu käytettäväksi myös tulevaisuudentutkimuksen kentän ulkopuolella, erityisesti ihmistieteissä. (Inayatullah 2004; Inayatullah 2009.)

Mielenterveyskriisi Suomessa

Yksi ratkaisua kaipaavista haasteista, johon tulevaisuudentutkimuksella ja varsinkin CLAlla voisi olla annettavaa on Suomessa viime vuosina enenevässä määrin puhuttanut mielenterveyskriisi ja sitä kautta lisääntynyt terapian kysyntä. Etenkin lasten ja nuorten pahoinvointi on lisääntynyt, mikä on johtanut mielenterveyden oireisiin liittyvien käyntimäärien voimakkaaseen kasvuun sekä perusterveydenhuollon että erikoissairaanhoidon puolella. Aihe on kiinnittänyt niin kansalaisten kuin päättäjien huomion ja ratkaisuja on pyritty hakemaan muun muassa terapiatakuusta. Terapiatakuulla viitataan lainsäädäntöön, joka turvaisi yhdenvertaisen hoitoon pääsyn aikarajoitteen puitteissa. (Eduskunta 2024.) Haasteena on kuitenkin mielenterveyskriisin kompleksinen luonne, eli ilmiö on vaikeaselkoinen, monista erilaisista elementeistä koostuva kokonaisuus, jonka analysointi ja ratkaisu ovat työläitä. Kompleksinen ilmiö on myös enemmän kuin osiensa summa, jonka osat ovat aktiivisessa vuorovaikutuksessa keskenään, mikä tuo omat haasteensa ratkaisujen luomiseen. (Rubin n.d.b.)

Mielenterveyskriisi aiheuttaa selkeästi muutospaineita nykyiselle järjestelmälle, jonka kantokyky ei riitä vastaamaan kysyntään ja tarpeeseen. Sopivien ratkaisujen löytäminen vaatii useiden alojen yhteistyötä, ja tulevaisuudentutkimuksella voisi olla keskeinen rooli pitkäjänteisten ratkaisujen hakemisessa. Wileniuksen (2022) mukaan etenkin pitkän linjan transformatiivisessa tulevaisuudentutkimuksessa on tärkeää tutustua omiin mentaalimalleihin ja arvioida kriittisesti luomiamme perusolettamuksia. Wilenius katsoo, että etenkin selkeät työkalut ovat tässä keskeisessä roolissa, nostaen esille Peter Schwartzin tekemän työn skenaarioajattelun parissa. CLA on juuri tällainen työkalu, joka mahdollistaa mentaalimallien ja perusolettamusten kriittisen arvioinnin avaten tilaa vaihtoehtoisille tulevaisuuksille ja pitkäjänteiselle muutokselle. Sosiaali- ja terveyspalvelut, joihin mielenterveyspalvelutkin kuuluvat, ovat olleet politiikan keskiössä 2000-luvun aikana niin sote-uudistuksen kuin nykyisen hallituksen talouskurin myötä. On ymmärrettävää, että sote-palveluihin liittyvät kysymykset politisoituvat helposti, sillä ne ovat yksi julkisen talouden suurimmista menoeristä (Tilastokeskus 2024). Pitkäjänteisyyden kannalta voimakas politisoituminen ei kuitenkaan ole eduksi, joten CLAn avulla voitaisiin saavuttaa parempi ymmärrys taustalla vallitsevista ajatusmaailmoista ja mahdollisesti rakentaa pitkän aikavälin toimintasuunnitelma.

Causal Layered Analysis menetelmänä

Menetelmän tausta

Causal Layered Analysis on Sohail Inayatullahin 1990-luvulla vahvaan teoreettiseen viitekehykseen perustuva kvalitatiivinen tutkimusmenetelmä, joka yhdistelee useita eri tutkimusperinteitä. CLA sijoittuu kriittisen tulevaisuudentutkimuksen kentälle, pohjautuen etenkin poststrukturalismiin, makrohistoriaan ja postkolonialistiseen monikulttuuriseen teoriaan. Menetelmä pyrkii purkamaan kiistoja eri tutkimusperinteiden välillä tunnustamalla, että on olemassa useita erilaisia tietämisen muotoja, joista kaikki voivat olla tavalla tai toisella arvokkaita, todellisia ja hyödyllisiä. Eri tietämisen tapojen huomiointia varten valittua ilmiötä tarkastellaan neljässä eri kerroksessa, joista kaikki pyrkivät tavoittamaan ilmiön eri aspekteja. Tämän vertikaalisen syvyyden lisäksi analyysiprosessissa liikutaan vielä horisontaalisesti kerroksien sisällä, jotta voidaan tavoittaa rinnakkaisista katsomuksista kumpuavat ilmiöt. (Inayatullah 2004.) CLA pyrkii siis yhdistämään eri koulukuntien viisaudet esittämällä, että useampi totuus voi vallita yhtä aikaa. Ilmiöiden analysointi kerroksien kautta puolestaan perustuu ajatukseen siitä, että samalla ilmiöllä voi olla useita eri ilmentymisen muotoja, jotka ovat kuitenkin yhteydessä toisiinsa. Akateemisessa maailmassa keskitytään usein vahvasti kielelliseen ja numeeriseen ilmaisuun, mutta esimerkiksi Inayatullah (2013) hyödyntää runsaasti erilaisia (mieli)kuvia kertoessaan CLAn toimintalogiikasta. Tämä kuvastaa CLAn taustalla vallitsevaa ajatusta erilaisten tietämisen tapojen arvostamisesta ja yhdistelystä.

CLAn painopiste on erityisesti ilmiöiden kriittisessä dekonstruktiossa ja tulevaisuuden kyseenalaistamisessa, joiden kautta pyritään avaamaan mahdollisuuksia vaihtoehtoisille tulevaisuuksille. Tavoitteena ei siis ole tulevaisuuden ennustaminen tai ennakointi, vaan ennen kaikkea transformaation mahdollistaminen, jonka taustalla vallitsee ymmärrys siitä, että vaihtoehtoiset tulevaisuudet syntyvät nykyhetken valinnoista. Poststrukturalistisen kriittisen tutkimuksen ytimessä on mittayksiköiden problematisointi, minkä vuoksi CLAn painopiste on tulevaisuuden ennustamisen sijaan sen kyseenalaistamisessa. Mittayksiköiden ja ylipäätään mittaamisen arvoisena pidettyjen asioiden kriittinen tarkastelu on tärkeää transformaation saavuttamiseksi, koska ne ohjaavat toimintaamme. Mittaamisen arvoisena pidettyihin asioihin puolestaan vaikuttavat erilaiset tarinat ja uskomukset, joiden kautta tarkastelemme ilmiöitä. Tulevaisuusaspektin yhdistäminen poststukturalistiseen analyysiin tarjoaakin hedelmällisen etäisyyden nykyisyyden kriittiseen tarkasteluun ja siten mahdollisuuden vaihtoehtoisille tulevaisuuksille (Inayatullah 2004; Inayatullah 2013.)

Kerrokset

CLA koostuu neljästä eri kerroksesta, joilla saman ilmiön nähdään esiintyvän eri tavoin.

1. Litania: Uutiset, mediadiskurssit, julkinen keskustelu. Liioitellut trendit, joita ei yhdistetä toisiinsa. Kaikista näkyvin kerros, päivittäinen vuorovaikutus.

2. Systeemi: Ympäristön vaikutusten analyysi, tulkinta ja virallisten tahojen julkaisut, joissa pohditaan litanian taustalla vaikuttavia syitä ja mekanismeja. Tekniset selitykset, kvalitatiivisen datan tulkinta. Eri tahojen intressien tarkastelu.

3. Maailmankuva: Kulttuurin ja sosiaalisesti tuotettujen merkitysten syvällinen analysointi. Kielen roolin ja ajatusmaailmojen tarkastelu. Miten käytävä keskustelu kehystää ymmärrystämme.

4. Myytti/metafora: Syvin taso, joka kiteyttää ilmiöön liittyvät kokemukset emotionaalisella tasolla. Ajan ja rationaalisuuden käsitysten tarkastelu. Tunteiden ja tiedostamattoman analysointi ja haastaminen.

Kerrosten avulla pyritään dekonstruktoimaan tarkasteltava ilmiö osiin, jotta syyt voidaan erotella seurauksista. Tämä mahdollistaa tehokkaan ja pitkäjänteisen transformaation, sillä tarvittavat toimenpiteet voidaan kohdistaa juurisyihin seurausten hoitamisen sijaan. Jokaisella tasolla on myös omat toimijat, jotka pystyvät tehokkaimmin vaikuttamaan tilanteeseen. Kerrokset ovat kuitenkin joustavia, eikä niiden tarkoituksena ole luoda jäykkiä, ulkopuolelta pakotettuja kategorioita, vaan ohjata dekonstruktioprosessia. Niiden avulla voidaan myös tehostaa toimenpiteiden vaikutusta, sillä paras lopputulos saadaan monesti samaan aikaan eri kerroksilla tapahtuvan toiminnan yhteisvaikutuksena. Kerrokset rakentuvat toistensa päälle niin, että alemmaksi mentäessä analyysin taso syvenee. CLA menetelmänä painottaa hieman enemmän syvempien kerrosten vaikutusta, koska muutoksen katsotaan olevan sitä pidempiaikaisempi, mitä alemmas mennään. Kaikki kerrokset nähdään kuitenkin arvokkaina ja uskomus eri tietämisen tapojen hyväksymiseen ja hyödyntämiseen on CLAn keskiössä. (Inayatullah 2004; Inayatullah 2009.) Alla Jennifer Fitzgeraldin taulukko (Inayatullah 2009, 39), jossa havainnollistetaan kerroksia ja niiden vaikutusalueita.

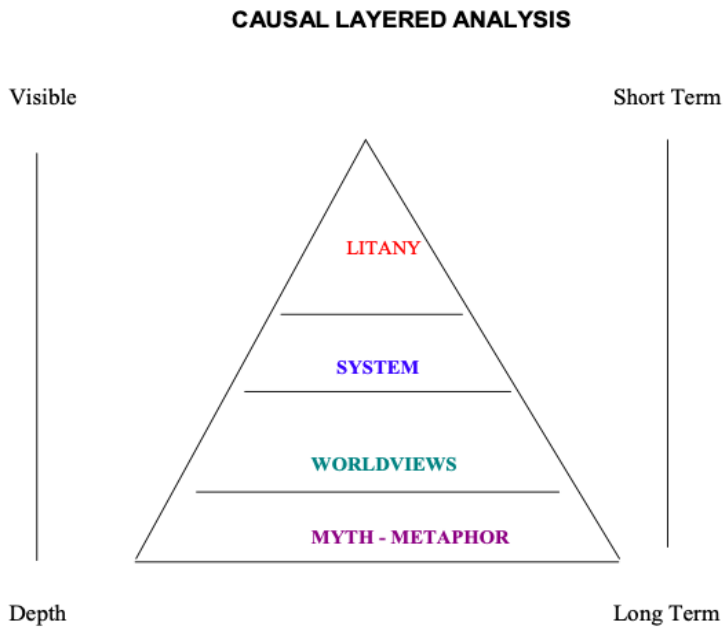
***Taulukko 1**. Causal Layered Analysis Table by Jennifer Fitzgerald (Inayatullah 2009, 39).*

CAUSAL LAYERED ANALYSIS TABLE (developed by Jennifer Fitzgerald).

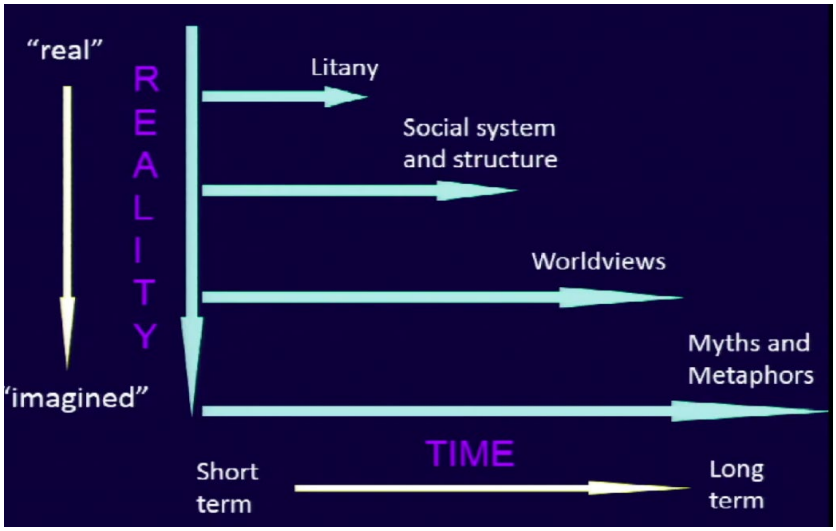
Level	Problem	Solution	Who can solve it?	Source – Information
Litany Official public discourse	Problem seems difficult to solve or easy to solve as depth is not seen	Short term approaches	Government	Television Newspaper
Systemic, Social Science analysis Society, Technology, Economy, Environment and Politics	Problem because of short term historical factors	Integrated approaches – systemic solutions	Partnerships between different sectors of society – government plus business plus civil society plus individuals	Policy Journals, editorials
Worldview (Discourse – Paradigm)	Constituted by frame of analysis – deep structure.	Transform consciousness, change worldview, rethink self and other	Writers, philosophers, those outside the dominant discourse	Peripheral journals, ideological journals, philosophy courses
Myth and Metaphor	Constituted by core myth, derived from often a traumatic or transcendent event	Uncover myth and metaphors and create processes to imagine alternative stories of what it means to be. Cannot be rationally designed. Emergence is necessary	Collective unconscious often guided by visionary, mystic, leader.	Works of artists, visionaries, mystics, and certain movies

Kerrosten tulkintaa

Kuvaajassa 1 Inayatullah (2009) esittää CLAn kerrokset pyramidin muodossa niin, että ylimpänä on pinnallisin litanian taso ja alimpana syvin myytti/metafora taso. Vasemmalla havainnollistetaan sitä, miten kerroksien näkyvyys heikkenee syvemmälle mentäessä ja oikealla puolestaan kuvataan kerroksilla tapahtuvien muutosten tai toimenpiteiden vaikutuksen aikajännettä. Inayatullahin kuvaaja on hyvin staattinen, eikä siitä välity CLAn keskeisiin piirteisiin kuuluva joustava, edestakainen liike kerroksien välillä tai sisällä. Menetelmän visualisointi on keskeistä, sillä Inayatullah (2013) kertoo mielikuvien ohjaavan toimintaamme. Kuvaajassa 2 Inayatullah (2013) huomioi paremmin CLAn dynaamisuuden ottamalla kuvioon mukaan nuolet, jotka kuvaavat kerrosten, ajan ja syvyyden liikettä. Nuolet kulkevat kuitenkin vain yhteen suuntaan, jolloin Inayatullahin (2004; 2009) itse korostama edestakainen liike niin kerroksien sisällä kuin niiden välillä jää kuvaajasta pois.



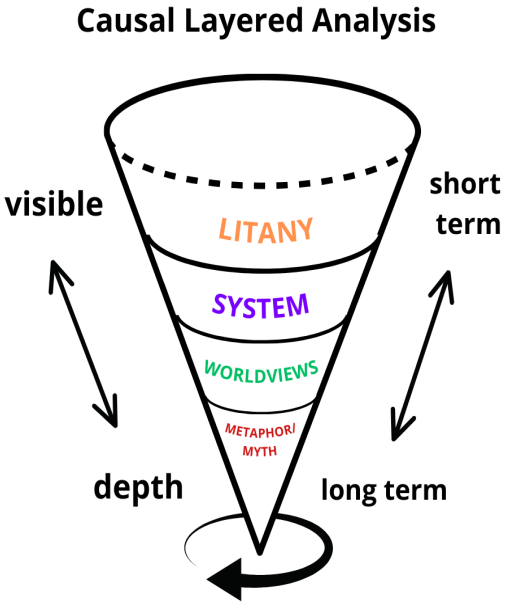
Kuvaaja 1. *Causal Layered Analysis (Inayatullah 2009, 40).*



Kuvaaja 2. *Causal Layered Analysis (Inayatullah 2013).*

Alapuolella kuvaajassa 3 esitän oman ehdotukseni sille, miten menetelmää voitaisiin kuvata niin, että kuvaajasta ilmenisi paremmin menetelmän dynaamisuus. Olen valinnut kaksiulotteisen kuvion sijaan kolmiulotteisen kartion, jonka alla oleva nuoli kuvastaa liikettä kerrosten sisällä. Kartion sivuille olen sisällyttänyt kuvion 1 esitystavan mukaisesti aikaa ja syvyyttä kuvaavat ulottuvuudet, joihin olen yhdistänyt kuvaajan 2 nuolet indikoimaan dynaamisuutta. Kuitenkin toisin kuin kuvaajassa 2, nuolet ovat viivan molemmissa päissä, jotta liike ymmärrettäisiin yksisuuntaisen sijaan edestakaisena. Lopuksi olen valinnut kääntää kartion kartion ylösalaisin, sillä se kuvastaa mielestäni paremmin kerrosten välistä suhdetta. Ylimpänä oleva litania on kaikista näkyvin kerros, joten sen asettaminen suurimmaksi on intuitiivinen valinta. Lisäksi, jos miettii tasojen ominaisuuksia, niin pinnalliseen litaniaan voi törmätä kaikkialla ja sitä on ikään kuin määrällisesti "suurin volyymi". Alimmaksi pienimpään osioon jää silloin myytti/metafora taso, johon tiivistyy ydinsanoma. Ylösalainen kartio voidaan esimerkiksi nähdä suppilona, joka suodattaa ylimääräisen kohinan

niin, että alimpaan kerrokseen jää vain ydin. Vaihtoehtoisesti muiden kerrosten voidaan ajatella kumpuavan kärkeen kiteytetystä myytistä. Kolmiulotteisuus puolestaan vahvistaa kaikkia edellä mainittuja mielikuvia ja mahdollistaa kuvion luovemman tulkinnan.



Kuvaaja 3. *Causal Layered Analysis esitettynä kartion muodossa.*

Soveltaminen kompleksisiin yhteiskunnallisiin haasteisiin

Vahvuuksia ja haasteita

Koska CLA keskittyy kriittiseen pohdintaan ja yhdistelee erilaisia tutkimusperinteitä ja tietämisen tapoja, se soveltuu käytettäväksi moniin erilaisiin tarkoituksiin. Verrattuna useisiin tulevaisuudentutkimuksen menetelmiin, sen katse kohdistuu voimakkaammin nykyhetkeen kuin suoranaisesti tulevaisuuteen, vaikka nykytilanteen analyysin taustalla onkin pyrkimys tulevaisuuksien avaamiseen (Inayatullah 2004; Inayatullah 2009). Tämän vuoksi CLA tarjoaa työkalun syväluotaavaan, kriittiseen analyysiin ja transformaation edistämiseen myös tulevaisuudentutkimuksen kentän ulkopuolella. Menetelmän kehittäjä Inayatullah (2004) ehdottaakin, että menetelmä voisi olla hyödyllinen pitkäjänteisen, inklusiivisen ja tehokkaamman politiikan kehittämisessä. Inayatullah (2009) arvioi, että CLAn vahvuuksia on sen kyky mennä pintaa syvemmälle maailmankuvien, myyttien ja metaforien tasolle, jolloin voidaan tarkastella paremmin eri diskursseihin liittyviä arvoja ja institutionalisoituneita eli vakiintuneita käytäntöjä. On kuitenkin syytä ottaa huomioon, että Inayatullah on itse menetelmän kehittäjä, joten hänen arvioonsa on hyvä suhtautua kriittisesti.

Myös Bishop & Dzidic (2014) argumentoivat CLAn puolesta kompleksisten, sosiaalisten ja yhteisöllisten haasteiden ratkaisijana psykologian kentällä. He esittävät oman sovelluksensa menetelmästä, jossa he keskittyvät CLAn potentiaaliin kompleksisten sosiaalipsykologisten ongelmien ratkomisessa. Tässä harjoitustyössä tarkastelemani esimerkki mielenterveyskriisistä Suomessa muistuttaa paljon Bishopin & Dzidicin kuvaamia ongelmatapauksia, joissa he lainaavat Rittelin & Webberin (1973) termiä ‘viheliäiset ongelmat’. Rittel ja Webber mainitsevatkin yhtenä esimerkkinä viheliäisestä ongelmasta mielenterveyspalveluiden kehittämisen, mikä on voinut toimia Bishopin & Dzidicin (2014) inspiraationa. Viheliäisillä ongelmilla Rittel & Webber (1973) viittaavat erityisesti laajan mittakaavan suunnitteluun liittyviin haasteisiin, joita ei voida ratkoa luonnontieteiden lailla pelkän loogisen päättelyn avulla. Näiden ongelmien viheliäisyys piilee siinä, että

ne ovat vaikeasti määriteltävissä, niihin ei ole olemassa oikeita vastauksia ja juurisyiden erottaminen voi olla haastavaa.

Bishop & Dzidic (2014) esittävät, että CLAn etuna on tietämisen tapojen yhdistäminen sekä monipuolinen ympäristön huomiointi, kuten taloudellisen, poliittisen, sosiaalisen ja historiallisen kontekstin vaikutusten arvioiminen. Tämä auttaa Bishopin & Dzidicin sanoin tarkastelemaan ihmisten “elettyjä kokemuksia” pakottamatta niitä tietyn oppialan rajojen sisälle. He korostavat, miten kompleksisten ongelmien kohdalla ratkaisut jäävät usein tehottomiksi, koska aihe on dekonstruktoitu vain pinnallisesti ja siten CLAn tuoma syvyys voisi auttaa suuntaamaan strategian paremmin juurisyihin. Bishop & Dzidic suhtautuvat kuitenkin kriittisesti tutkijan rooliin CLAn toteutuksessa ja valtaan määritellä CLAn kautta avautuvat (parempana pidetyt) vaihtoehtoiset tulevaisuudet. Siksi heidän esittämässään versiossa painopiste on selittävässä analyysissä ja tulevaisuusaspekti jää vähemmän merkittäväksi. Voimaantumisteoriaan pohjaten Bishop & Dzidic korostavat, että todellisen sosiaalisen muutoksen aikaansaamiseksi ongelman keskiössä olevien ryhmien tulisi olla ensisijaisena suunnannäyttäjänä ja tutkijan avustavana fasilitaattorina.

Inayatullah (2009) on kerännyt myös muiden esittämiä potentiaalisia haasteita, jotka käsittelevät erityisesti menetelmän taustalla vallitsevia epistemologisia lähtökohtia tai käyttäjän perehtyneisyyttä. Esimerkiksi Rick Slaughter esittää CLAn käytön vaativan sellaisia kriittiseen tulkintaan ja hermeneutiikkaan liittyviä taitoja, jotka voivat aluksi olla haastavia humanististen alojen ulkopuolelta tuleville. Andy Hines puolestaan huomauttaa, että homogeenisessa ympäristössä erityisesti CLAn pyrkimys leveyteen voi jäädä heikoksi. Silloin menetelmä ei toimi tavoitteiden mukaisesti uusien ajatusmallien avaajana, vaikka tällaisessa tilanteessa tarve saattaisi olla kaikista suurin. Inayatullah (2009) itse lisää tähän listaan myös, että vahvasti empirismiin nojaavien tutkijoiden kohdalla CLA voi johtaa kognitiivisen dissonanssin syntymiseen, sillä CLAn ajatus useiden totuuksien ja tietämisen tapojen olemassaolosta on lähtökohtaisesti ristiriidassa empiristisen ajatuksen kanssa yhden totuuden löytämisestä tai paljastamisesta tutkimuksen kautta. Laajojen yhteiskunnallisten haasteiden kohdalla, joihin keskityn tässä harjoitustyössä, on syytä kiinnittää erityistä huomiota liian homogeenisuuden välttämiseen. Edellä luetellut mahdolliset haasteet eivät kuitenkaan merkittävästi rajoita CLAn hyödyntämistä kompleksisten yhteiskunnallisten haasteiden ratkaisuun ja menetelmän teoreettiset lähtökohdat vaikuttavat soveltuvan hyvin tähän tarkoitukseen.

Causal Layered Analysis ja mielenterveyskriisi Suomessa

Bishopin & Dzidic (2014) näkemykset huomioiden esimerkkini tutkimiseen voisi sopia osallistava, työpajamuotoinen toteutus, johon osallistuisi tutkijoiden lisäksi mielenterveyspalveluiden asiantuntijoita, psykologian alan ammattilaisia, aktivisteja ja poliitikkoja. Moni myös toimii useassa näistä rooleista samanaikaisesti. Esimerkkejä sopivista henkilöistä voisi olla vuoden 2024 europarlamenttivaaleissa ehdolla ollut psykologi Julia Sangervo, jonka keskeinen vaaliteema oli mielenterveyden edistäminen yhteiskuntarakenteiden muutoksen kautta tai Alviina Alametsä, entinen europarlamentaarikko ja nykyinen kansanedustaja, joka tunnetaan muun muassa Terapiatakuu-kansalaisaloitteesta. Toiminnan kautta oppiminen on ollut alusta asti keskeinen osa CLAn kehitystä, missä työpajatyöskentelyllä on merkittävä rooli (Inayatullah 2004). Toimintatutkimuksessa nimensä mukaisesti edetään osallistavan toiminnan pohjalta, jolla pyritään ongelmanratkaisuun muutoksen kautta. Toimintatutkimusta luonnehtii myös monenlaisten menetelmien yhdistely ja prosessinomaisuus, jossa suunnitelmaa arvioidaan ja kehitetään tutkimuksen edetessä. (Jyrkämä 2021.)

Jotta vältyttäisiin yksipuoliselta näkemykseltä, CLAn kanssa työpajatyöskentelyyn voisi olla hyvä yhdistää muita menetelmiä ja ryhmiä. Inayatullah (2009) katsoo CLAn yhdistämisen esimerkiksi skenaariomenetelmään olevan hyvä vaihtoehto strategiseen suunnitteluun. Muun muassa Minkkinen ym. (2019) ovat kokeilleet CLAn hyödyntämistä skenaarioprosessin keskellä. Inayatullah tuo myös esille, että CLAn toimii parhaiten, kun osallistujia valitaan moninaisista taustoista, jotta analyysiin saadaan syvyyden lisäksi myös leveyttä, eli kerroksien sisäistä liikkuvuutta. Näiden huomioimiseksi voitaisiin pohtia, ketkä jäävät usein yhteiskunnallisen suunnittelun ulkopuolelle. Esimerkiksi maahanmuuttajat ja etenkin pakolaiset kohtaavat

monia haasteita, jotka altistavat mielenterveyden häiriöille (Kerkkänen & Säävälä 2015). Heidän yhteiskunnallispoliittinen osallistuminen jää kuitenkin usein heikoksi esimerkiksi alkeellisen kielitaidon ja päätöksentekoon liittyvien prosessien tiedon puutteen vuoksi (Ahokas, Weide & Wilhelmsson 2011, 58–60).

Esimerkkitapauksen kartoitus ja haasteet

Mielenterveysaiheisen työpajan keskeisiä kysymyksiä ovat muun muassa rahoitus, ajankäyttö, fyysinen tila tai muut materiaalit, osallistujien tavoittaminen ja mahdollinen kompensointi sekä tuotosten todellinen vaikuttavuus. Ensinnäkin, aika on usein hyvin rajallinen resurssi ja työpajatyöskentely vaatii osallistujilta samanaikaista läsnäoloa, jolloin kiireisten aikataulujen yhteensovittaminen voi olla haastavaa. Toinen keskeinen, rajallinen resurssi on raha, mutta mielenterveyskriisin kaivatessa kipeästi ratkaisuja rahoituksen löytäminen tuskin muodostuisi esteeksi. Tilaa on myös syytä pohtia, sillä se voi vaikuttaa työskentelyssä syntyvään dynamiikkaan tai osallistujien luovuuteen. Virtuaaliset ratkaisut voivat olla helpompia järjestää, mutta fyysinen tila voi puolestaan edistää paremmin kommunikaatiota ja ideoiden jakamista. Kuten Inayatullah (2013) kuvaa, fyysisen tilan asetelma voi vaikuttaa omaksumiimme rooleihin ja ajatusmalleihin. Koska CLAn tarkoituksena on avata vaihtoehtoisia tulevaisuuksia ja dekonstruktoida ilmiöitä pintaa syvemmälle, konventionaalinen kokoushuone ei välttämättä ole paras työpajan toteutukseen.

Työpajaan osallistuvien henkilöiden mielekäs määrä on rajallinen, joten tasapainottelua käytännön rajoitteiden ja edustavuuden huomioinnin välillä on syytä pohtia. Jyrkämä (2021) tuo esille, että toimintatutkimuksessa on syytä harjoittaa triangulaatiota, eli erilaisten menetelmien ja aineistojen yhdistelemistä. Siten edustavuutta voitaisiin hakea esimerkiksi erilaisista rekisteri- tai kyselyaineistoista, jotka olisi suunnattu mielenterveyspalveluiden käyttäjille. Kyselyitä on mahdollista tehdä myös eri kielillä, jolloin saataisiin huomioitua aiemmin mainittu maahanmuuttajien heikko kielitaito, joka voisi muuten muodostua työpajamuotoisessa työskentelyssä osallistumisen esteeksi. Olennainen haaste on myös CLAn kautta tuotettujen vaihtoehtoisten tulevaisuuksien valjastaminen osaksi konkreettisia käytäntöjä. Tämä huomioiden esimerkiksi juuri poliitikkojen ja aktivistien kutsuminen työpajatyöskentelyyn voi olla hyvä keino levittää tuloksia tehokkaasti laajalle, vaikutusvaltaiselle yleisölle.

Lisäksi täytyy miettiä, miten ohjeistus pidetään mahdollisimman selkeänä ja yksinkertaisena, jotta CLAn ymmärtäminen ei muodostu kenellekään esteeksi. CLA vaatii käyttäjältään perehtyneisyyttä, joten osallistujille ei todennäköisesti ole mielekästä selittää yksityiskohtaisesti CLAn teoreettista taustaa, vaan tutkijan tai tutkijoiden tehtävänä on tuntea menetelmä ja laatia sen pohjalta työpajan tehtävät kohderyhmä huomioiden. Minkkinen ym. (2019) korostavat kokeilussaan yhdistää CLA skenaarioprosessin keskelle niin selkeitä ohjeita kuin ajankäytön huomioimista. He huomauttavat myös osallistujien mahdollisesta väsymisestä, jos tehtävät ovat pitkiä ja monimutkaisia. Työpajan toteutuksessa voisi ottaa mallia esimerkiksi tavasta, jota Zackery ym. (2022) ovat käyttäneet Ishafan kaupungin suunnitteluun. Siinä osallistujat virittäytyvät ensin aiheen pariin lämmittelytehtävien avulla ja sitten siirtyvät työskentelemään ryhmissä tuottaen materiaalia annettujen tehtävien mukaan. Tämän jälkeen tutkijat käyvät läpi materiaalin ja tulkitsevat sitä CLAn kehyksessä. Prosessiin voisi kuitenkin lisätä vielä toisen työpajan sen jälkeen, kun tutkijat ovat analysoineet materiaalia. Näin ensimmäisellä kerralla voitaisiin pyrkiä kartoittamaan vallitsevia (rajoittavia) uskomuksia ja jälkimmäisellä kerralla puolestaan pohtia, miten näistä päästään yli kohti muutosta ja minkälaiset vaihtoehtoiset tulevaisuudet olisivat toivottavia.

Loppupäätelmät

Laajojen, kompleksisten yhteiskunnallisten ongelmien ratkaisu vaatii useiden eri alojen yhteistyötä. Näitä ongelmia, kuten mielenterveyskriisiä voidaan kutsua myös viheliäisiksi ongelmiksi, koska niiden ratkaisuun ei riitä pelkkä asiantuntijuus tai looginen päättely. Siten voidaankin puhua ennemmin suunnittelusta, kuin ratkomisesta, sillä näihin ongelmiin ei ole olemassa yhtä oikeaa ratkaisua, joka odottaa oikean kaavan löytämistä. CLA menetelmänä perustuu erilaisten tietämisen tapojen hyödyntämiseen ja luovaan yhdistelyyn, mikä vaikuttaa soveltuvan hyvin tällaisten ongelmien tarkasteluun. Etenkin CLAn kyky ottaa huomioon useiden eri ajatusmaailmojen tavat käsittää ilmiöitä on merkittävä etu globalisaation myötä kriisien paisuessa polykriiseiksi. Suomen mielenterveyskriisin kontekstissa puolestaan esimerkiksi maahanmuuton kasvaessa CLA voisi auttaa tavoittamaan väestöryhmiä, jotka eivät yleensä saa ääntään kuuluviin.

CLAn etuna on myös pitkäjänteisyys, joka voisi kompensoida politiikan luonteelle tyypillistä nopeatempoisuutta. Etenkin syvempien kerroksien analysointi pystyy tarjoamaan sellaisia pitkäaikaisia ratkaisuja, joihin useat muut selvitykset ja konventionaaliset tutkimusmenetelmät eivät kykene. Vahvasti teoriaan pohjautuvana menetelmänä käytännön toteutus on syytä suunnitella huolellisesti ja miettiä tapauskohtaisesti, miten yksityiskohdat olisi järkevää toteuttaa toivotun tuloksen aikaansaamiseksi. Inayatullah (2009) varoittaakin siitä, että liiallinen keskittyminen ilmiön analysointiin voi johtaa toiminnan puutteeseen. Siksi toimintatutkimuksellinen lähestymistapa, jossa toiminta nostetaan keskiöön toimii hyvin erityisesti yhteiskunnallisessa suunnittelussa, jossa abstraktille tasolle jääminen on yksi haastavimmista sudenkuopista.

Antamassani esimerkissä Suomen mielenterveyskriisistä työpajamuotoinen työskentely voi auttaa niin Inayatullahin painottaman konkretian, kuin Bishopin & Dzidic (2014) varoittaman liiallisen teknokraattisen lähestymistavan kanssa. Esimerkiksi poliitikkojen tai aktivistien ottaminen työpajaan voi olla helppo tapa levittää tuotoksia resurssitehokkaasti myös akateemisen maailman ulkopuolelle. Kokonaisuudessaan CLA vaikuttaa soveltuvan hyvin laajojen yhteiskunnallisten haasteiden ratkaisuun, sillä se huomioi monipuolisesti eri tietämisen tapoja, mikä on merkittävä etu etenkin polarisaation kasvaessa. Se huomioi myös vaikeasti tavoitettavat, tiedostamattomat myytinomaiset uskomukset, joita kaikki tutkimusmenetelmät eivät tavoita. Tämä voi auttaa löytämään sellaisia ratkaisuja, jotka vetoavat osapuoliin myös syvemmällä, emotionaalisella tasolla kestävän muutoksen aikaansaamiseksi.

Lähdeluettelo

Ahokas, Laura & Weide, Marjukka & Wilhelmsson, Niklas (toim.) (2011) Maahanmuuttajien yhteiskunnallisen osallistumisen tukeminen julkishallinnossa ja puolueissa, Oikeusministeriön julkaisuja, 58–60.

Bishop, Brian & Dzidic, Peta (2014) Dealing with Wicked Problems: Conducting a Causal Layered Analysis of Complex Social Psychological Issues. American Journal of Community Psychology 53, 13–24. https://doi.org/10.1007/s10464-013-9611-5.

Eduskunta (2024) Lasten ja nuorten terapiatakuu. https://www.eduskunta.fi/FI/naineduskuntatoimii/kirjasto/aineistot/kotimainen_oikeus/LATI/Sivut/lasten-ja-nuorten-terapiatakuu.aspx?TSPD_101_R0=0814c91602ab20006f5fc9be3eb0cc18539b8bfa82c5a3af80945d02806257b04d24bed622017d4408e44ad4911430007301d0d7431d5111b06fcf6243c5a631897f1588ad292801c226ee05e10d9c3c0f6ca2e6d1e1c35fc25114bc83a254a1 (haettu 10.10.2024)

Jyrkämä, Jyrki (2021) Toimintatutkimus. Tampere: Yhteiskuntatieteellinen tietoarkisto [ylläpitäjä ja tuottaja]. https://www.fsd.tuni.fi/fi/palvelut/menetelmaopetus/kvali/tutkimusasetelma/toimintatutkimus/ (haettu 15.10.2024)

Kerkkänen, Heikki & Säävälä, Minna (2015) Maahan muuttaneiden mielenterveyden tila, riskitekijät ja vahvistavat tekijät. Teoksessa Kerkkänen, Heikki & Säävälä, Minna (toim.) Maahanmuuttajien psyykkistä hyvinvointia ja mielenterveyttä edistävät palvelut. Työ- ja elinkeinoministeriön julkaisuja, 16–29. https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/75031/TEMjul_40_2015_web_09062015.pdf?sequence=1&isAllowed=y (haettu 16.10.2024)

Minkkinen, Matti & Heinonen, Sirkka & Parkkinen, Marjukka (2019) Drilling and Blasting to Learn Scenario Construction: Experimenting with Causal Layered Analysis as a Disruption of Scenario Work. World Futures Review 11(2), 110–121.

Rittel, Horst & Webber, Melvin (1973) Dilemmas in a General Theory of Planning. Policy Sciences 4(2), 155–169. http://www.jstor.org/stable/4531523.

Rubin, Anita (n.d.a) Tulevaisuudentutkimus tiedonalana. TOPI – Tulevaisuudentutkimuksen oppimateriaaleja. https://tulevaisuus.fi/perusteet/tulevaisuudentutkimus-tiedonalana/ (haettu 10.10.2024)

Rubin, Anita (n.d.b) Käsitteitä I–R. TOPI – Tulevaisuudentutkimuksen oppimateriaaleja. https://tulevaisuus.fi/perusteet/tulevaisuudentutkimus-tiedonalana/ (haettu 10.10.2024)

Sohail, Inayatullah (2004) Causal Layered Analysis: Theory, historical context and case studies. Teoksessa Sohail Inayatullah (toim.) The Causal Layered Analysis (CLA) Reader: Theory and Case Studies of an Integrative and Transformative Methodology. Tamakang University Press, 8–49.

Sohail, Inayatullah (2009) Causal Layered Analysis: An Integrative and Transformative Theory and Method. Teoksessa Glenn, Jerome & Gordon, Theodore (toim.) Futures Research Methodology, Version 3.0. Washington D.C, The Millenium Project, 1–51.

Sohail, Inayatullah (2013) Causal Layered Analysis: Sohail Inayatullah at TEDxNoosa. https://www.youtube.com/watch?v=ImWDmFPfifI&t=4s.

Tilastokeskus (2024) Julkisyhteisöjen sulautetut menot tehtävittäin. https://stat.fi/tup/suoluk/suoluk_kansantalous.html#Julkisyhteis%C3%B6jen%20sulautetut%20menot%20teht%C3%A4vitt%C3%A4in (haettu 11.10.2024)

Zackery, Ali & Demneh, Mohsen & Karimi, Alireza & Nejad, Maryam (2022) Insights from a Causal Layered Analysis of “Isfahan 2040”: A Participatory Foresight Workshop. Journal of Futures studies 26(4), 113–129.

Nature Futures Framework – Skenaariomenetelmä ekosysteemipalveluiden turvaamiseksi

Ellimaija Virtanen

Turun yliopisto

Johdanto

Luonnon tilan heikentyminen ei ole nykypäivänä enää tuntematon ja huomaamattomaksi jäänyt asia, vaan se on laajasti esillä kansainvälisellä, kansallisella kuin paikallisellakin tasolla. Luonnon monimuotoisuuden väheneminen, ilmastonmuutos ja sään ääri-ilmiöt ovat esimerkkejä ilmiöistä, joiden esiintyminen mediassa on arkipäivää. Jo useamman vuosikymmenen ajan luonnon monimuotoisuus on alentunut merkittävästi, ja arvioiden mukaan noin 25 % lajeista on uhanalaisia. Määrä on merkittävä, koska se tarkoittaa noin miljoonan lajin olevan lähellä sukupuuttoa, ja sen ennustetaan kasvavan tulevina vuosina ja vuosikymmeninä ilman toimintatapojen muutosta. (IPBES 2019.) Ekosysteemipalvelut ja luonnon monimuotoisuus liittyvät vahvasti toisiinsa, koska luonnon monimuotoisuus on monien ekosysteemipalveluiden perusta sen tuottaessa niitä (European Environment Agency 2020). Täten luonnon monimuotoisuuden heikentyessä ekosysteemipalvelutkin ovat heikentyneet.

Kasvavan huolen pohjalta on sovittu erilaisia kansainvälisiä sopimuksia. Jo vuonna 1992 useat maat allekirjoittivat Yhdistyneiden kansakuntien (YK) Biologista monimuotoisuutta koskevan yleissopimuksen, joka sitoo sopimuksen allekirjoittaneet luonnon monimuotoisuuden kestävään käyttöön, suojeluun ja tasapuoliseen jakoon (EUR-Lex 2024). Vuonna 2015 YK hyväksyi kestävän kehityksen Agenda2030 -toimintaohjelman, joka pyrkii eri tavoitteillaan saavuttamaan muun muassa ekologisen kestävyyden ja biologisen monimuotoisuuden. Vuonna 2022 merkittäviä edistysaskeleita otettiin Montrealin luontokokouksessa, jossa hyväksyttiin Kunming-Montrealin maailmanlaajuinen luonnon monimuotoisuuskehys. Se auttaa kestävän kehityksen tavoitteiden saavuttamisessa ja sisältää luonnon monimuotoisuutta koskevat tavoitteet, joiden avulla luonnon monimuotoisuuden väheneminen pysäytetään ja pyritään kohti luontopositiivisuutta. (Ympäristöministeriö 2024.)

Tavoitteiden saavuttaminen ja sovittujen kehysten noudattaminen tarvitsee tuekseen tieteellistä tutkimusta. Ongelmien tunnistaminen, huoli maapallon hyvinvoinnista ja täten ihmisten hyvinvoinnista on tunnistettu myös tulevaisuudentutkimuksen parissa. Lisäksi ympäristötutkimus, joka tutkii luonnon tulevaisuuksia, on hyväksytty tulevaisuuteen suuntautuvan tutkimuksen sovellusalaksi. Myös tulevaisuudentutkimuksen metodologista panosta ympäristötutkimukseen on käsitelty paljon tulevaisuudentutkimukseen liittyvässä kirjallisuudessa. Tutkimuksen merkittävä panos aiheen tarkasteluun sekä pyrkimys löytää ratkaisuja näkyy myös siinä, että skenaariotutkimukseen on syntynyt yläkäsite ekosysteemiskenaariot. Lisäksi uusia menetelmiä on kehitetty luonnon monimuotoisuuden säilyttämisen ja parantamisen tutkimiseen. (ks. Weh 2023.)

Nature Futures Framework (NFF) on tällainen menetelmä. Se pyrkii vastaamaan tarpeisiin ymmärtää luonnon ja ihmisten välisiä suhteita, ja luoda niistä toivottuja tulevaisuuksia skenaarioiden avulla. Menetelmää pidetään merkittävänä, koska se ei tarkastele tulevaisuuksia vain siitä näkökulmasta, mitä hyötyjä luonnosta on ihmisille, vaan se pyrkii huomioimaan luonnon myös itseisarvona. (Pereira ym. 2020). NFF- pohjaiset skenaariot, jotka käsittelevät ekosysteemeitä ovat ekosysteemiskenaariota. Niiden sovellukset voivat auttaa hahmottamaan eri mahdollisuuksia saavuttaa luonnon monimuotoisuus ja ekosysteemipalveluiden kestävyys. Näin menetelmä tukee myös edellä mainittujen kansainvälisten sopimusten saavuttamista. Tämän kirjoitelman tarkoituksena on syventyä NFF-menetelmään sekä arvioida sen soveltuvuutta ja toimivuutta luoda sellaisia skenaarioita, jotka auttavat saavuttamaan luontopositiivisen tulevaisuuden ja ekosysteemipalveluiden kestävyyden.

Johdannon jälkeen kirjoitelman luvussa 2 käsitellään ekosysteemipalveluita ja ekosysteemiskenaarioita. Luku 2 on jaettu kahteen alalukuun, joista alaluvussa 2.1 selitetään ekosysteemipalveluiden käsite ja palveluiden tärkeys ihmisen selviytymisen kannalta. Alaluvussa 2.2 esitellään lyhyesti skenaariot ja tämän jälkeen keskitytään ekosysteemiskenaarioiden syntymiseen ja perusteisiin. Luvussa 3 perehdytään tarkemmin kirjoitelman tarkastelun kohteeksi valikoituneeseen NFF-menetelmään. Alaluvussa 3.1 määritellään yleisesti skenaariomenetelmät ja puhutaan niiden puutteista. Alaluvussa 3.2 syvennytään NFF:n kehittämiseen ja alaluvussa 3.3 sen toimintaperiaatteisiin ja sitä käyttäneisiin tutkimuksiin. Lopuksi luvussa 4 kootaan yhteen kirjoitelmassa käsiteltyjä asioita ja keskustellaan NFF:n onnistumisista ja puutteista sekä siitä, täyttääkö se tarkoituksensa.

Ekosysteemipalvelut ja -skenaariot

Ekosysteemipalvelut ja niiden merkitys

Ekosysteemipalveluilla tarkoitetaan ekosysteemien, eli elävien olentojen ja niiden elottoman ympäristön muodostaman kokonaisuuden, tuottamia ilmaisia aineellisia ja aineettomia palveluita, jotka ovat ihmisille välttämättömiä ja elintärkeitä. Ekosysteemipalvelut voidaan jakaa neljään luokkaan – tuotanto-, ylläpito-, sääntely- ja kulttuuripalveluihin. Tuotantopalvelut tarkoittavat palveluita, jotka tarjoavat vettä, ravintoa sekä lääke- ja rakentamisaineita. Ylläpitopalvelut tarjoavat fotosynteesin, maaperän muodostuksen sekä ravinteiden kierrätyksen. Sääntelypalvelut puolestaan tarjoavat ilmaston sääntelyn sekä veden ja ilman puhdistuksen ja kulttuuripalvelut käsittävät virkistyksen, esteettisyyden sekä muun luonnosta saatavan nautinnon. (Opetushallitus 2024.) Ekosysteemipalveluista voidaan harvoin puhua ilman biodiversiteetin eli luonnon monimuotoisuuden huomioon ottamista. Luonnon monimuotoisuudella tarkoitetaan elämän kirjoa, joka käsittää lajien genetiikan ja runsauden sekä niiden elinympäristön monimuotoisuuden. Se on monimuotoisuutta lajien sisällä sekä niiden ja ekosysteemien välillä. (IPBES 2019.) Koska luonnon monimuotoisuus on alentunut merkittävästi jo usean vuosikymmenen ajan, myös ekosysteemipalvelut ovat heikentyneet.

Ekosysteemipalveluiden merkittävyys ja välttämättömyys on tunnistettu laajasti niin akateemisella, poliittisella kuin kansallisellakin tasolla. Tästä yhtenä merkittävänä ja konkreettisena esimerkkinä on vuonna 2015 sovittu Agenda2030 kestävän kehityksen toimintaohjelma, joka koskee kaikkia YK:n alaisia maita. Ohjelman tavoitteena on taata yhteinen suunnitelma rauhan ja vaurauden saavuttamiseksi ihmisille sekä planeetalle nyt ja tulevaisuudessa. Toimintaohjelman yhteydessä luotiin kuuluisat 17 kestävän kehityksen tavoitetta, jotka on jaettu 169 alatavoitteeseen. Nimensä mukaisesti tavoitteet on tarkoitus saavuttaa vuoteen 2030 mennessä. (Ulkoministeriö 2024.) Ekosysteemipalvelut ovat osa kestävän kehityksen ekologista kestävyyttä, jonka tavoitteena on säilyttää ekosysteemien toimivuus, kasvi- ja eläinlajien monimuotoisuus sekä käyttää luonnonvaroja kestävästi (Opetushallitus 2024). Tavoite 13, joka korostaa ilmastotoimia, tavoite 14, joka korostaa elämää vedessä ja tavoite 15, joka korostaa elämää maalla, ovat suoraan ekosysteemipalveluihin vaikuttavia tavoitteita. Lisäksi myös muut tavoitteet, kuten tavoite 12 ”kestävä kulutus ja tuottaminen” voivat edistää ekosysteemipalveluita luonnon kuormittamisen vähentämisen kautta. (ks. UN 2024.)

Toistaiseksi on kuitenkin selvää, ettei kestävän kehityksen tavoitteita tulla saavuttamaan vuoteen 2030 mennessä huolimatta osittaisista edistysaskelista joissain tavoitteissa. Esimerkiksi talouskasvuun ja infrastruktuuriin liittyvät tavoitteet 8 ja 9 ovat lähempänä toteutumista. Puolestaan ilmastonmuutokseen liittyvä tavoite 13 on selvästi jäljessä. (ks. Moyer – Hedden 2020; Halkos – Gkampoura 2021.) Tavoitteiden kesken on havaittavissa myös ristiriitoja. Esimerkiksi rakentaminen ja talouskasvu rasittavat luontoa ja luonnon monimuotoisuutta, mikä vaikuttaa myös suoraan ekosysteemipalveluihin.

Ekosysteemiskenaariot

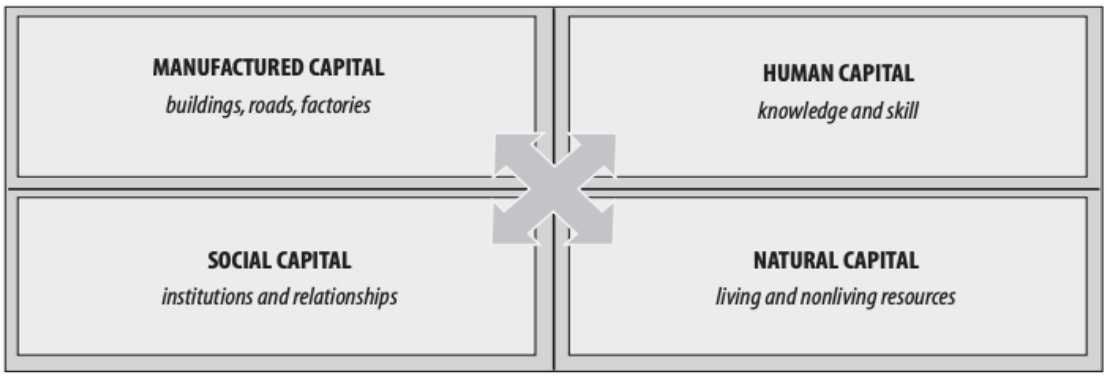
Skenaario on yleisesti käytetty termi tulevaisuudentutkimuksessa. Sen voidaan määrittää olevan tarina, joka koostuu uskottavista syy-seuraussuhteista ja joka yhdistää tulevaisuuden tilan nykyhetkeen. Samalla se havainnollistaa keskeisiä päätöksiä, tapahtumia ja seurauksia koko kertomuksen ajan. (Glenn ym. 2009.) Toisin sanoin skenaario on ketju tai kehityskulku, joka etenee loogisesti kohti tiettyä tulevaisuudentilaa. Skenaariot perustuvat uskottaviin oletuksiin, todennäköisiksi nähtyihin sarjoihin ja selvitettäviin muuttujiin. (Rubin 2024.) Mannermaan (2013) mukaan tulevaisuudentutkimuksessa esitettyjen skenaarioiden ei tulisi olla ristiriidassa nykyhetken tai menneisyyden kanssa sillä hetkellä, kun skenaario on julkaistu. Lisäksi skenaarioiden tulisi olla formaalisti virheettömiä suhteessa käytettyyn malliin tai teoriaan, joka viittaa tulevaisuudentutkimuksen sisäisen konsistenssin vaatimukseen. Puolestaan ulkoinen konsistentti viittaa siihen, että skenaario pystyy puolustamaan olemassaoloaan erilaisesta kritiikistä huolimatta sekä korjaamaan itseään tarvittaessa. Skenaarioiden määritelmiä on siis paljon ja ne voivat riippua lisäksi tutkimuksista tai asianyhteyksistä. Lisäksi niihin saatetaan viitata metodeina, tekniikkana tai työkaluna. (Cordova-Pozo – Rouwette 2023, 9.)

Ekosysteemiskenaariot tarkoittavat perinteisten skenaariomääritelmien lisäksi skenaarioita, jotka jollakin tavalla ottavat kantaa ja tutkivat ilmiöitä ekosysteemipalveluiden ympärillä. Ne yhdistävät tulevaisuudentutkimuksen tieteenteorian ja menetelmällisiä elementtejä monipuolisesti useamman tieteenalan, kuten luonnon- ja sosiaalitieteiden sekä maapallon systeemitieteiden (*earth system sciences*), tutkimukseen (Weh ym. 2023).

Yksi merkittäviä ja ensimmäisiä ekosysteemiskenaarioita luonut projekti on Millennium Ecosystem Assessment (MA). Vuodesta 2001 vuoteen 2005 kansainvälisellä tasolla toiminut ja yli tuhat asiantuntijaa osallistanut MA tarkasteli ekosysteemien muuttumisen vaikutuksia ihmisten hyvinvointiin. MA:ssa toiminut skenaariotyöryhmä pyrki ymmärtämään ekosysteemien hallintaa tarkastelemalla mahdollisia tulevaisuuden kehityskulkuja. Neljä rakennettua skenaariota käsittelivät uskottavia tulevaisuuden muutoksia ekosysteemipalveluiden kysynnässä ja tarjonnassa, ja palveluiden muutosten vaikutuksia ihmisten hyvinvointiin. Lisäksi skenaariot ottivat huomioon erilaisten ekosysteemien hallintatapojen seuraukset ja kompromisseja, joita päätöksentekijät kohtaavat heidän tehdessä ekosysteemipalveluiden tuleviin virtoihin vaikuttavia valintoja. (Millennium Ecosystem Assessment 2005; Carpenter ym. 2006, 29.)

MA:n skenaariotyöryhmä loi teoreettisen ja käytännön pohjan skenaariometodologian käytölle ympäristöprojekteissa. Ryhmä korosti osallistavien skenaariomenetelmien merkitystä, jotta sidosryhmät osallistettaisiin kunnolla ekosysteemiskenaarioiden luomiseen. Tällöin myös päätöksentekijät saavuttaisivat syvemmän ymmärryksen ja luottamuksen tutkimusprosessiin ja sen tuloksiin. (Weh ym. 2023.) Parhaimmillaan soveltavat ja sidosryhmäkeskeiset ekosysteemiskenaarioiden tutkimukset osana ympäristöarviointeja tarjoavat tietoa tulevaisuuden ekologisista kehityskuluista ja vaikuttavat päätöksentekoon. Ekosysteemiskenaariot voivat vaikuttaa myös uuden sosiaalisen pääoman syntymiseen, joka koostuu yksilöistä ja sosiaalisista ryhmistä, joita ilman tiettyjä asioita ei voida saavuttaa. Uuden sosiaalisen pääoman syntyminen on merkittävää, koska se auttaa saavuttamaan toimintatapojen muutoksen ja kestävän kehityksen. (ks. Lang – Ramírez 2017; Weh ym. 2023.)

Eri pääomien muodot vaikuttavat ekosysteemiskenaarioiden luomisprosessissa, ja niiden lopputuloksissa. Millennium Ecosystem Assessment (2003) jakaa nämä yhteiskunnan tuotantopohjat (*society's productive base*) kuvion 1 mukaisesti teollisesti tuotettuun pääomaan, inhimilliseen ja sosiaaliseen pääomaan sekä luontopääomaan.



***Kuvio 1**. Ekosysteemiskenaarioihin liittyvät pääomat (Millennium Ecosystem Assessment 2003, 29).*

Teollisesti tuotettu pääoma sisältää infrastruktuurin, inhimillinen pääoma tiedon ja osaamisen, sosiaalinen pääoma instituutiot ja ihmissuhteet ja luotopääoma elävät ja elottomat resurssit. Luontopääoma edustaa siis aineellista arvoa, joka yhdistyy taloudellisen arvon luomiseen (Weh ym. 2023). Joidenkin näkökulmien mukaan jaottelussa ongelmallisena voidaan nähdä luontopääomaan rooli, jonka mukaan se on hyvinvoinnin mahdollistaja taloudellisen pääoman luomisen kautta. Kun luontopääoma valjastetaan voittojen tavoitteluun, voi se vaikuttaa negatiivisesti ekosysteemipalveluiden laatuun. (esim. Wegner – Pascual 2011; Schröter ym. 2017.) MA:n jaottelun vahvuus on kuitenkin ekosysteemiskenaarioiden tekemiseen liittyvien yhteiskunnallisten rakenteiden tunnistaminen ja havainnollistaminen. On lisäksi hyvä huomioida, että MA:n työssä merkityksellisemmäksi on noussut ekosysteemien huomioiminen skenaarioiden avulla, kuin sen jaottelun käyttäminen suoraan otettuna. Lisäksi ajattelu luontopääomasta on kehittynyt moniäänisemmäksi yli 20 vuoden aikana, joka heijastuu myös ekosysteemiskenaarioiden luomisen moninaisuudessa.

Natures Futures Framework

Skenaariomenetelmät

Skenaariomenetelmä on menetelmä, jonka avulla skenaario rakennetaan ja jolla luodaan loogisesti etenevä tapahtumasarja. Se näyttää, miten mahdollinen, joko todennäköinen, tavoiteltava tai uhkaava tulevaisuudentila kehittyy nykytilasta. (Rubin 2024.) Määritelmä on luonnollisesti samankaltainen skenaarion määritelmän kanssa skenaariomenetelmän ollessa työkalu niiden luomiseen.

Skenaariomenetelmien historia heijastuu tulevaisuudentutkimuksen yleiseen historiaan ja maailmansotien jälkeiseen aikaan, jolloin tulevaisuudentutkimusta alettiin harjoittamaan selkeämmin. Tällöin alettiin tuottamaan ennusteita, jotka voidaan ymmärtää myös skenaarioina, sotilaallisiin tarkoituksiin sekä talouskasvusta ja teknologian kehittymisestä (Kylliäinen 1997). Herman Kahn on merkittävä hahmo skenaariomenetelmien kehittämisessä. Hänen työhönsä viitataan usein, kun kerrotaan menetelmien historiasta ja niiden aloittamisesta. Kun Yhdysvaltojen ilmavoimat pyrkivät ennakoimaan yllättäviä ydiniskuja toisen maailmansodan jälkeen ja he aloittivat skenaarioiden suunnittelun vaihtoehtoisilla strategioilla, oli Kahn merkittävässä roolissa näiden toteuttamisessa. Shellin skenaariotyö yrityksen strategiassa on tunnettu esimerkki yritysmaailman varhaisimmista skenaarioita hyödyntävistä yrityksistä, ja Kahn oli myös mukana laatimassa tätä. Nykyään skenaariomenetelmiä käytetään eri toimijoiden parissa laajasti. Toimijoita ovat esimerkiksi tutkijat, yritykset ja koulutuslaitokset. Skenaariomenetelmiä käytetään myös politiikkapäätösten tukena ja erilaisiin tilanteisiin varautumisessa. (Bradfield ym. 2005.)

Skenaariomenetelmiä on lukuisia. Joitain yleisiä menetelmiä ovat esimerkiksi morfologinen skenaariotyöskentely eli tulevaisuustaulukointi ja erilaiset tulevaisuusverstaat tai -työpajat. Tulevaisuustaulukoinnin tarkoituksena on tunnistaa tarkasteltavan ongelman keskeiset muuttujat, niiden mahdolliset toteutumisvaihtoehdot ja koostaa skenaariot. Tulevaisuusverstas on puolestaan hyvin osallistava menetelmä, jonka pääasiallisena tarkoituksena on tulevaisuuksien pohtiminen, yhteistyö, oppiminen sekä uusien ideoiden ja ratkaisujen luominen. Tulevaisuusverstaisiin voidaan lisäksi sisällyttää laajasti erilaisia työtapoja, kuten backasting- ja skenaariotyöpajoja. Yhtenä haasteena tulevaisuusverstaissa on nimitysten, käytäntöjen ja sovellusten moninaisuus, jolloin menetelmän määrittelykin on hankalaa. (Armanto ym. 2022, 223; Lätti ym. 2022, 319.) Myös tulevaisuustaulukoinnin koostamisessa on mahdollista käyttää apuna esimerkiksi PESTE-menetelmää, jolloin sekin saattaa koostua useammasta osasta. Skenaariomenetelmiä onkin kritisoitu niiden moniulotteisuuksista, päällekkäisyyksistä ja menetelmien suuresta määrästä. Tätä on kuvattu menetelmien kaaoksena (esim. Bishop ym. 2007; Cordova-Pozo – Rouwette 2023; Varum – Melo 2010).

Menetelmien kaaos ja selkeän typologian puute voi luoda haasteita, vaikka menetelmien laaja kirjo luo samalla mahdollisuuksia soveltaa niitä moneen eri tarkoitukseen useamman käyttäjän näkökulmasta. Tietty selkeyden puute voi johtaa haasteisiin esimerkiksi menetelmän valinnassa ja ymmärrykseen toivotusta lopputuloksesta. Ymmärrys siitä, minkä tyyppistä menetelmää voi käyttää tietyn tyyppisten skenaarioiden luomiseen ja minkälaisia tuloksia voi odottaa, voisi tuoda jonkin asteista koheesiota eri töiden välille ja helpottaa sopivan menetelmän valintaa. (Cordova-Pozo – Rouwette 2023.) Toisaalta yksi skenaarioiden piirre on yllättävyys, jolloin voidaan pohtia, onko edes toivottavaa osata odottaa jotain tiettyä tulosta. Menetelmän selkeys tiettyjen tulosten tuottamisesta ei toisaalta poista skenaarioiden yllättävyyttä, vaan voi auttaa sopivan menetelmän löytämisessä.

Popper (2008) kirjoittaa yleisesti ennakointimenetelmien valinnan haasteellisuudesta, ja siitä kuinka valintaa voi ohjata vahva intuitio, impulsiivisuus ja joskus jopa vastuuttomuus ja kokemattomuus. Kun tulevaisuudentutkimuksen harjoituksissa tai tutkimuksissa käytetään useampia menetelmiä, tämä voi altistaa entisestään epäsopiville valinnoille. Lisäksi skenaarioiden luomisprosessi voi itsessään vaikuttaa ja muuttaa osallistuvien suunnittelijoiden tapaa ajatella tulevaisuutta, jos prosessissa pyritään vaikuttamaan jotain tiettyä tulevaisuutta vastaan. Tällöin tasapainoinen arviointi mahdollisesti tärkeistäkin toimijoista voi olla puutteellista. (Glenn 2009.) Toisaalta jo menetelmiä valitessa tietoisuus mahdollisista sudenkuopista voi auttaa ehkäisemään harhojen syntymistä. Lisäksi sidosryhmiä on tärkeä osallistaa skenaarioiden tekemiseen. Parhaimmillaan skenaariomenetelmien moninaisuus mahdollistaakin monitieteellisen ja moniulotteisen työn, jota tehdään tämän päivän haastavien ongelmien, kuten kestävän kehityksen saavuttamisen ratkaisemiseksi.

Nature Futures Frameworkin historia ja kehitys

Nature Futures Framework on menetelmä, jonka avulla voidaan kehittää skenaarioita toivotuille tulevaisuuksille, jotka korostavat ihmisen ja luonnon välistä suhdetta. Heuristiseksi kuvattu työkalu perustuu näihin monimuotoisiin ja positiivisiin suhteisiin, ja auttaa taltiomaan ja ottamaan suhteet huomioon. Menetelmää voidaan käyttää apuna, kun skenaarioiden luomisprosessissa pyritään tuomaan monipuolisia näkökulmia esille. Lisäksi se voidaan ymmärtää toiminnallisena viitekehyksenä, jonka avulla kehitetään johdonmukaisia luontoskenaarioita. (Pereira ym. 2020; NFF 2024.) Konkreettisesti NFF auttaa tunnistamaan tarpeellisia toimia, asettamaan tavoitteita ja valvomaan kehitystä kohti haluttuja tavoitteita. Sitä voidaan käyttää politiikan arvioinnissa paikallisella, kansallisella ja globaalilla tasolla. Arviointi voi olla politiikkapäätösten takautuvaa tarkastelua, mahdollisten päätösten seurausten arviointia tai se voi auttaa tunnistamista laajempia politiikkatavoitteita. (Kim ym. 2023, 7.)

NFF kehitettiin vuosien 2016–2019 aikana IPBES:n (*The Intergovernmental SciencePolicy Platform on Biodiversity and* Ecosystem Services) skenaario- ja malliasiantuntijoiden toimesta. IPBES on vuonna 2012

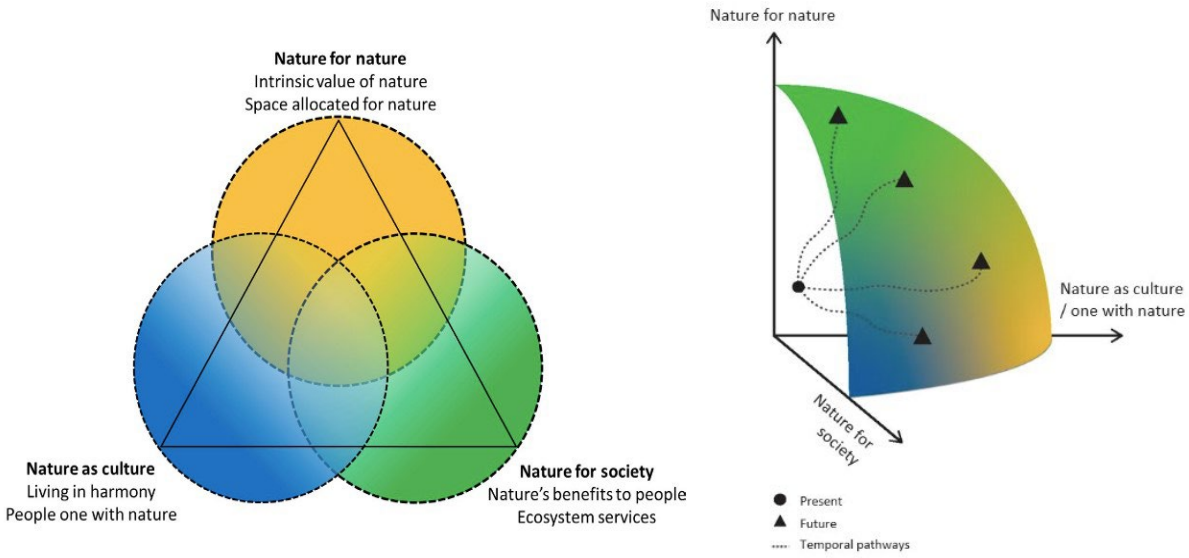
perustettu itsenäinen hallitusten välinen elin, joka on avoin kaikille YK:n jäsenille. Sen tavoitteena on vahvistaa tieteen ja politiikan välistä rajapintaa luonnon monimuotoisuuden ja ekosysteemipalveluiden suojelua ja kestävää käyttöä varten, ja samalla mahdollistaa ihmisten pitkäaikainen hyvinvointi ja kestävä kehitys. (Diaz ym. 2015.) Motivaationa mallin kehittämiseen toimi IPBES:n aikaisempi metodologinen arviointiraportti, jossa tarkasteltiin luonnon monimuotoisuuden ja ekosysteemipalveluiden arvioimiseen käytettyjä skenaarioita ja malleja, sekä näiden pohjalta tehtyjä poliittisia suunnitelmia ja politiikkapäätöksiä. (ks. IPBES 2016). Raportin mukaan globaalit skenaariot ottavat harvoin huomioon pienempien alueiden arvoja, tapoja ja näiden vaihteluita, kun taas pienempien alueiden tarkasteluun kehitetyt skenaariot ovat hyvin spesifejä ja paikallisiin ominaisuuksiin keskittyneitä. Lisäksi skenaariot epäonnistuvat usein huomioimaan luonnon ja sen ihmisille tarjoamia asioita, jolloin erilaiset sosiaaliekologiset liittymät ja moniulotteiset prosessit jäävät aliymmärretyiksi. Tällöin on myös mahdollista, etteivät skenaariot ota huomioon eri luontoarvoja ja näiden yhteyttä hyväksi koettuun elämään tarpeeksi monipuolisesti. Tämä voi synnyttää ristiriitoja ja väärinymmärryksiä. (Rosa ym. 2017; Pereira ym. 2020.)

Näiden puutteiden pohjalta IPBES lähti kehittämään moniulotteista soveltavaa prosessia, joka huomioi sidosryhmien äänet ja arvot sekä luo kehityskulkuja kohti toivottua luonnon monimuotoisuuden visiota, jonka mukaan vuonna 2050 elettäisiin sopusoinnussa luonnon kanssa. Tällöin luonnon monimuotoisuus olisi arvostettu, säilytetty, uudistettu ja viisaasti käytetty, ekosysteemipalveluita ylläpidettäisiin, ja terve planeetta täyttäisi kaikkien ihmisten välttämättömät tarpeet. Keskeistä oli löytää tapa kehittää skenaarioita, jotka eivät sisällä aikaisemmin mainittuja puutteita ja joka tukee IPBES:n tarkoitusta. (Pereira ym. 2020, 1174.)

NFF:n kehittämisprosessi koostui viidestä vaiheesta, joista ensimmäisessä luotiin visiot toivotuista tulevaisuuksista tulevaisuusverstaassa yhdessä sidosryhmien kanssa. Toisessa vaiheessa visioita työstettiin osana IPBES:n erillistapahtumia, joissa osallistujina oli suurempi joukko sidosryhmiä. Kolmannessa vaiheessa asiantuntijaryhmä koosti NFF:n viitekehyksen, niin sanotun NFF-kolmion aikaisempien vaiheiden pohjalta. Neljännessä vaiheessa testattiin viitekehyksen toimivuutta erillisillä osallistujaryhmillä. Viidennessä vaiheessa asiantuntijat kehittävät pakettia NFF:ään liittyvästä materiaalista sekä useampaa skenaariota viitekehystä käyttäen. (Pereira ym. 2020.) Viides vaihe on tämän kirjoitelman kirjoittamisen aikana vielä käynnissä (ks. IPBES 2023).

Nature Futures Frameworkin toimintaperiaatteet

NFF-kolmio on viitekehyksen yksi oleellisimmista työkaluista skenaarioita muodostaessa. Se muodostettiin kehittämisprosessin kolmannessa vaiheessa, kun asiantuntijat kokivat tarpeelliseksi löytää seitsemästä aikaisemmissa vaiheissa muodostetuista visiosta niitä yhdistävät ja erottavat tekijät. Näistä muodostettiin kolme arvonäkökulmaa ihmisen ja luonnon välille – luonto luonnolle (*Nature for Nature*), luonto yhteiskunnalle (*Nature for Society*) ja luoto kulttuurina (*Nature as Culture*). Näistä ensimmäinen kuvastaa luontoa itseisarvona, ja korostaa luonnon monimuotoisuuden sekä luonnon toimintojen olevan tärkein periaate. Luonto yhteiskunnalle kuvastaa luonnon merkitystä ihmisille siitä saatavien hyötyjen ja käytön kautta, mikä saattaa tosin johtaa luonnon optimaaliseen hyödyntämiseen. Luonto kulttuurina edustaa ihmisen ja luonnon vastavuoroista suhdetta, jossa ihmiset nähdään osana luontoa. (Pereira ym. 2020.) On hyvä huomioida, ettei arvonäkökulmat ole toisiaan poissulkevia, vaan ne ovat toisiinsa monimutkaisesti yhteydessä ja voivat vahvistaa toisiaan (Kim ym. 2023, 3). Kuviossa 2 vasemmalla, on perusmuotoinen esitystapa NFF-kolmiosta ja oikealla oleva kuva havainnollistaa tarkemmin arvonäkökulmien yhteyksiä.



Kuvio 2. *Nature Futures Framework -kolmio (Pereira ym. 2020; IPBES 2023).*

Kuvion 2 vasemmanpuoleisen kolmion reunat ja sivut edustavat skenaarioita, ja kolmion sisällä oleva alue kaikkia mahdollisia yhdistelmiä eri arvonäkökulmista. Reunoilla olevat pisteet dominoivat enemmän tiettyä arvoa, ja kolmion sisällä olevat pisteet edustavat useampaa näkökulmaa. (Pereira ym. 2020.) Kolmion ulkopuolelle jäävä ala kuvastaa epämieluisia tulevaisuuksia ihmisistä ja luonnosta (Durán ym. 2023.). Arvonäkökulmien yhteydet tulevat esille oikeanpuoleisessa kuvassa, ja väliaikaiset kehityskulut kuvaavat siirtymistä nykyisyydestä tulevaan. Kuva on yksinkertaistettu, koska se ei pysty kunnolla havainnollistamaan tosielämän moniulotteisia tiloja ja kehityskulkuja. Mahdollista kuitenkin on, että esimerkiksi tietyn akselin arvon kasvaminen kasvattaa toista arvoa tai puolestaan jossakin avaruuden tilassa arvojen välille voi syntyä parannusten välisiä kompromisseja. Tämä tapahtuu varsinkin silloin, kun jokin arvo on jo todella korkea. (IPBES 2023; Kim ym. 2023.) Kolmessa arvoperspektiivissä on tärkeä ottaa huomioon, että ne edustavat jo valmiiksi positiivisia visioita ihmisen ja luonnon välisestä suhteesta. Tällöin nykyiset useassa yhteiskunnassa näkyvät asenteet luonnon aliarvostamisesta eivät näy NFF:ssä. (Pereira ym. 2020.) Tämä on ongelmallista, koska skenaarioiden tekemisessä on tärkeä ottaa huomioon myös nykyhetken asenteet. Arvot ohjaavat vahvasti ihmisten käyttäytymistä, ja jos niiden muuttamiseksi tarvittavia työkaluja ei osata suunnitella, voi skenaariot jäädä vajanaisiksi.

Kuten monet muut skenaariomenetelmät ja niiden vaiheet, vaatii NFF parikseen tai sen yhteydessä usein käytetään muita menetelmiä tai malleja. Tämä tapahtuu varsinkin silloin kun sitä käytetään viitekehyksenä. Esimerkiksi Dou ym. (2023) tutkii Euroopan maankäyttöä vuonna 2050 ja luo kolme skenaariota kolmen arvonäkökulman mukaisesti. Arvonäkökulmien ohjatessa skenaarioiden suuntaa, tutkijat käyttävät alueellisten maajärjestelmien allokaatioon suunniteltua dynaamista CLUMondo -mallia. Diprose ym. (2022) puolestaan heijastavat kerätyn datan lintujen bongauksesta viitekehykseen, ja tuovat näin näkyväksi Uudessa-Seelannissa vaalitut ja ilmaistut luonnon ympärillä olevat moninaiset arvot. Viitekehyksen avulla on myös tunnistettu erilaisia arvoja, jotka liittyvät veteen liittyviin ekosysteemipalveluihin (ks. Resende ym. 2020) sekä arvioitu olemassa olevien skenaarioiden tuloksia luonnosta ja ennallistamistoimista kolmen arvonäkökulman perusteella (ks. Quintero-Uribe ym. 2022). NFF:n kaksi käyttötarkoitusta jakaantui viitekehyksenä olemiseen sekä prosessiin, joka auttaa tuomaan useita näkökulmia esille. Esitettyihin tutkimuksiin perustuen voisi arvioida, että käyttötarkoituksista korostuu kolmen arvonäkökulman käyttäminen viitekehyksenä. Nämä ohjaavat tutkimuksia ottamaan huomioon ihmisten ja luonnon väliset arvot. Vaikka tässä esiteltiin hyvin pintapuolisesti vain murto-osa NFF käyttäneitä tutkimuksia, eikä sitä hyödyntäneitä muita projekteja ole otettu huomioon, voidaan näin sanoa suhteellisen varmasti. Esimerkiksi IPBES:n itsensä mukaan täysin NFF:ää käyttäneitä skenaarioprojekteja ei ole kehitetty (NFF 2024).

NFF:n kehittäminen jatkuu yhä, ja menetelmään liittyviä haasteita on tunnistettu. Nämä haasteet eivät kaikki liity suoraan menetelmään, vaan ne voivat ilmetä esimerkiksi olemassa olevassa datassa. Keskeisenä haasteena on luonnon monimuotoisuuteen ja ekosysteemipalveluihin vaikuttavien suorien vaikutusten aikasarjadatan puute. Tämä on ongelmallista, koska historiallinen data ja empiiriset todisteet ovat olennaisia tulevaisuutta tarkasteltavien mallien kehitykselle. (Kim ym. 2023, 9.) Koska NFF vaatii parikseen myös muita kehyksiä, voi näiden puutteet vaikuttaa NFF:n käyttöön ja tehokkuuteen. Lisäksi syvän ymmärryksen puute sosiaaliekologisista yhteyksistä voi vaikuttaa skenaarioihin ja niiden tulkitsemiseen negatiivisesti, kuten aikaisemmin todettiin (ks. IPBES 2023, 18.)

Yhteenveto ja keskustelu

Luonnon monimuotoisuuden ja ekosysteemipalveluiden ennustetaan huononevan merkittävästi seuraavien vuosikymmenien aikana, jos selkeitä muutoksia ei saada aikaan (IPBES 2022). Ekosysteemipalveluiden heikentyessä ihmisten kyky selviytyä ja elää hyvinvoivaa elämää huononee, mikä vaikuttaa laajasti yhteiskunnan muihinkin osa-alueisiin. Luontoa ja sen tarjoamia palveluita ja hyödykkeitä pyritään usein ylläpitämään ihmisten hyötynäkökulmasta, mutta myös luontoarvot itseisarvoina motivoivat tekoihin.

Tulevaisuudentutkimus tutkii erilaisia tulevaisuuksia ja niiden kehityskulkuja, ja skenaariot ovat suosittu tapa mallintaa näitä. Yhä useampi skenaarioita hyödyntävä tutkimus tai raportti pyrkii vastaamaan kestävään kehitykseen liittyviin viheliäisiin ongelmiin, ja terveen planeetan säilyttämiseen. Näitä luontoa ja tarkemmin ekosysteemeitä huomioon ottavia skenaarioita kutsutaan ekosysteemiskenaarioiksi, ja ne yhdistävät usein tulevaisuudentutkimuksen tieteenteoriaa ja menetelmällisiä elementtejä muihin tieteenaloihin, kuten luonnontieteisiin (ks. Weh ym. 2023).

Huolimatta ekosysteemiskenaarioiden yleistymisestä IPBES havaitsi vuonna 2016, että monet olemassa olevat skenaariomenetelmät eivät ota huomioon luonnon ja ihmisen välisiä moniulotteisia suhteita, ja ne epäonnistuvat tarkastelemaan kehityskulkuja tarpeeksi kattavasti (ks. IPBES 2016). Havaitut puutteet johtivat motivaatioon ja tarpeeseen kehittää uusi menetelmä ja viitekehys, jonka avulla voitaisiin paremmin ottaa huomioon luonnon ja ihmisten välinen suhde. Tämän työn perusteella syntyi Nature Futures Framework, joka pyrkii yhdistämään luonnon ja ihmisen välisen suhteen kolmella arvonäkökulmalla. Nämä arvonäkökulmat käsittelevät luontoa itseisarvona, hyödykkeenä sekä kulttuurina.

NFF:ssä on havaittavissa ristiriitaisuuksia tai puutteita, kun sitä tarkastellaan skenaarioiden ja menetelmien yleisten määritelmien valossa. NFF:n ei ota nykyisten yhteiskuntien aliarvoisia asenteita huomioon skenaarioita rakentaessa, koska ne ovat kolmion avulla ohjattu jo valmiiksi luomaan positiivisia ihmisten ja luonnon välisiä skenaarioita. Tämä voidaan nähdä yhtenä menetelmän puutteena tai ongelmallisuutena, koska skenaarioiden ei tulisi olla ristiriidassa menneisyyden eikä nykyisyyden kanssa (ks. Mannermaa 2013). Lisäksi NFF:n skenaarioiden luomisprosessissa pyritään selkeästi vaikuttamaan luontoarvoja kunnioittamattomia skenaarioita vastaan, joka voi johtaa epätasaiseen arviointiin mahdollisesti tärkeistäkin toimijoista (ks. Glenn 2009). Jos skenaariot eivät ota tarpeeksi kantaa nykyisiin ongelmiin ja niistä pois pääsemiseen, ovatko skenaariot uskottavia kehityskulkuja toivottuihin tulevaisuuksiin, vai kauniita ajatuksia asioista, mitä voisi olla.

Toisaalta NFF-menetelmän tarkoituksena on löytää toivottuja tulevaisuuksia, joissa luonnon monimuotoisuus ja ekosysteemipalvelut voivat hyvin. Jos skenaarioiden luomisprosessiin sisällytettäisiin mahdollisuus heijastaa negatiivisia luontoarvoja, ei menetelmä täyttäisi tarkoitustaan. Positiivisella näkökulmalla pyritään menetelmän tekijöiden mukaan tuomaan ihmiset osaksi luontoa luontoarvon muodossa, eikä tarkastelemaan luontoa ilman ihmistä (Pereira ym. 2020). Lisäksi skenaariomenetelmiä on arvosteltu niiden kaaoksesta sekä epäselvyyksistä siitä, millaista menetelmää voi käyttää tietyn tyyppisen skenaarion luomiseen ja minkälaisia tuloksia voidaan odottaa (ks. Cordova-Pozo – Rouwette 2023). NFF vastaa omalta osaltaan tähän ongelmaa, koska sen tarkoitus ja mahdolliset tulokset on määritelty tarkkaan luontopositiivisiksi.

Huolimatta puutteistaan ja hyveistään on hyvä pohtia, voiko NFF mahdollistaa luonnon monimuotoisuuden yleissopimuksen vision ihmisen ja luonnon sopusointuisesta rinnakkaiselosta vuonna 2050 ja auttaako se tukemaan esimerkiksi Kunming-Montrealin maailmanlaajuisen luonnon monimuotoisuuskehyksen toimeenpanoa. Merkittävää NFF käytössä on se, että se antaa sen käyttäjille työkalun suunnata huomio ihmisen ja luonnon väliseen suhteeseen. Sen selkeä rakenne ja kolme arvonäkökulmaa ohjaavat sen käyttäjiä toivottaviin luontopositiivisiin tulevaisuuksiin, ja ymmärtäessään mahdolliset haasteet, voidaan muilla menetelmillä ja ajatuksilla tukea laadukkaiden skenaarioiden syntymistä. Uskottavasti, hyvin tehdyillä ja integroiduilla skenaarioilla on voimaa vaikuttaa esimerkiksi politiikkapäätöksiin ja muihin toimintoihin.

On totta, että NFF sisältää edellä keskusteltuja puutteita. Täydellistä tai kaikkia mahdollisia kompleksisuuksia huomioon ottavaa menetelmää tai skenaariota on hyvin vaikea ja toistaiseksi jopa mahdotonta saavuttaa – eikä tämä ole myöskään NFF:n tavoite. Loppujen lopuksi kaikki skenaariomenetelmät ovat työkaluja ymmärtää tulevaisuuksia ja mahdollisuuksia hahmottaa eri polkuja tulevaisuuksiin. NFF on lisäksi nuori työkalu, ja sen kehittäminen ja laajempi käyttöönotto on kesken. Voidaan siis todeta, että NFF on menetelmä, joka voi auttaa ekosysteemipalveluiden ja luonnon monimuotoisuuden säilyttämisessä ja parantamisessa. Sen avulla voidaan saavuttaa tarkempaa ja merkityksellisempää vuoropuhelua niin tutkijoiden, päättäjien kuin muidenkin ammattilaisten ja sidosryhmien keskuudessa luonnon mahdollisista tulevaisuuksista. Yksi menetelmä ei voi itsessään ratkaista ihmiskunnan kohtaamia viheliäisiä ongelmia. Syvemmät muutokset – transformaatio – arvoissa, normeissa sekä järjestelmissä ja instituutioissa ovat näihin ratkaisu ja NFF on yksi työkalu näiden saavuttamiseksi.

Lähteet

Armanto, Riikka – Lauttamäki, Ville – Siivonen, Katriina (2022) Monimuotoinen tulevaisuusverstas. Teoksessa: Aalto, Hanna-Kaisa – Heikkilä, Katariina – Keski-Pukkila, Pasi – Mäki, Maija – Pöllänen, Markus (ed.). Tulevaisuudentutkimus tutuksi – perusteita ja menetelmiä. TVA-julkaisuja 1/2022. Turku: Tulevaisuudentutkimuksen Verkostoakatemia.

Bradfield, Ron – Wright, George – Burt, George – Cairns, George – Van Der Heijden, Kees (2005) The origins and evolution of scenario techniques in long range business planning. Futures: the journal of policy, planning and futures studies. Vol. 37 (8), 795–812.

Carpenter, Stephen R. – Bennett, Elena M. – Peterson, Garry D. (2006) Scenarios for Ecosystem Services: An Overview. Ecology and society. Vol. 11 (1), Article 29.

Cordova-Pozo, Kathya – Rouwette, Etiënne A.J.A. (2023) Types of scenario planning and their effectiveness: A review of reviews. Futures: the journal of policy, planning and futures studies, Vol. 149, p. 103153, Article 103153

Díaz, Sandra – Demissew, Sebsebe – Carabias, Julia – Joly, Carlos – Lonsdale, Mark – Ash, Neville – Larigauderie, Anne – Adhikari, Jay Ram – Arico, Salvatore – Báldi, András – Bartuska, Ann – Baste, Ivar Andreas – Bilgin, Adem – Brondizio, Eduardo – Chan, Kai MA– Figueroa, Viviana Elsa – Duraiappah, Anantha – Fischer, Markus – Hill, Rosemary – Koetz, Thomas – Leadley, Paul – Lyver, Philip – Mace, Georgina M – Martin-Lopez, Berta – Okumura, Michiko – Pacheco, Diego – Pascual, Unai – Pérez, Edgar Selvin – Reyers, Belinda – Roth, Eva – Saito, Osamu – Scholes, Robert John – Sharma, Nalini – Tallis, Heather – Thaman, Randolph – Watson, Robert – Yahara, Tetsukazu – Hamid, Zakri Abdul – Akosim, Callistus – Al-Hafedh, Yousef – Allahverdiyev, Rashad – Amankwah, Edward – Asah, Stanley T – Asfaw, Zemede – Bartus, Gabor – Brooks, L Anathea – Caillaux, Jorge – Dalle, Gemedo – Darnaedi, Dedy – Driver, Amanda – Erpul, Gunay – Escobar-Eyzaguirre, Pablo – Failler, Pierre – Fouda, Ali Moustafa Mokhtar – Fu, Bojie – Gundimeda, Haripriya – Hashimoto, Shizuka – Homer, Floyd – Lavorel, Sandra – Lichtenstein, Gabriela – Mala, William Armand – Mandivenyi, Wadzanayi – Matczak, Piotr – Mbizvo, Carmel – Mehrdadi, Mehrasa – Metzger, Jean Paul – Mikissa, Jean Bruno – Moller, Henrik – Mooney, Harold A – Mumby, Peter – Nagendra, Harini – Nesshover, Carsten – Oteng- Yeboah, Alfred Apau – Pataki, György – Roué, Marie – Rubis, Jennifer – Schultz, Maria – Smith, Peggy – Sumaila, Rashid – Takeuchi, Kazuhiko – Thomas, Spencer – Verma, Madhu – Yeo-Chang, Youn – Zlatanova, Diana (2015) The IPBES Conceptual Framework — connecting nature and people. Current opinion in environmental sustainability. Vol. 14, 1–16.

Diprose, Gradon – Greenaway, Alison – Moorhouse, Benjami (2022) Making Visible More Diverse Nature Futures through Citizen Science. Citizen science: theory and practice. Vol. 7 (1), Article 6.

Dou, Yue – Zagaria, Cecilia – O'Connor, Louise – Thuiller, Wilfried – Verburg, Peter H. (2023) Using the Nature Futures Framework as a lens for developing plural land use scenarios for Europe for 2050. Global environmental change. Vol. 83, Article 102766.

EUR-Lex (2024) Biologista monimuotoisuutta koskeva yleissopimus. https://eur- lex.europa.eu/FI/legal-content/summary/convention-on-biological-diversity.html, haettu 16.10.

European Environment Agency (2020) Luonnon monimuotoisuus – ekosysteemit. https://www.eea.europa.eu/fi/themes/biodiversity/intro, haettu 16.10.

Glenn, Jerome C. – The Futures Group International (2009) Scenarios. The Millennium Project; 3.0 edition.

Halkos, George – Gkampoura, Eleni-Christina (2021) Where do we stand on the 17 Sustainable Development Goals? An overview on progress. Economic analysis and policy. Vol. 70, 94–122.

IPBES (2016) The methodological assessment report on scenarios and models of biodiversity and ecosystem services. Acosta, L. A. – Akçakaya, H. R. – Brotons, L. – Cheung, W. W. L – Christensen, V. – Harhash, K. A. – Kabubo-Mariara, J. – Lundquist C. – Obersteiner, M. – Pereira, H. M. – Peterson, G. – Pichs-Madruga, R. – Ravindranath, N. – Rondinini, C. – Wintle, B. A. (eds.). IPBES Secretariat, Bonn, Germany.

IPBES (2019) Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Díaz, S. – Settele, J. – Brondízio E.S., E. S. – Ngo, H. T. – Guèze, M. – Agard, J. – Arneth, A. – Balvanera, P. – Brauman, K. A. – Butchart, S. H. M. –Chan, K. M. A. – Garibaldi, L. A. – Ichii, K. – Liu, J. – Subramanian, S. M. – Midgley, G. F. – Miloslavich, P. – Molnár, Z. – Obura, D. – Pfaff, A. – Polasky, S. – Purvis, A. – Razzaque, J. – Reyers, B. – Chowdhury, R. Roy – Shin, Y. J. – Visseren-Hamakers, I. J. – Willis, K. J. – Zayas, C. N. (eds.). IPBES secretariat, Bonn, Germany.

IPBES (2023) The Nature Futures Framework, a flexible tool to support the development of scenarios and models of desirable futures for people, nature and Mother Earth, and its methodological guidance. Rolling draft, version July 2023, IPBES secretariat, Bonn, Germany.

Kim, HyeJin – Peterson, Garry D. – Cheung, William W.L. – Ferrier, Simon – Alkemade, Rob – Arneth, Almut – Kuiper, Jan J. – Okayasu, Sana – Pereira, Laura – Acosta, Lilibeth A. – Chaplin-Kramer, Rebecca – den Belder, Eefje – Eddy, Tyler D. – Johnson, Justin A – Karlsson-Vinkhuyzen, Sylvia – Kok, Marcel T.J. – Leadley, Paul – Leclère, David – Lundquist, Carolyn J. – Rondinini, Carlo – Scholes, Robert J. – Schoolenberg, Machteld A. – Shin, Yunne-Jai – Stehfest, Elke – Stephenson, Fabrice – Visconti, Piero – van Vuuren, Detlef – Wabnitz, Colette C.C. – José Alava, Juan – Cuadros-Casanova, Ivon – Davies, Kathryn K. – Gasalla, Maria A. – Halouani, Ghassen – Harfoot, Mike – Hashimoto, Shizuka – Hickler, Thomas – Hirsch, Tim – Kolomytsev, Grigory – Miller, Brian W. – Ohashi, Haruka – Gabriela Palomo, Maria – Popp, Alexander – Paco Remme, Roy – Saito, Osamu – Rashid Sumalia, U. – Willcock, Simon – Pereira, Henrique M. (2023) Towards a better future for biodiversity and people: Modelling Nature Futures. Global environmental change. Vol. 82, Article 102681.

Kylliäinen, Petri (1997) Tulevaisuudentutkimuksen historiaa. Tulevaisuudentutkimuksen (TVA) verkostoakatemian kurssi, TUTUS4 Tulevaisuudentutkimuksen tieteellinen perusta.

Lang, Trudi – Ramírez, Rafael (2017) Building new social capital with scenario planning. Technological forecasting & social change. Vol. 124, 51–65.

Mannermaa, Mika (2013) Tulevaisuudentutkimus tieteellisenä tutkimusalana. Acta Futura Fennica. Vol. 5 B-osa, 1–15.

Millennium Ecosystem Assessment (2003) Ecosystems and Human Well-being: A Framework for Assessment. Washington, DC: Island press.

Millennium Ecosystem Assessment (2005) Overview of the Millennium Ecosystem Assessment. https://www.millenniumassessment.org/en/About.html#, haettu 12.10.

Moyer, Jonathan D. – Hedden, Steve (2020) Are we on the right path to achieve the sustainable development goals? World development. Vol. 127, p. 104749, Article 104749.

NFF (2024) What is the Nature Futures Framework? https://www.naturefuturesframework.org/background, haettu 13.10.

Opetushallitus (2024) Ekosysteemipalvelut. https://www.oph.fi/fi/oppimateriaali/luovasti- luonnonvaroista/suomen-luonnonvarat/ekosysteemipalvelut, haettu 11.10.

Pereira, Laura M. – Davies, Kathryn K. – Belder, Eefje – Ferrier, Simon – Karlsson-Vinkhuyzen, Sylvia – Kim, HyeJin – Kuiper, Jan J. – Okayasu, Sana – Palomo, Maria G. – Pereira, Henrique M. – Peterson, Garry – Sathyapalan, Jyothis – Schoolenberg, Machteld – Alkemade, Rob – Carvalho Ribeiro, Sonia – Greenaway, Alison – Hauck, Jennifer – King, Nicholas – Lazarova, Tanya – Ravera, Federica – Chettri, Nakul – Cheung, William W. L. – Hendriks, Rob J. J. – Kolomytsev, Grigoriy – Leadley, Paul – Metzger, Jean-Paul – Ninan, Karachepone N. – Pichs, Ramon – Popp, Alexander – Rondinini, Carlo – Rosa, Isabel – Vuuren, Detlef – Lundquist, Carolyn J. – Egoh, Benis; Egoh, Benis (2020) Developing multiscale and integrative nature–people scenarios using the Nature Futures Framework. People and nature (Hoboken, N.J.). Vol. 2 (4), 1172–1195.

Popper, Rafael (2008) How are foresight methods selected? Foresight (Cambridge). Vol. 10 (6), 62– 89.

Quintero-Uribe, Laura C. – Navarro, Laetitia M. – Pereira, Henrique M. – Fernández, Néstor (2022) Participatory scenarios for restoring European landscapes show a plurality of nature values. Ecography (Copenhagen), Vol. 2022 (4), Article e06292.

Resende, Fernando de Moura – Cornejo Denman, Lara A. – Selva, Gracie Verde – Campanhão, Ligia Maria Barrios – Nobre, Regina Lúcia Guimarães – Jimenez, Yohana Gisell – Lima, Edberto Moura – Niemeyer, Julia (2020) A conceptual model to assess the impact of anthropogenic drivers on water-related ecosystem services in the Brazilian Cerrado. Biota neotropica. Vol. 20, 1–12.

Rosa, Isabel M.D. – Pereira, Henrique M. – Ferrier, Simon – Alkemade, Rob – Acosta, Lilibeth A. – Akcakaya, H. Resit – Den Belder, Eefje – Fazel, Asghar M. – Fujimori, Shinichiro – Harfoot, Mike – Harhash, Khaled A. – Harrison, Paula A. – Hauck, Jennifer – Hendriks, Rob J.J. – Hernández, Gladys – Jetz, Walter – Karlsson-Vinkhuyzen, Sylvia I. – Kim, Hyejin – King, Nicholas – Kok, Marcel T.J. – Kolomytsev, Grygoriy O. – Lazarova, Tanya – Leadley, Paul – Lundquist, Carolyn J. – García Márquez, Jaime – Meyer, Carsten – Navarro, Laetitia M. – Nesshöver, Carsten – Ngo, Hien T. – Ninan, Karachepone N. – Palomo, Maria G. – Pereira, Laura M. – Peterson, Garry D. – Pichs, Ramon – Popp, Alexander – Purvis, Andy – Ravera, Federica – Rondinini, Carlo – Sathyapalan, Jyothis – Schipper, Aafke M. – Seppelt, Ralf – Settele, Josef – Sitas, Nadia – Van Vuuren, Detlef (2017) Multiscale scenarios for nature futures. Nature ecology & evolution. Vol. 1 (10), 1416–1419.

Rubin, Anita (2024) Skenaarion käsitteestä. https://tulevaisuus.fi/menetelmat/skenaarioajattelu- tulevaisuudentutkimuksessa/skenaarion-kasitteesta/, haettu 8.10.

Schröter, Matthias – Stumpf, Klara H. – Loos, Jacqueline – van Oudenhoven, Alexander P.E. – Böhnke-Henrichs, Anne – Abson, David J. (2017) Refocusing ecosystem services towards sustainability. Ecosystem services. Vol. 25, 35–43.

Ympäristöministeriö (2024) Montrealin luontokokous. https://ym.fi/montrealin-luontokokous- cop15, haettu 16.10.

Ulkoministeriö (2024) Agenda 2030 – kestävän kehityksen tavoitteet. https://um.fi/agenda-2030- kestavan-kehityksen-tavoitteet, haettu 10.10.

UN (2024) The 17 goals. https://sdgs.un.org/goals, haettu 10.10.

Varum, Celeste Amorim – Melo, Carla (2010) Directions in scenario planning literature – A review of the past decades. Futures: the journal of policy, planning and futures studies. Vol. 42 (4), 355–369.

Wegner, Giulia – Pascual, Unai (2011) Cost-benefit analysis in the context of ecosystem services for human well-being: A multidisciplinary critique. Global environmental change. Vol. 21 (2), 492–504.

Weh, Ludwig – Weil, Charlotte – de Haan, Gerhard – Leinfelder, Reinhold (2023) Ecosystem Scenarios as Environmental Futures – Implications for Participatory Framework Designs Integrating Social Capital Formation and Natural Capital Preservation. Journal of Futures Studies. Vol. 28 (2), 21–35.

Tekoälyn käyttö

Tässä kirjoitelmassa on käytetty tekoälyä apuna sisällysluettelon ja otsikon ideoimisessa.

LATEST FFRC eBOOKS

5/2025 Kuhmonen, Tuomas & Tembo, Belyta: Savon maatalouden tulevaisuuskuvat: Viljelijöiden näkemykset.

4/2025 Di Berardo, Mara – Heinonen, Sirkka – Taylor, Amos – Viitamäki, Riku & Virmajoki, Veli: Exploring Socio-Technical Futures of Work: A Narrative-Based Foresight Approach. Report of the Millennium Project Session at the Futures of Technologies Conference 2025.

3/2025 Ahokas, Ira – Lakkala, Hanna & Vehmas, Jarmo: Esiselvitys korkea-aktiivisen ydinjätteen loppusijoituksen mahdollisista tulevaisuuksista (SAFER2028).

2/2025 Kuhmonen, Tuomas & Tembo, Belyta: Savon maatalouden tulevaisuuskuvat: Sidosryhmien näkemykset.

1/2025 Heinonen, Sirkka & Viitamäki, Riku: Society, Skills and Spaces – Curated Conversations on Futures of Work with Foresight Experts.

7/2024 Karjalainen, Joni – Miettinen, Sari – Haapasaari, Osku & Kaskinen, Juha: Shaping Education and 21st Century Skills with Futures Literacy. The Futures of Teacher Education in Kenya 2050.

6/2024 Kirveennummi, Anna & Heikkilä, Katariina: Hoivaa, vaali ja säilytä – Tulevaisuuskeskusteluja rakennusperinnön ja -suojelun puolesta.

5/2024 Aalto, Hanna-Kaisa – Birmoser Ferreira-Aulu, Marianna – Halme, Amanda – Heikkilä, Katariina – Heino, Hanna – Keski-Pukkila, Pasi – Parkkinen, Marjukka – Puustinen, Sari – Richards, Martyn – Salminen, Hazel – Shaw, Morgan – Siivonen, Katriina – Tapio, Petri & Arvonen, Anne (editors): Coolest Student Papers at Finland Futures Research Centre 2023–2024. Tulevaisuuden tutkimuskeskuksen valittuja opiskelijatöitä 2023–2024.

4/2024 Heinonen, Sirkka – Ebrahimabadi, Samaneh – Viitamäki, Riku – Taylor, Amos – Pättikangas, Paula – Knudsen, Mikkel & Tähtinen, Lassi: Deconstructing Paradoxes of Work through CLA. Millennium Project Special Session at FFRC Conference ‘Futures of Natural Resources’, 13 June 2024, Turku, Finland.

3/2024 Jones-Wilenius, Ana: Futures and Foresight in Participatory Planning: Exploring Images of the Future in Communities of the Transforming New Indonesian Capital City – Nusantara.

2/2024 Karayel, Tolga – Kaivo-oja, Jari – Villman, Tero – Pouru-Mikkola, Laura – Lindholm, Michael & Immonen, Eero: Exploring Smart City Digital Twins. From Distinct Concepts Towards Integrated Socio-Technical Applications.

1/2024 Heinonen, Sirkka – Sivonen, Risto – Karjalainen, Joni – Taylor, Amos – Toivonen, Saija & Tähtinen, Lassi: Testing Urban Resilience with Immersive CLA and What If? Three Cases: Rovaniemi, Kotka and Tripla.

7/2023 Kuhmonen, Tuomas – Penttilä, Atte – Kuhmonen, Irene – Selänniemi, Marjatta – Saarimaa, Riikka – Savikurki, Anni & Karttunen, Kaisa: Suomen ruokajärjestelmän haavoittuvuus: Keskinäisriippuvuuksien verkko toimintakyvyn haasteena.

6/2023 Heino, Hanna – Ahvenharju, Sanna – Ahlqvist, Toni – Ferreira-Aulu, Marianna – Lehtiö, Kati – Puustinen, Sari – Pöllänen, Markus, Siivonen, Katriina & Arvonen, Anne (editors): Coolest Student Papers at Finland Futures Research Centre 2022–2023. Tulevaisuuden tutkimuskeskuksen valittuja opiskelijatöitä 2022–2023.

5/2023 Heinonen, Sirkka – Maree, Burgert – Sivonen, Risto – Toivonen, Saija – Viitamäki, Riku & Pättikangas, Paula: Towards Twin Transformations and Spaces – Convoluted Conversations on the Green and Digital Futures of Work.

COOLEST STUDENT PAPERS AT FINLAND FUTURES RESEARCH CENTRE 2024–2025

Tulevaisuuden tutkimuskeskuksen valittuja opiskelijatöitä 2024–2025

Hanna-Kaisa Aalto, Hanna Heino, Pasi Keski-Pukkila, Liisa Haapanen, Sari Puustinen, Markus Pöllänen, Morgan Shaw, Katriina Siivonen, Petri Tapio, Amos Taylor, Markku Wilenius & Anne Arvonen (editors)

FFRC eBooks 6/2025

Finland Futures Research Centre, University of Turku

ISBN 978-952-249-633-1

ISSN 1797-1322

UNIVERSITY OF TURKU

FINLAND FUTURES RESEARCH CENTRE

FFA Finland Futures Academy