



**UNIVERSITY  
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**Mirrors Of Entrepreneurial Foresight: A  
Qualitative Study As Seen Through The Lens Of  
Female Entrepreneurs In ICT**

Futures Studies

Master's thesis

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Navigating in an uncertain and volatile sector requires the implementation of foresight to identify business opportunities and to attain a competitive advantage. This thesis aims to explore images of the future of female entrepreneurs in ICT through the lens of business opportunities and digital skills to determine their outlook on the digitalisation. To further assess the application of foresight in an organisation, this thesis focuses on the approaches that female entrepreneurs utilise to conduct foresight practices in their everyday processes. The research approach adopted in this thesis includes qualitative methods that were executed through eight interviews with female entrepreneurs from ICT with less than 20 employees and who are based in Finland. A qualitative content analysis was employed to uncover emerging themes.

The results indicate that three future images could be distinguished: Community Before All, Green World and Seeing The World Through Smart Glasses. These images reveal business opportunities related to the gaming industry and emerging technologies (e.g. AI). The most striking result to surface from the data is the alignment between a business opportunity and the values of female entrepreneurs as a critical factor. The findings also underline that female entrepreneurs implement foresight practices, ranging from thought experiments to horizon scanning. However, collaborative foresight practices within inter-firm structures were not adopted. It was evident that the present orientation of female entrepreneurs, accompanied by their misconceptions about foresight, tight financial budgets and time constraints influence how the future is perceived.

The main conclusion to be drawn from this work is that female entrepreneurs' images of the future concern building a community to induce social change and achieving environmental sustainability, therefore demonstrating the aspiration to tackle global challenges. Contrary, the counterimage focuses on technological advancements and generating profit. The present orientation of female entrepreneurs and the gap between the research of futures studies and the practitioners present core challenges when considering the practical implications to promote the application of foresight.

**Key words:** Images of the future, entrepreneurial foresight, foresight practices, female entrepreneurs, ICT

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## **LIST OF ABBREVIATIONS**

CoP	Communities of Practice
SME	Small and medium-sized enterprises

# 1 Introduction

## 1.1 Background

The concept of portraying a unique vision of the future and implementing foresight is central for entrepreneurs to gain a competitive advantage in an organisational setting by generating value through transformational processes (Colwell & Narayanan 2010). According to Rohrbeck et al. (2015), foresight is a vital requisite to obtain a competitive advantage for an organisation. By identifying the driving forces that could shape the future, organisations can adapt by responding appropriately to the changes in the environment that are characterised by complexity and uncertainty (Vecchiato 2012). Therefore, strategic foresight plays a critical role in supporting organisations, as it offers value-creating decisions to construct a strategy (Rohrbeck et al. 2015). Evidence suggests that foresight is among the most indispensable factors for entrepreneurs to determine future opportunities that could aid in estimating market demands and supporting risk management (Hajizadeh & Valliere 2022).

However, a significant challenge for entrepreneurs is the insufficiency of necessary resources to attain a competitive position and to enhance the needed capabilities to realise their vision of the future, which is crucial for their success (Colwell & Narayanan 2010). In line with Colwell & Narayanan (2010), a robust strategy is fundamental for entrepreneurs to rely on since their survival and success are not predetermined but rather dependent on how and if they can manifest their vision of the future. This perspective contends that foresight can be viewed as an integral part of entrepreneurship (Fuller & Warren 2006). So far, there is a dearth of published data on entrepreneurial foresight (Rhisiart & Jones-Evans 2016), especially on the individual level (Hajizadeh & Valliere 2022). In addition, few studies have assessed the role of operational-level foresight (Gordon et al. 2020) as well as practice-oriented foresight that materialises in the everyday activities of an organisation (Sarpong et al. 2013a). Whilst research has primarily investigated how foresight is applied at an organisational level, scarce attention has been paid to how foresight is linked to the strategic planning processes and operational processes in an organisation (Gordon et al. 2020).

## **1.2 Business Opportunities Emerging From Images Of The Future**

Drawing from Hines et al. (2017), foresight conducted at the individual level illuminates the mental processes that are utilised to construct images of the future. Emphasising this concept, images of the future display expectations of particular conditions in the future (Mau & Bell 1971). The action of imagining involves creating a mental representation that diverges from real life by deliberating on the what-ifs, which subsequently influences actions in the present time (Patvardhan & Ramachandran 2020).

Beckert (2021) argued that images of the future illustrate an approach for organisations to navigate their decision-making by providing legitimacy to reduce uncertainty and to foster coordination within an organisation. These images of the future determine the present activities of these companies (Beckert 2013), encompassing strategy planning, financial budgeting and the development of technological advancements (Beckert 2021). Strategic imagination is delineated as a cognitive process that results in generating business opportunities, instead of discovering them. Through imagination markets can be endogenously shaped through certain actors. (Patvardhan & Ramachandran 2020.) A prevalent view in this thesis follows the definition of Berglund et al. (2020) who differentiated opportunities as artefacts. They proposed that discovered opportunities stem from experiments and are closely linked to visions (Berglund et al. 2020). Based on the structuration theory, Sarason et al. (2006) defined that business opportunities begin with an idea, before undergoing processes of experimentation through market research or consultancy. Thus, causing changes to the original idea due to social interaction with others (Sarason et al. 2006). Complimenting the suggestion that ideas precede opportunities, Dimov (2007) concluded that ideas represent an imagined future, while opportunities turn the imagined future into a reality.

Taken together, it is evident that images of the future are interconnected with future business opportunities, as these opportunities can be seized in the present time to realise an entrepreneur's ideal image of the future or vision.

## **1.3 ICT Sector As A Supporting Force Of The Digitalisation**

The information and communication technology (ICT) sector was chosen as a context in this study because it encompasses digital technologies that aid communication through the employment of broadband applications and services (ICT Sector n.d.). Additionally,



its orientation to future possibilities including smart devices that lead to constructing global network infrastructures was a prominent factor in selecting the ICT sector as a focus of this study (ICT Sector n.d.). Subsequently, the ICT sector enables the reduction of geographical disparities, promoting a stronger collaboration between businesses and strengthening interactions between individuals (Kretschmer 2012). Facilitating knowledge flows (García-Muñiz & Vicente 2014), managing data and information results in a body of knowledge which can be accessed online (ICT Sector n.d.). A principal aspect of the ICT industry is fostering innovation (Maryska et al. 2012), hence contributing to global competitiveness in the digital age (Saarenketo et al. 2008).

The ICT sector has a substantial impact on the growth of an economy (Maryska et al. 2012), representing 5.79% of Finland's GDP (gross domestic product) in 2020 (Clausnitzer 2023), due to the high growth potential of the industry (Saarenketo et al. 2008). Finland is recognised as a digital leader in the world due to its widespread implementation of ICT technologies (Cordis 2023). Within Europe, Finland ranks first in accordance with the Digital Economy and Society Index (DESI) in 2022. The DESI index consists of four dimensions related to human capital, connectivity, integration of digital technology and digital public services. Finland holds the highest score among most of the DESI dimensions which is considered ideal. Alternatively, Finland's dominant position could imply that saturation was achieved with no possible need for further growth. Starting with the human capital, Finland occupies the first place, as almost 80% of the individuals encompass basic digital skills, while about 50% are comprised of individuals with above-average digital skills. ICT specialists who are in employment constitute 7.4%. Among these ICT specialists, 24% are female ICT specialists, as 19% are the average in the EU. Moreover, the number of companies enforcing ICT training is comparable to twice the EU average. Regarding connectivity, Finland takes 8<sup>th</sup> place because established high-capacity networks were unequally distributed, thus leaving rural areas with a lower coverage. Finland also holds the first rank within the integration of digital technologies, as 82% of small and medium-sized enterprises (SMEs) in Finland possess a basic level of digital intensity (55% is the EU average). With the adoption of advanced technologies, involving cloud solutions and AI technology, Finland's implementation represents twice the average within the EU. Lastly, taking the second place in digital public services, the communication between the government and individuals primarily occurs online with 92% of Finnish citizens taking advantage of e-government services. On top of that,

individuals are able to access medical records through a national portal, as e-Health was introduced. (DESI 2022.)

However, due to the divergent progression of the digitalisation within Europe, Finland ranks above the EU average, taking the first place, while other countries do not reflect the same digital progression, there is still evidence for convergence (DESI 2022). Entering the Digital Decade, the European Commission launched digital targets for the year 2030 to digitally empower individuals and businesses to build a digital society and economy (2030 Digital Compass n.d.). The Digital Compass, embodying four major areas, involves creating a digitally skilled public and labour pool, establishing safe and sustainable infrastructures, supporting firms in the digital revolution and providing digital public services (Digital Decade n.d.). Finland utilised the Digital Compass issued by the EU as a framework, while adopting more stringent objectives to drive the digitalisation forward (Finland's Digital Compass 2022), thus reinforcing their commitment.

#### **1.4 Female Entrepreneurs**

There is a growing body of literature (e.g. Doran et al. 2018; Neumann 2021; Toma et al. 2014; Urbano et al. 2019) that recognises the significance of entrepreneurship as a driving force that promotes economic development. Specifically, female entrepreneurs play a critical role in economic growth. (Ahl 2006.)

Compared to other Nordic countries, Finland is represented by a considerably higher number of female entrepreneurs (Grünfeld et al. 2020, as cited in Alsos et al. 2014). In a study conducted by Alsos et al. (2014), 41% of entrepreneurs in Finland are shown to be female, thus exceeding the average of 38% of the examined countries in the study (Grünfeld et al. 2020, as cited in Alsos et al. 2014). In comparison, about 35% of female entrepreneurs are from Denmark and Norway. Sweden, on the other hand, has a female representation of about 28%. However, most businesses that are run by female entrepreneurs in Finland, are small businesses that are not oriented towards growth. (Grünfeld et al. 2020, as cited in Alsos et al. 2014.)

Despite the fact that the Nordic countries belong to the most gender-equal countries in the world, according to a study by Dyvik (2024b), it is apparent that female entrepreneurs are underrepresented even within the Nordics (Dyvik 2024a). Moreover, the majority of female-owned businesses are linked to services, health, social work and education

(Grünfeld et al. 2020, as cited in Alsos et al. 2014), whereas male-owned businesses are engaged in industries such as information and communication technologies, construction or manufacturing (Dyvik 2024a). Thus, it has been observed that female entrepreneurs pursue businesses within industries that are already occupied by women (Grünfeld et al. 2020). The underrepresentation of women specifically in the ICT industry has existed for a long period of time, regardless of the need for skilled ICT specialists in a globalised world. Recent evidence suggests that although women constitute half of the population, the European Commission stated that only one out of five ICT specialists are women. (European Commission 2024.) It is now well established from various studies that incorporating women in ICT activities contributes to diversity, which subsequently yields favourable results through promoting economic growth and social welfare since women foster inventions that include a wide range of technologies with greater effects (OECD 2018).

Studies over the past five decades on entrepreneurship have provided critical information on women-owned businesses and the effect of gender on entrepreneurship. However, to date, there is a paucity of published data on female entrepreneurship within high-technology sectors. (Wheadon & Duval-Couetil 2019.) As women's perception of the world differs from men's (Allen et al. 2019), it is vital to shed light on this underrepresented group. Moreover, Kubberød et al. (2021) conducted interviews with female entrepreneurs in high-tech sectors located in Norway who established firms in male-dominated industries. The study's comprehensive review concluded that female entrepreneurs leverage their otherness and not belonging to a field as a vehicle to induce change and to establish new rules to challenge the norms (Kubberød et al. 2021). Almost 25 years ago, Masini (2002) highlighted the significance of visions that are conceptualised by women who proffer new perspectives in society due to different capabilities and values that are salient only in women. Resulting in alternative futures with a prevalence of values originating from solidarity through building a like-minded community, encouraging an optimistic mindset and preserving natural resources. On a societal level, women could foster a society in which non-materialism pervades, instead of being ruled by economic factors. However, she argued that for these capacities and values to permeate society, it is imperative for women to assume leadership roles and to gain visibility in society to advocate for change. (Masini 2002.)

## 1.5 Research Aims & Research Questions

The aim of this study is to enhance our understanding of the implementation of entrepreneurial foresight in practice. Moreover, this thesis intends to examine female entrepreneurs' images of the future from the perspective of future business opportunities and digital skills in the context of the ICT sector. In addition, this study aims to shed light on the views and experiences of female entrepreneurs in an underrepresented sector by unravelling their outlook on the future. Focusing on an understudied group within this research allows for a significant contribution to the literature.

The research questions of this study are presented as follows:

- 1) What are the images of the future of female entrepreneurs from the ICT sector?**
  - How do female entrepreneurs perceive the impact of the digital transformation on their businesses and their customers' businesses in the future?
  - What digital skills and business opportunities are presented in this study which are significant in the future when considering the digital transformation?
- 2) Which foresight practices are employed by female entrepreneurs to aid the realisation of future opportunities?**

Moving on to the methodological approach taken in this study, it was based on qualitative methods through conducting semi-structured interviews. The research data in this thesis was drawn from eight interviewees, who are female entrepreneurs from the ICT sector and are based in Finland.

It is important to note that this study does not highlight the gendered experiences female entrepreneurs have observed while being involved in a male-dominated industry. Instead, the analysis of the foresight practices and therefore the future orientation, as well as their images of the future regarding the digitalisation are the focal points of this study.

The thesis is composed of six chapters and is structured as follows:

Firstly, the introduction provides a brief overview of the background of the research, while presenting the research aims and questions. Next, Chapter Two begins by displaying the theoretical dimensions of the research and considers the images of the

future as well as the EROS model by Fuller & Warren (2006) to explain entrepreneurial foresight. The third chapter is concerned with the methodology used for this study, involving the applied methods in data collection and data analysis. Chapter Four presents the findings of the research, focusing on the three identified images (“Community Before All”, “Green World” and “Seeing The World Through Smart Glasses”), as well as the business opportunities and the digital skills that female entrepreneurs viewed as crucial in the future. Next, the EROS model by Fuller & Warren (2006) was employed to comprehend which foresight practices were implemented by organising the practices into the four categories of the EROS model: experiments, reflexive identities, organising domains and sensitivity to change. In Chapter Five the main findings are discussed. The issue addressed in this chapter explores the future orientation of female entrepreneurs in a broader context and connects the results with additional notions that are prominent in futures studies. Furthermore, the limitations of the study, the implications for future research and the practical implications for promoting foresight practices are also underlined. Finally, the key contributions of this research and recommendations for further research are reiterated in the conclusion.

## 2 Theoretical Framework

In this chapter, the framework for the present study is established. It describes images of the future from the standpoint of the collective and the individual, before moving on to an exploration of the cognitive processes to build images of the future. Having discussed how images of the future are generated, the following subchapter will explain how images of the future differ from visions.

Furthermore, this study will outline the history of the emergence of organisational foresight, while demonstrating the benefits and barriers to applying foresight within an organisational setting. Another significant aspect of organisational foresight is to consider practice-oriented foresight which will be highlighted in this chapter. To conclude this chapter, principal factors of entrepreneurial foresight are reviewed and the EROS model by Fuller & Warren (2006) is introduced to elucidate foresight practices from the perspective of entrepreneurs.

### 2.1 Images Of The Future

#### 2.1.1 Exploration Of Images Of The Future On A Collective And An Individual Level

##### Collective action through a shared understanding of images of the future

Jasanoff & Kim (2015) stated that in the current world, imagination is part of an individual's trait. However, they reported that imagination can also occur intersubjectively within communities through common perspectives of the future that are either desirable or undesirable (Jasanoff & Kim 2015). In particular, Amara (1974) underlined the significance of understanding the role of shared images in the process of social change.

According to Polak (1973), images of the future can operate as a vision to guide future activities. As soon as the individual perceives the established images of the future, an active role is assumed to shape the future. Being aware of ideal values is fundamental to consciously designing images of the future, as future images mirror and further amplify core values. (Polak 1973.) This sentiment parallels Albertson & Cutler (1976), who surmised that worldviews reflect the present state of society. That said, Polak (1973) put an emphasis on shared images of the future, that are linked to the processes that are

prevalent in society and culture. He suggested that images of the future are determined by an individual's attitude. Key components of future images are defined by essence and influence. Essence is delineated as the perception that events cannot be altered, while influence depicts the possibility of individuals engaging in action and therefore the ability to interfere. At an essence and influence level, optimism or pessimism can produce positive or negative images of the future. (Polak 1973.) On top of that, culture has a monumental effect on an individual's images of the future. As "the rise and fall of the images of the future precedes or accompanies the rise and fall of cultures" (Polak 1973, 19), it is of utmost importance to establish positive images of the future to give rise to a thriving society. In contrast, the decline of images of the future engenders the eradication of cultures. (Polak 1973.) Reinforcing this notion, Slaughter (1991) highlighted that constructing images of the future is a practice that originated from history. Hence, to harness and guide social action, a careful selection of a convincing image is essential to direct a cultural force (Slaughter 1991). This perspective contends that images of the future are connected to power which can elicit a change on a social level (Vásquez 1999). Overall, through imagination a desirable future or a better society can be envisioned, thereby increasing democratic participation and encouraging social action (Bell 2003).

Although Polak (1973) drew upon multiple examples to recite images of the future in various contexts, Morgan (2002) dismissed the cases relating to ancient and medieval periods due to the one-sided arguments that were cherry-picked by Polak (1973). Moreover, other examples from history were omitted in Polak's (1973) work to support his narrative (Morgan 2002). Morgan (2002) also challenged Polak's (1973) claim of the "rise and fall of cultures" (Polak 1973, 19) on the grounds that he should have demonstrated how subsequent images of the future awake after an image collapsed. (Morgan 2002.) Van der Helm (2005) criticised Polak (1973) for abstaining from employing empirical methods and not unveiling how a better society would surface, although Polak (1973) claimed that uplifting images of the future are conducive to the emergence of a positive future in reality. Compared to Polak (1973), who linked images of the future to an individual's attitude, Dator (2019) suggested that gender, age groups, culture, social class and origins exert an influence on future images.

Images of the future can also be delineated as an "expectation about the state of things to come at some future time" (Mau & Bell 1971, 23). To explain how the creation process

of future images engenders individual or collective action, Mau & Bell (1971) illustrated the cybernetic-decisional model, which is displayed in Figure 1.

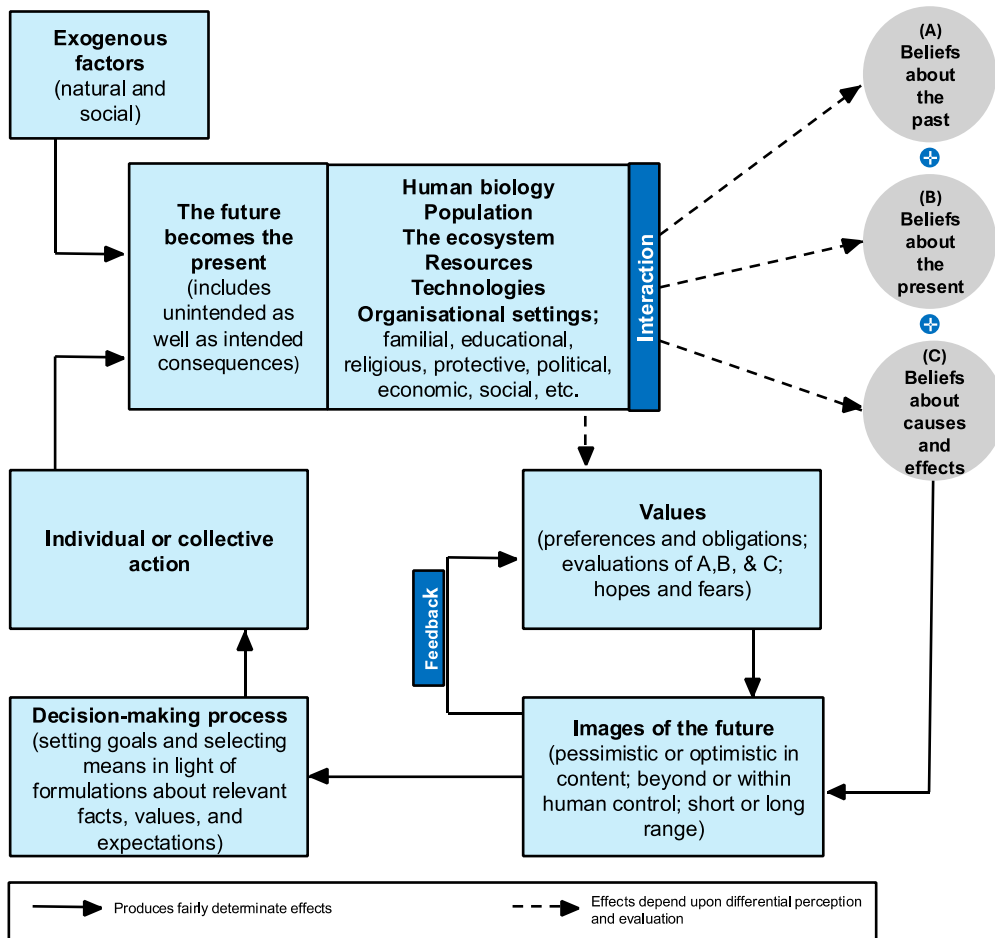


Figure 1 Cybernetic-decisional model of social change, author's own adaption based on Mau & Bell (1971, 21)

As stated by Mau & Bell (1971), images of the future are shaped by values and beliefs about the past, present, causes and effects. Knowledge and understandings from individuals or a society that were acquired in the past affect the present time by influencing the aspired future. In comparison, the present also shapes the future because images of the future in turn affect the decision-making process which induces actions that could lead to the future materialising in the present time. The perspective that images of the future contribute to social change to fulfil a desirable future, is seen as of greatest importance in the theory of social change. (Mau & Bell 1971.) Complimenting Polak's (1973) work, Mau & Bell (1971) considered that images of the future can either be pessimistic or optimistic depending on the content. Moreover, the existence of assumptions that rule images of the future involve factors that can impact the forthcoming



future. This includes factors that can be transformed directly by actions, indirectly by prayers and those factors that are unpreventable despite prevailing circumstances. (Mau & Bell 1971.) This sentiment parallels Aligica's (2011) view that images of the future are composed of various building blocks, which can be regarded as a roadmap, as each building block can involve a potential action. Mau & Bell (1971) concluded that the selection of an image of the future precedes the decision-making process which evokes individual or collective action. Deciding on an image of the future as a north star can be intentional, conscious and based on reason. Due to the taken actions a future arises, however, a disparity between the actual future and an image of the future could be detected due to inadvertent interventions. (Mau & Bell 1971.) In addition, Mau & Bell (1971) elucidated that the created model resembles a feedback loop with a smaller feedback loop integrated between values and images of the future, which is depicted in Figure 1. Therefore, indicating an interrelated relationship between these elements (Mau & Bell 1971).

#### Exploration of images of the future as a mental tool on an individual level

Rubin & Linturi (2001) deduced that an amalgam of three factors, comprised of general knowledge, social knowledge and identity are essential to explain the origins of images of the future, as shown in Figure 2.

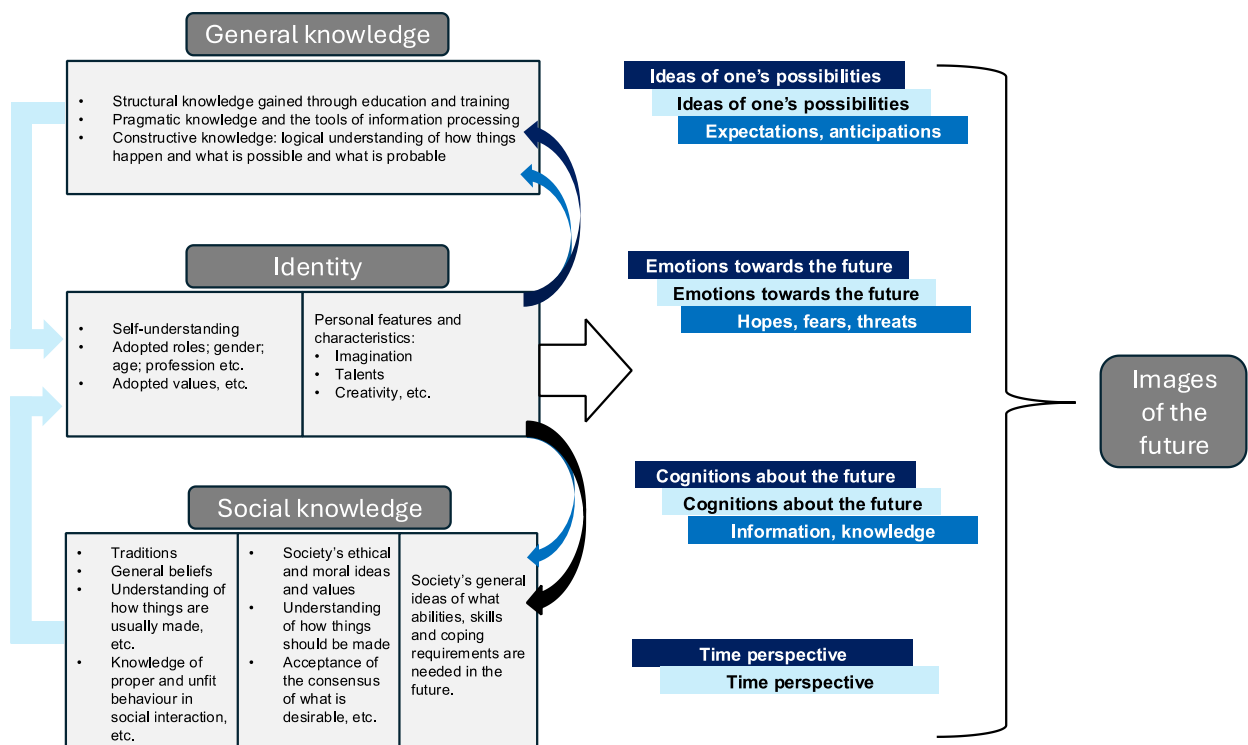


Figure 2 Establishing images of the future, author's own adaptation based on Rubin & Linturi (2001, 271)

According to Rubin & Linturi (2001), general knowledge is based on information that individuals collect throughout their lives and in education. Additionally, their ability to process information is also an influencing factor. Moving on to social knowledge, it is obtained through experiences and from social interactions with others. Quintessential to social knowledge is the worldview of individuals, their assumptions about their beliefs as a guiding factor for decision-making and their behavioural conduct. Lastly, the identity which involves the individual's role in society, also relies on gender, age, skills and professional jobs which affect how individuals perceive the future. (Rubin & Linturi 2001.) Rubin & Linturi (2001) proposed that drafting images of the future is determined not only by internal processes through an individual's attributes but also by external processes.

Establishing the future orientation of an individual depends on their ability to direct activities which support the decision-making process to materialise images of the future (Rubin & Linturi 2001). However, Rubin & Linturi (2001) cautioned that images of the future are time-bound and encompass worldviews and therefore a particular set of values. Thereby, it has to be acknowledged, that an individual's worldviews, beliefs, expectations etc. can change over time (Rubin & Linturi 2001). Neuhaus (2022) specified that every image of the future reflects the time that the image was designed. To fully understand the depth of these images, it is imperative to comprehend the background context during the time the images of the future surfaced. This would include an awareness of the overarching values as well as the links to historical events that occurred during that time frame. (Neuhaus 2022.)

In her research, Rubin (1998) discussed that images of the future do not result from logical and analytical reasoning, instead, she referred to the fact that humans are emotional beings with values, beliefs, concerns and hopes. Moreover, humans are affected by their environment and their social community. Images of the future arise when individuals perceive incidents that appear in their awareness, after which they connect an emotional distress or a pertinence to this event. She explained that images are highly personal and can change over time. Images are employed as a coping mechanism to adapt to the developments in the world. It is viewed as a medium to process and to put interpretations about reality in order. (Rubin 1998.)

In a later work, Rubin (2013) illustrated that humans unconsciously or consciously create images of the future during their entire lifespan, which are either related to one's individual life or could concern society. These images of the future are invisible and not shared with others, as they are connected to power. She further delved into the expectation that images of the future present a mental model to assess assumptions about the future. Furthermore, images of the future are based on knowledge which manifest based on certain opinions and beliefs. However, they are also complemented by imaginative elements of what could transpire in the future. These images of the future are influenced by past and present knowledge as well as moral principles and beliefs of the status quo which then surface through hopes and fears that unfold in these images. They have the power to affect decision-making and can function as a motivator to attain a positive future. Regardless, negative images of the future can also motivate individuals by deterring them from actions that could lead to an undesirable future. (Rubin 2013.) Moreover, Rubin (2013) proved that contradictions exist within images of the future which arise through conflicting building blocks.

However, Rubin's (1998, 2013) research fails to fully define the mental processes an individual experiences that result in the emergence of images of the future that eventually affect an individual's actions. This research gap was filled by Rogers & Tough (1996) who claimed that discovering various potential futures can cause disruptive experiences for individuals. The authors surmised that one should not undermine the complexity of being confronted with the future (Rogers & Tough 1996). To further analyse the cognitive processes, Rogers & Tough (1996) identified five stages of learning about potential futures, which are depicted in Figure 3.

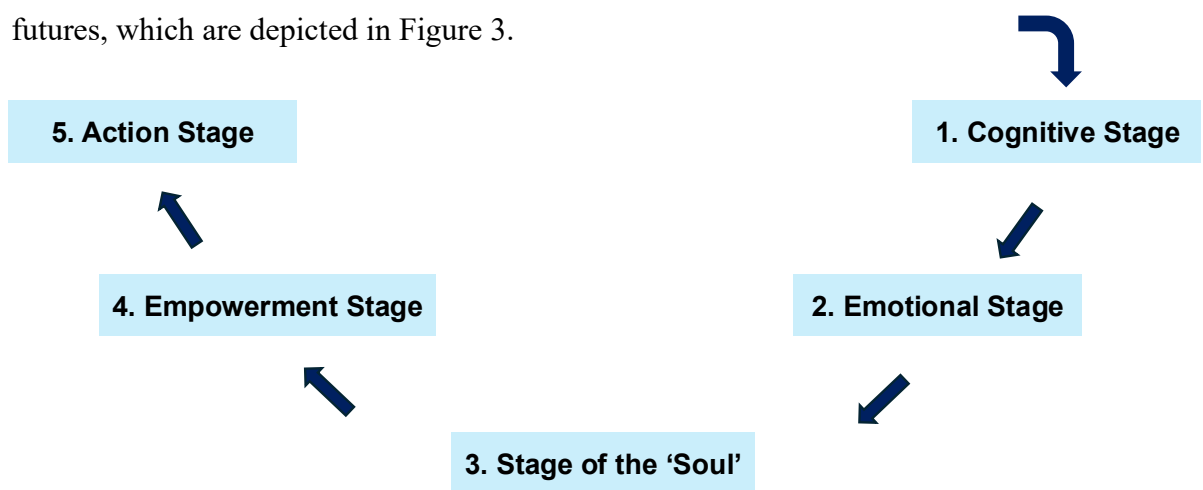


Figure 3 Five stages of learning about potential futures, author's own adaptation based on Rogers & Tough (1996, 492)

Starting with the first phase, also denoted as the cognitive stage, the learning process is at the centre. Individuals discover images of the future, scenarios and novel developments, such as trends or notions. During this process, individuals may experience negative feelings, such as resistance to these future concepts, as they are bewildered and stunned by these new perspectives. (Rogers & Tough 1996.) Moving on to the emotional stage, Rogers & Tough (1996) described the response to it as being on a roller coaster while undergoing highs and lows. This includes experiencing conflicting emotions, ranging from being optimistic to being depressed. In the stage of the soul, the emergence of a futures consciousness of different alternatives is palpable, even resulting in an individual's mindset shift which encompasses transcending previous values and worldviews. Next, in the empowerment stage, individuals are compelled to act due to feeling a great autonomy and devotion. (Rogers & Tough 1996.) However, Rogers & Tough (1996) cautioned that the empowerment stage is indispensable to reach the stage of action-taking, otherwise, individuals will only experience a force of emotion without seeking action or they would remain in inertia. The authors appealed to facilitators in the field of futures studies to encourage individuals during the process to devise positive images of the future that can give a glimmer of hope for a better future. Reaching the last stage, the action stage, it is perceived as the best possible outcome of supporting individuals in their decision-making with the goal of attaining a more desirable future. Instead of only being aware of possible futures, inspiring individuals to act is regarded to be the preferred consequence. (Rogers & Tough 1996.)

Complimenting the suggestion from Rogers & Tough (1996) of putting futures facilitators in the spotlight during the exploration of images of the future, Bell (1998) stated that futurists should assume a more active role by providing guidance and reinforcing individuals to seek alternatives. Futurists can aim to reach the objective of supporting individuals to develop personal images of the future on their own. The purpose is to assist individuals in taking responsibility in their everyday lives, whether it concerns their private lives or in society. (Bell 1998.) Bell (1998) emphasised the role of futurists in steering individuals to independently think outside of the box to be able to identify future opportunities. Nonetheless, he also acknowledged the importance of futurists generating more probable futures, while devising actions that induce alternative options, so individuals are informed about the impact of their present actions. (Bell 1998.)

### 2.1.2 Visions As Preferable Images Of The Future

As previously mentioned in the introduction, Colwell and Narayanan (2010) argued that portraying a unique vision of the future is instrumental for entrepreneurs to acquire a competitive advantage. Unless a compelling vision is created, entrepreneurs will not execute subsequent steps to reach their vision. (Colwell & Narayanan 2010.) This corroborates the significance for entrepreneurs to construct a vision. However, the notion also calls to mind how one can draw a distinction between visions and images of the future since both terms are in conjunction with the future.

Van der Helm (2009) proffered a definition of a vision by relying on three criteria. Firstly, a vision is linked to the future which is influenced by one's worldview. Secondly, a vision is perceived to be an ideal state in the future, resulting in preferable futures. Finally, he demonstrated that visions are established to precipitate collective activities that promote a desirable goal. In an entrepreneurial context, a business vision can support leadership in converging the actions of organisational actors. This affirms that visions are linked with particular actions that elicit a change to reach a preferable future. Hence, visions are not of an exploratory nature with the objective of scrutinising possible futures, which are instead connected to images of the future. (van der Helm 2009.) In contrast to visions, van der Helm (2009) differentiated that images of the future function as a testing environment to assess various possible futures, so a variety of images can emerge. On top of that, the scope of visions can be demarcated by their function to raise enthusiasm and to encourage committed individuals to advance towards a preferable future. Compared to goals, however, visions offer a mental framework to evaluate activities and to determine whether the possible activities could support or hinder realising a desirable future (van der Helm 2009). Taken together, van der Helm (2009) identified that the concepts of visions and future images have been used interchangeably for a long time, which exacerbates the intricacy of clearly differentiating them. Similar to van der Helm (2009), Beers et al. (2010) deduced that a desirable future is preeminent in a vision. Nevertheless, undesirable futures can be pictured as well as a basis to create a vision (Beers et al. 2010). Although Beers et al. (2010) differentiated that visions transpire in the future, images do not necessarily have to concern the future. Following Beers et al. (2010), images of the future can be denoted as a hypernym of visions, as a vision can represent an image of a desirable future.

Drawing upon Vásquez (1999), he generalised that visions are outlined as a transformation of the current circumstances in the present time, resulting in a brighter future that can be attained through initiating various activities. Every vision occurs through a variety of images of the future, however, Vásquez (1999) asserted that it is not a prerequisite that images of the future evolve into a vision. (Vásquez 1999.) Corresponding with van der Helm (2009), Masini (2002) drew a line between visions and images due to the possibility to actualise visions, while an image is connected to a fuzzy concept.

Drawing from these findings, it can be deduced that a differentiation from visions to images is based on the possibility of visions to realise the desired image of the future by eliciting particular actions to evoke a change. Contrarily, images of the future do not scrutinise a variety of possible futures which are only tied to desirable futures, instead, they are characterised by their exploratory nature.

Moving on to entrepreneurial visions, van der Helm (2009) surmised that an organisational vision acts as an instrument with the ability to leverage different actions within the organisation due to its inspiring nature. Utilising a compass on a ship as a metaphor, visions are harnessed to direct various actors while being challenged by waves of constitutional change. He further examined the origins of visions and explained that visions do not simply reflect an ideal future, but rather they are represented by a leader who in turn receives authority. (van der Helm 2009.) This sentiment parallels Stamm & Gutzeit (2022), who discerned a tight link between the organisational vision and the entrepreneurial individual. During the process of realising a vision, the entrepreneurial individual induces the process of externalisation by sharing the created goals in a social setting, which exposes the initial vision to different personal views (Stamm & Gutzeit 2022). Preller et al. (2020) outlined that individuals can intentionally choose to omit components of the entrepreneurial vision during the externalisation process, as these components might not be an inspiration to others. Especially, when parts of the vision are targeted towards enriching the individual's personal wealth. In the case of a founding team, a variety of visions can exist, precipitating either congruent or incongruent visions. Congruent visions are characterised by a high degree of compatibility, leading to an overlap of future images concerning different elements (such as growth or values), while incongruent visions require more time and effort to be aligned. (Preller et al. 2020.)

## 2.2 Investigating Corporate Foresight Approaches

### 2.2.1 Organisational Foresight To Build A Competitive Advantage

Drawing upon Rohrbeck et al. (2015), foresight is a field that emerged in the 1950s through the founding of the RAND corporation in the US by Hermann Kahn, but also Gaston Berger, who played a major role since he introduced the prospective view. In the 1970s, technological forecasting was integrated into the decision-making and planning processes within an organisation. Moreover, in the past forty years, rapid advances have been observed in the field of corporate foresight, as scenarios were progressively utilised to obtain a competitive advantage in turbulent environments. (Gordon et al. 2020.) Specifically, when Shell applied scenarios in the 1970s to successfully navigate through the oil crises, after which notable corporations, such as Nokia and Philips followed suit in the implementation of scenarios (Rohrbeck et al. 2015). Furthermore, technology roadmaps were employed in the 2000s to generate anticipation by linking technology to organisational planning (Gordon et al. 2020). In recent years, corporate foresight has been incorporated to a greater extent to support obtaining strategic leverage (Gordon et al. 2020) and acquiring abilities to foster breakthrough innovations (Rohrbeck & Gemünden 2011). However, there is a large volume of published studies that are dedicated to the application of organisational foresight (Rohrbeck et al. 2015), while scant studies have assessed the role of foresight that is incorporated within strategic planning processes and operational processes (Gordon et al. 2020). Despite the importance of understanding how foresight is implemented on an operational level (Gordon et al. 2020), there remains a dearth of studies on practice-oriented foresight that consider how foresight materialises in the daily activities of an organisation (Sarpong et al. 2013a).

In the literature, the term corporate foresight was used to recognise, monitor and construe driving forces that could shape the future, so organisations can adapt by responding appropriately to the changes in the environment (Gordon et al. 2020). This sentiment parallels Rohrbeck et al. (2015), who outlined that corporate foresight is employed to determine factors that could induce change and that could elicit a reaction from the organisation. Corporate foresight is applied to attain a competitive advantage in the market due to engendering value-creating processes. The advantages of implementing foresight include the acquisition of resources that support an organisation in assuming a leading position because organisations are then equipped for a transformation, which

underpins the organisation towards a desirable direction. (Rohrbeck et al. 2015.) Furthermore, organisations that conduct corporate foresight facilitate an increased awareness of rising environmental changes with an enhanced response to emerging developments (Rohrbeck & Schwarz 2013). When faced with environments that are characterised by complexity and rapid changes, organisations need to rely on the anticipation of possible pathways to remain competitive. Pertaining to this subject, the ability to improvise is considered crucial, as it enables the ability to act without devising a plan while seizing unforeseen opportunities. (Cunha 2004.)

During the recent period, however, the application of strategic foresight has been challenged by a few scholars. For instance, Hines & Gold (2015) argued that they observed four different barriers, that impede the implementation of strategic foresight within an organisation. Firstly, foresight activities require time, while organisational actors are engaged with a demanding schedule. Secondly, foresight can be viewed as frightening, as it may interfere with the usual business operations. Thirdly, the intangible nature of foresight contributes to the judgement that foresight does not result in practical outcomes. Lastly, many organisations experience a shortage of foresight capabilities that transcend the identification of trends. (Hines & Gold 2015.) Following Ruff (2015), he corroborated that most small and medium-sized companies lack the financial resources to employ a separate team or a department dedicated to foresight. Additionally, he mentioned that depending on the company's portfolio, foresight might not be required due to minimal external threats and insecurities from the environment (Ruff 2015). That said, Rohrbeck (2012) asserted that an improvement in the return on investment (ROI) occurs in the long-term future when implementing foresight. Illustrating this point, investing in foresight is connected to a higher risk, than allocating funds to marketing or business development because the results of the invested efforts into marketing etc. come into effect immediately without a time delay, which does not apply to the results of foresight activities (Rohrbeck 2012).

### 2.2.2 Practice-Oriented Strategic Foresight As A Social Process

Taking a practical perspective towards strategic foresight, Sarpong et al. (2013b) deduced that foresight surfaces as a continuous social practice involving daily actions and tasks. These could occur without concrete deliberations, resulting in unconscious activities after which an unintentional result follows. Strategic foresight is connected to practices and



activities that are designed to alter the allocation of resources that are directed towards possible futures. (Sarpong et al. 2013b.)

Sarpong & Maclean (2014) identified three key practices in the form of prospective sense-making, multilateral participation and lastly the implementation of foresight techniques and methods to achieve strategic foresight. All three practices are intertwined with each other and cannot be separated. Prospective sense-making elicits indications from random events or arising problems, which support individuals to perceive patterns that guide them towards deliberating alternative pathways. While prospective sense-making focuses on the individual, multi-lateral conversations take the team or the social environment of the individual into account to attain the legitimacy of an idea before being able to proceed. During the process of multi-lateral conversations, the team exchanges facts, premonitions and even ideal visions with the goal of demarcating future options and limitations. After this, foresight techniques and methods are utilised to precipitate targeted activities and to obtain a better grasp of the entire spectrum of future possibilities. (Sarpong & Maclean 2014.) In a different publication by Sarpong et al. (2013a), an additional component was included which encompasses cooperation and practical judgement with the purpose of reaching an agreement by selecting among future possibilities. The components of strategic foresight as a practice are displayed in Figure 4.

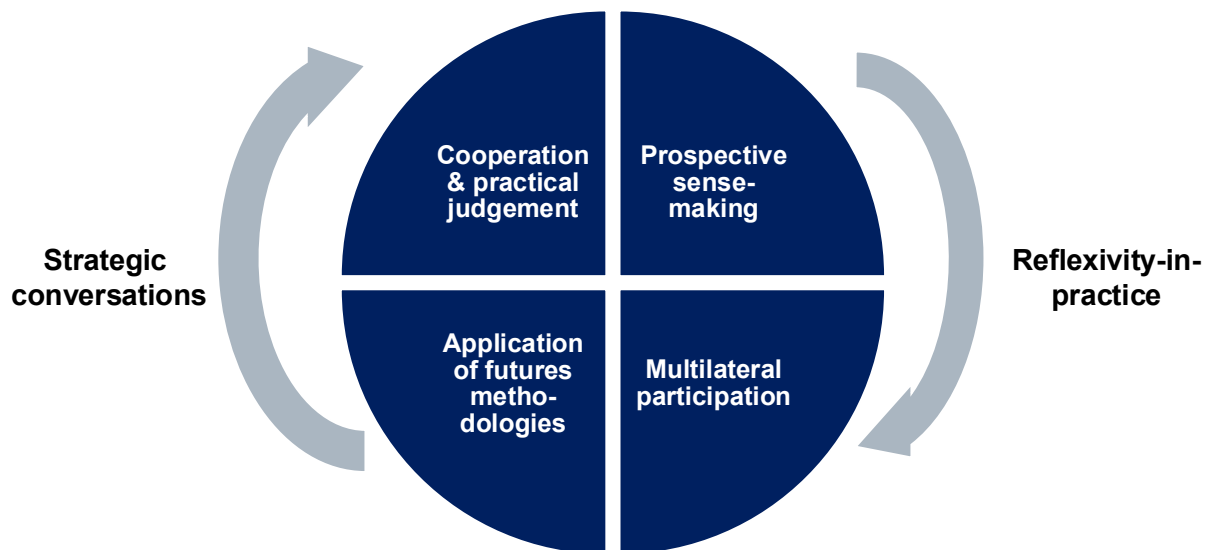


Figure 4 Strategic foresight as a practice, author's own adaptation based on Sarpong et al. (2013a, 37)

Sarpong et al. (2013a) explained that practices develop over the course of time by participating in communities of practice (CoP) that involve sharing collective know-how,

inducing a social practice that facilitates interrelations between actors. Echoing this point of view, Corradi et al. (2010) demonstrated that communities of practice offer the opportunity to explore different pathways, as learning occurs in a social context with others. Subsequently, the involvement in communities fosters maintaining and construing practices among actors that share similar working approaches (Corradi et al. 2010).

Nevertheless, Rowland & Spaniol (2021) observed a gap between practitioners and scientific research concerning foresight. They have identified that this obstacle pertains to two interrelated issues: on the one hand, practitioners disavow from research by not referring to academic work and by not establishing communication with research. On the other hand, academic researchers do not utilise the means and time to transmit their know-how, so practitioners can receive access. (Rowland & Spaniol 2021.) Reinforcing this notion, Ratcliffe (2006) discerned that the main weakness of foresight arises from being exceedingly intertwined with the academic community.

Regarding the application of foresight methods, Tilley & Fuller (2000) criticised that an overemphasis on foresight methods could provoke the notion that the results based on foresight are linked to predictions. Specifically, when the results of foresight do not unfold in reality, the view might emerge that foresight methods are inadequate. Instead, the researchers proposed that the principal focus should be centred on the process of aiding the transformation of individuals by reskilling and empowering them to investigate their judgements. (Tilley & Fuller 2000.)

### 2.2.3 Entrepreneurial Foresight: An Exploration Of The EROS Model By Fuller & Warren (2006)

Following Jafari-Sadeghi et al. (2020), foresight is interconnected with the envisioning capabilities of an entrepreneur, so opportunities can be identified. Subsequently, the awareness of future developments and opportunities provides guidance in the strategy formulation (Jafari-Sadeghi et al. 2020). Echoing this sentiment, Hajizadeh & Valliere (2022) reported that foresight activities not only foster the discovery but also the assessment of opportunities, while allocating information about the financial prognosis and risk assessment.

Fuller and Warren (2006) defined entrepreneurship “as the practice of foresight” (Fuller & Warren 2006, 956), which infers a focus on the execution of foresight in practice

(Rowland & Spaniol 2021). The perspective of viewing entrepreneurship as a practice can be applied to discern the collective action that is integral in business ventures (Stamm & Gutzeit 2022). Hence, Fuller & Warren (2006) integrated the concept of communities of practice into their model, which is referred to as the EROS model, as social networks are paramount when pursuing entrepreneurship. Embedding CoPs within their framework proffers the opportunity to explore discussions around learning, transformational upheaval and reformation as a social process, that is rooted in reflexivity. (Fuller & Warren 2006.)

Fuller & Warren (2006) explained that foresight, which is also elucidated as the anticipation of futures, cannot be segregated from the processes of the EROS Model that are represented by experiments, reflexive identities, organising domains and sensitivity to change. Foresight is an integral component of the practices that firms conduct on a regular basis (Fuller & Warren 2006). Situated within an organisational context, Inayatullah (2008) concluded that alignment is fundamental when considering the future. He stressed that everyday activities have to be adjusted to the objectives of the strategy. On top of that, the strategy has to be aligned to the vision, since Inayatullah (2008) often recognised a disparity between the recurrent activities of the firm and the imagined future. Within an organisation, employing futures thinking provides the opportunity to increase the futures capacity and to instil confidence in organisational members when encountering the future. Futures thinking has a profound impact on individuals since they are required to scrutinise the status quo and their assumptions about the world. Consequently, their frame of mind experiences a significant shift. (Inayatullah 2008.) Despite that, Fuller et al. (2004) stated that small firms lack the resources to induce radical changes in the market. The authors also indicated that foresight conducted in small businesses can range from scanning and construing signals from the environment to active action with stakeholders (Fuller et al. 2004). Tilley & Fuller (2000) concluded that small firms are inclined to not utilise formal planning methods for the anticipation of the future, however, they outlined that foresight might not be a concern for these firms, as they are not affected by environmental upheaval.

Foresight in an entrepreneurial context that is manifested in small businesses is connected to the owner's capabilities and commitment (Fuller et al. 2004). The reflexive identity of the entrepreneur is affected by their mental models, motivations, and daily practices.

In addition, the reflexive identity of the entrepreneur and the recursive activity of the entrepreneur's firm mutually influence each other. In turn, the repetitive activities of the entrepreneur's firm and the regular activities that are enacted by a network of firms are interrelated. (Fuller & Warren 2006.) An outline of the interdependencies related to the different levels mentioned above is illustrated in Figure 5.

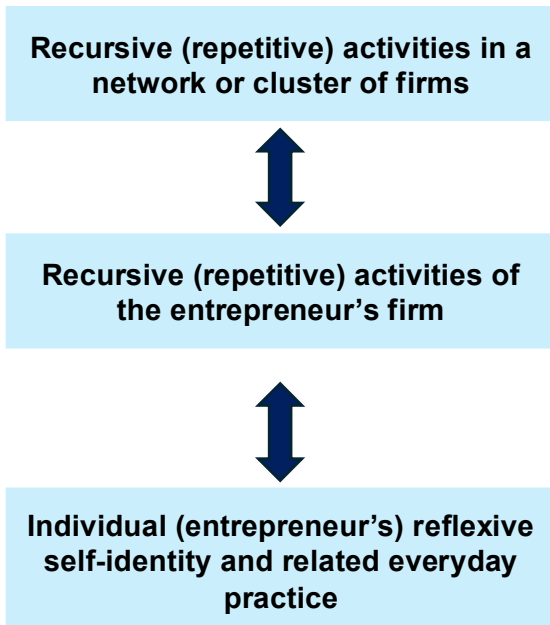


Figure 5 Interdependencies between repetitive activities and the entrepreneur's reflexive identity, author's own adaptation based on Fuller & Warren (2006, 960)

The notion of reflexivity connects the cognitive domain of an individual with the environment, encompassing daily practices that entrepreneurs adopt. Thus, the identity and the sense of purpose of an entrepreneur are reflected in their business. Meaning that the identity of the entrepreneur is interlinked to the type of business that is established as well as the activities and approaches that are initiated. (Fuller & Warren 2006.)

Furthermore, an interconnected concept of reflexivity is embedded in futures literacy. According to Miller (2015), futures literacy can be elucidated as the capability to comprehend assumptions that are based on anticipatory systems. By encouraging individuals to question their anticipatory presumptions and by promoting the understanding of the link between an activity and the outcome that determines imagined futures, futures literacy contributes to more transparency, better perception and sense-making of arising changes in the present time (Miller 2015). This means that through futures literacy, individuals are able to increase their futures capabilities based on what

they perceive in the current time. By “using-the-future”, individuals discover various ways of anticipation by questioning their inherent assumptions, which results in the imagination of various futures. (Miller 2018.) Reflexive futures literacy, however, pertains to the skill to comprehend various outlooks towards the future that encourages reflexive thinking (Mangnus et al. 2021). Mangnus et al. (2021) emphasised the value of reflexive futures literacy regarding images of the future, as reflexivity cultivates an enhanced awareness of what kind of future arises. It therefore elevates the understanding of images of the future, specifically how these future images are constructed and how they can be achieved with different measures (Mangnus et al. 2021).

As introduced in the previous section, the fundamental elements of entrepreneurial foresight were presented. To link entrepreneurial foresight to foresight practices, Fuller and Warren (2006) established a conceptual model, the “EROS” model, which connects the emergent properties that appear from a process (Experiments, Reflexive Identities, Organising Domains, and Sensitivity to Change) with foresight practices across three levels (firstly, the individual’s self-identity, containing the mental models and motivation; secondly, the individual firm’s identity, involving relationships and everyday practices; thirdly, the inter-firm structures). Table 1 displays an overview of the EROS model.

Table 1 EROS Model, author's own adaptation based on Fuller &amp; Warren (2006, 962-963)

Process	Emergent Property	Foresight Practice
Experiments	Individual's self-identity, mental models and motivation	Thought experiments, such as concept formation and visioning; discussions of ideas with others
	Individual firm's identity, relationships and everyday practice	Discourses of possibilities (e.g. as thought experiments) between partners, groups and with external collaborators Small-scale projects, often in collaboration with other stakeholders that address a particular need or utilise an emergent technology
	Inter-firm structures	Small-scale projects in collaboration between members and with those "outside" the recognised community of practice (CoP) Shared visioning (thought experiments) between groups (e.g. typical "foresight" projects) New entrants, new firms and/or marginal activities Alternative practice by "competing" models
Reflexive Identities	Individual's self-identity, mental models and motivation	Moderation of personal role and identity reflecting personal circumstances and motivations embedded in the milieu of personal and professional experiences
	Individual firm's identity, relationships and everyday practice	Evolution in the meaning of "what we are" and "what we do" to continue a coherent narrative of the meaning of the organisation in context Modifications to expectations of relationships within the CoP
	Inter-firm structures	Modification of dominant discourses within community over time
Organising Domains	Individual's self-identity, mental models and motivation	Restructuring of daily routines, priorities and values and inter-dependencies on relationships
	Individual firm's identity, relationships and everyday practice	(Changes to) what is done; expected modes of behaviour, culture and values; rules and rewards for activities; ways of doing things Structure of relationships and strategies associated with relationships
	Inter-firm structures	Dynamics of the strength and nature of interrelationships and dependencies, information flows, dominant actors and discourses
Sensitivity To Change	Individual's self-identity, mental models and motivation	Awareness of changes in environment and in imperatives of stakeholders, sensed through language and observations of mainstream and alternative (precursor) activities Significance of psychological safety and motivation associated with change
	Individual firm's identity, relationships and everyday practice	Testing of everyday recursive practices as to their fitness with the environment Measures of effects of, and degree of, decoupling from environmental structure Assessment of salience of (new) experiments relative to existing recursive activities Desensitising resistance of internal structures to change
	Inter-firm structures	Openness of community to wider networks, emerging technologies and competing structures, increasing sensitivity Degree of "lock in" to particular courses of action, reducing sensitivity Connections to and availability of "experiments" with other CoPs/ milieu, increasing sensitivity Evidence of responsiveness and learning from experiments (e.g. individual firms) and adoption of novel practices on wider scale

Moving on to elucidate the four different processes of the EROS model:

**Experiments** are conducted to recognise weak signals of future opportunities to create novel patterns or accentuate current patterns. The objective is discerning possible

demands from stakeholders in close vicinity, which could result in obtaining resources. (Fuller & Warren 2006.)

**Reflexive identities** are ingrained in the motivations and learning processes of the entrepreneur which are mirrored in the identity of their business (Fuller & Warren 2006).

**Organising domains** refer to the speed at which change is incorporated into the patterns of the behaviour of the firm. Additionally, the adaptation of the recursive structures to the competitive environment is imperative to achieve a sustainable business. (Fuller & Warren 2006.)

**Sensitivity to change** describes the environmental change that causes a shift in the entrepreneur, as well as the time period before a transformation transpires (Fuller & Warren 2006).

There is a growing body of literature (e.g. Chen et al. 2016; Stringfellow & Maclean 2014; Tavana et al. 2022) that references the work by Fuller & Warren (2006) when illustrating entrepreneurial foresight. However, a limitation of the EROS model is that it was not applied while following a structured approach which entails an analysis considering the different levels that are displayed in the processes, emergent properties and foresight practices. Apart from an example by Fuller & Warren (2006) that provided a brief overview of the processes of the EROS model, there has not been a practical application to date. Moreover, the EROS model fails to acknowledge the significance of further foresight practices that exceed the method of horizon scanning, which is demonstrated in the process of sensitivity to change. Furthermore, the EROS model is centred on the notion of CoP, which externalises across the level of the individual firm's identity and the inter-firm structures (Fuller & Warren 2006). Yet, the present study does not primarily focus on the inter-firm structures and CoPs, which might lead to a limited application of the EROS model. Nonetheless, the EROS model presents a diverse view on disparate levels that are connected to foresight practices, which establishes the foundation for a detailed examination to answer the second research question that explores which foresight practices are employed by female entrepreneurs in ICT.

### **3 Methodology**

#### **3.1 Research Problem**

In this section of the thesis, the methodology and the applied approaches are illuminated that were employed to realise the objectives of this research.

This study was concerned with two main objectives. The first objective involved determining the images of the future of female entrepreneurs stemming from the ICT sector. From the standpoint of business opportunities and digital skills, the impact of the digitalisation on the entrepreneurs' businesses and their customers' businesses in the future was analysed. The aim was to illustrate future possible developments that could occur with the digital transformation. As foresight practices influence future images of female entrepreneurs, the second objective explored the implementation of foresight practices to aid the realisation of future opportunities. A critical aspect of this study is connected to understanding how foresight is employed in practice and in an entrepreneurial setting.

The literature review examined how images of the future generate collective or individual action. Moreover, the fundamental elements of entrepreneurial foresight were demonstrated. However, the literature review also outlined the imperative need to study the everyday practices that are realised by entrepreneurs to conduct foresight on an operational level.

The following sections of this chapter are structured as follows: firstly, the research strategy is outlined while highlighting the methodological approaches that were taken within this study. A key aspect of the methodology was the application of images of the future to investigate alternative futures that are further demonstrated in this chapter. Secondly, the procedures of data collection and data analysis are elucidated. Within these sections, the justification for the taken methodological choices is illustrated to evaluate the chosen approaches and the limitations of this study. Finally, the ethical considerations of this thesis are delineated to explain the taken steps within this research to ensure that ethical guidelines were followed.



### 3.2 Research Strategy

The present study employed a qualitative approach in which primary data was collected to identify images of the future and the foresight practices that were used by the female entrepreneurs from ICT in this study. A qualitative approach was applied since it offered an effective way of emphasising the experiences of a specific sample while allowing study participants to express themselves freely. By utilising qualitative methods, individuals who constitute an underrepresented group can be empowered to voice their opinions and to share their knowledge. (Sofaer 1999.) As this study aims to understand the views and experiences of female entrepreneurs from the ICT sector, a qualitative approach therefore provided a means of enhancing our understanding of an understudied group. Furthermore, qualitative methods were viewed as more suitable for determining patterns, leading to more meaningful conclusions (Sofaer 1999). In addition, primary data was obtained to address this study's research objectives to proffer novel perspectives into the future orientation and the implemented foresight practices of a specific study sample. Acquiring primary data also ensures that prevailing issues in the ICT industry were considered in this study, which especially affects the construction of future images.

The sample of this study was focused on female entrepreneurs, who are connected to the ICT industry. These criteria were established since specifically female entrepreneurs play a critical role in economic growth (Ahl 2006). They are, however, underrepresented in the ICT sector, which is regarded as a male-dominated industry (Dyvik 2024a), despite the need for skilled ICT specialists in a globalised world (European Commission 2024). Furthermore, a previous study conducted by Kubberød et al. (2021) demonstrated that female entrepreneurs in high-technology sectors leverage their otherness and not belonging to a field to introduce fundamental changes and to challenge the status quo. Therefore, illuminating the views and future outlook of an understudied group within an underrepresented sector could yield a significant understanding of the literature. Moreover, this study examined female entrepreneurs that are based in Finland, since Finland is one of the leading countries in the digitalisation within Europe (DESI 2022) and possesses a considerably higher number of female entrepreneurs (Grünfeld et al. 2020, as cited in Alsos et al. 2014). Since most businesses that are led by female entrepreneurs in Finland operate as small businesses (Grünfeld et al. 2020, as cited in Alsos et al. 2014), the study sought to gain insights into the businesses of female entrepreneurs who manage less than 20 employees.

As the sample of the study participants is a crucial element of the design of a qualitative study due to its influence on the trustworthiness of the study, purposive sampling was chosen in this research to select study participants based on specific criteria. Purposive sampling impacts the trustworthiness of a study as the expertise of the selected study participants provides specialised knowledge with deeper insights that are relevant to the research aims of this study. (Adeoye-Olatunde & Olenik 2021.)

### **3.3 Composing Images Of The Future: A Methodological Approach**

The current study utilised images of the future as a method since they exhibit the power to explore and to investigate alternative futures. Images of the future supported in comprehending how female entrepreneurs envision the future, thus showcasing possible pathways in the digitalisation. Moreover, not only challenges could be highlighted in the images of the future, but also possible opportunities that could arise. By constructing images of the future that represent the digitalisation through the viewpoint of female entrepreneurs in ICT, alternative futures could be displayed in depth by illustrating the perspectives of an underrepresented group. Applying a time frame of five to ten years targets the purpose of exploring images of the future involving the long-term future of the ICT industry (Vecchiato & Roveda 2010).

Although these images of the future were determined in terms of future business opportunities and digital skills, the present study also adopted a PESTE+V analysis to provide rounded and detailed illustrations of the future macro-environment (Edwards et al. 2014). The PESTE+V analysis consists of the conventional PESTE analysis, which is enhanced through the value factor. Encompassing political, economic, social, technological and environmental factors, the PESTE analysis was chosen to enable a deeper insight into the different factors that impact the analysed industry and that could engender opportunities or threats (Edwards et al. 2014), thus ensuring the breadth of the images of the future. Moreover, the PESTE analysis with an extension through additional dimensions (such as ethical, cultural or legal factors etc.) have been traditionally employed to obtain detailed information on the environment of an image of the future (e.g. Mäkelä et al. 2020; Marjamaa & Mäkelä 2022; Vinnari & Tapio 2009). Therefore, this study extended the PESTE analysis by including the value dimension, resulting in a PESTE+V analysis to further capture the complexities of the interviewee's identity with the objective of acquiring an enhanced understanding of their perception of the

environment and how their values guide subsequent actions. These insights could be significant in attaining clarity about the reflexive identity of the entrepreneur, which is a crucial element of the EROS model by Fuller & Warren (2006). In addition, the value dimension was employed since it immensely affected the central theme of each image of the future.

Images of the future were devised based on the data that was collected in the interviews. Through several iterations of coding, clusters emerged within the PESTEV categories, which are explained in further detail in Subchapter 3.5.

As this study refers to context-specific knowledge with a central focus on transformative elements, a social constructivist approach was selected. This enabled a better grasp of the images of the future that involve multiple realities by highlighting how female entrepreneurs construct their reality through actions and their underlying beliefs. Moreover, an interpretivist approach was also adopted because the core of this study is centred on identifying the meaning of future images, as these have the ability to investigate and assess multiple futures. Previous studies have utilised an interpretivist approach in qualitative studies (e.g. Matthews et al. 2015; Power et al. 2017) since an interpretivist approach supports gaining a more extensive perception of the data that was collected in a qualitative study. The semi-structured interviews also encompassed interactions between the interviewer and the interviewees, thus allowing the interviewees to direct the attention towards their perceptions of the world and the experiences they have acquired. Hence, an interpretivist approach provides the opportunity to decipher meaning through the interviewee's eyes.

Overall, this study is grounded in a constructivist-interpretivist approach, which also aligns with the methodological approach followed by Ganzin et al. (2020), who implemented a constructivist-interpretivist perspective to determine the influence of future-oriented sensemaking.

### **3.4 Data Collection: Employing Semi-Structured Interviews**

Semi-structured interviews were conducted with eight female entrepreneurs from ICT, who were approached via LinkedIn, their business emails or by contacting business networks that distributed the inquiry for an interview. Coming from different sub-sectors of the ICT industry, Table 2 presents a basic profile of the interviewees.

Table 2 Profile of interviewees

Interviewee	ICT sub-sectors
1.	Digital Educational Software
2.	Digital Educational Software
3.	Media Software Solutions
4.	Digital Educational Software
5.	Digital HR Consulting
6.	Connectivity Solutions
7.	Digital Collaboration and Communication Solutions
8.	Financial Consulting Services

Moreover, six out of eight interviews took place online via Microsoft Teams to reduce barriers such as travelling time. These interviews were carried out as video interviews to emulate real-life interactions (James & Busher 2012). Apart from the six online interviews, one interview was conducted in person, while another interview was held via e-mail. The asynchronous nature of the e-mail interview permitted more flexibility and thus the participant could answer the questions according to her own schedule (James & Busher 2012). To ensure the trustworthiness of the data and to receive more detailed information and clarifications on the given answers during the e-mail interview, two iterations of additional questions from the interviewer were implemented.

The interviews ranged from 50 minutes to 90 minutes, leading to 468 minutes or 7,8 hours of interview material altogether. Furthermore, the interviews were recorded on Microsoft Teams. The transcription function of Microsoft Teams was used as a basis for the transcription, while an extra round of listening to the material was executed to complete the transcription and to correct possible errors. During the transcription process, noticeable non-verbal actions and verbal emphasis on certain words were documented to capture the entire meaning of the data (Bengtsson 2016).

This study employed a qualitative research approach in which semi-structured interviews were applied. The semi-structured approach was chosen because it not only supported the researcher in focusing on specific topics through the formulated interview questions, but more importantly, it also allowed the researcher to inquire the interviewee about relevant ideas that arose during the interview (Adeoye-Olatunde & Olenik 2021). Due to the higher engagement of the interviewee (Galletta 2013), in-depth insights can be collected about given subjects (Adeoye-Olatunde & Olenik 2021). Hence, individual interviews

were implemented to be able to support a more thorough and detailed data collection process (Beitin 2014).

The design of the interview questions, which is displayed in Table 3, was loosely based on Galletta's (2013) guide to conducting a semi-structured interview.

Table 3 Interview guide

<b>Interview Questions</b>	
<b>Warm-Up Questions</b>	<ol style="list-style-type: none"> <li>1. What do you do in your daily work?</li> <li>2. How does it relate to what you have done in the past?</li> <li>3. What inspired you in the beginning to start your own business?</li> <li>4. What is the vision that you have created for your company that aligns with your goals and values? (Focus of the warm-up questions is on the value dimension of the PESTE+V analysis)</li> </ol>
<b>1<sup>st</sup> part: Images of the future (RQ 1)</b>	<ol style="list-style-type: none"> <li>5. <b>If you think about the future of your business in ten years, what do you think your business will look like?</b> <ol style="list-style-type: none"> <li>5.1. <b>What thoughts are going through your mind when thinking about how the digitalisation will impact your business in 10 years? What about your clients' businesses?</b> To answer the question 5.1. the PESTE dimensions of the PESTE+V analysis are put in the centre Leading question through each element of the analysis: What factors could lead to opportunities? How would these factors support or hinder future opportunities? <ul style="list-style-type: none"> <li>- <i>What policies or laws would have an effect on your business and your clients' businesses in the future?</i></li> <li>- <i>Which economic factors could affect your business and your clients' businesses?</i></li> <li>- <i>What socio-cultural developments could have a determining influence in the future?</i></li> <li>- <i>What technological innovation or trends could shape the future? What influence might they have on your business or your clients' businesses?</i></li> <li>- <i>What environmental impact could be significant?</i></li> </ul> </li> <li>5.2. <b>Think about the digital skills that are important in the future based on the developments we have identified earlier (refer to 5.1.).</b> <ul style="list-style-type: none"> <li>- What digital skills do you believe would be crucial for your business to focus on in the future?</li> <li>- What kind of particular digital skills do you believe are going to be in demand from a customer's perspective?</li> </ul> </li> </ol> </li> <li>6. <b>Based on our conversation earlier, what business opportunities would you like to grasp that are arising from the digital transformation? Could you describe possible opportunities that feel the most significant to you?</b></li> </ol>
<b>2<sup>nd</sup> part: Foresight practices (RQ 2)</b>	<ol style="list-style-type: none"> <li>7. <b>In an ideal world, what would help you to be more prepared for the future to be able to seize opportunities that come with the digital transformation?</b> <ol style="list-style-type: none"> <li>7.1. What is your experience in creating plans to respond to future challenges?</li> <li>7.2. Are there any foresight tools that you employ systematically or would like to use? Examples of foresight tools would be scanning the environment for trends or weak signals, making scenarios or thinking about alternatives.</li> </ol> <p><u>If the interviewees answer that they do not utilise any foresight tools, the following questions were asked:</u></p> <ul style="list-style-type: none"> <li>- Think about the last time you have spotted a business opportunity that you would like to explore. How did you evaluate whether the opportunity was worth exploring in the future?</li> <li>- How do you keep account of the changes in the environment?</li> </ul> </li> </ol>
<b>Conclusion</b>	<ol style="list-style-type: none"> <li>8. <b>Is there anything that you want to share that you find relevant that I have not asked you about?</b></li> </ol>

In the first section of the interview, open-ended questions were asked in the introduction to collect relevant information about the interviewees' background and experience working in the ICT sector (Galletta 2013). The aim was to acquire a clearer picture of their role, responsibilities, motivations and values which is portrayed in the reflexive identity, a key process displayed in the EROS model by Fuller & Warren (2006).

The middle segment of the interview related to more specific questions to answer the two research questions (Galletta 2013), therefore this segment was split into two thematic parts. The first thematic part focused on the **first research question**, which is centred on the images of the future of female entrepreneurs in ICT. Participants were asked how they imagined their business would look five or ten years into the future. The time span of five to ten years was selected to analyse the long-term future, as the ICT industry is characterised by fast growth (Vecchiato & Roveda 2010). Images of the future were determined based on questions about business opportunities or digital skills that female entrepreneurs could discern in the future. As indicated previously in Subchapter 3.3, a PESTE+V analysis was applied in the data analysis to gain breadth in detailing the images of the future to achieve a more elaborate portrayal of the future macro-environment. The dimensions of the PESTE+V analysis were mirrored in the interview, as the warm-up questions encompassed indirect questions about the values and motivations of the interviewee. These questions that targeted the values of the interviewee were placed at the beginning of the interview since it offered an effective way of capturing the core beliefs and the identity of the entrepreneur, whilst the PESTE categories were introduced in the first part of the middle segment of the interview to discern how female entrepreneurs imagine the future of the digitalisation. Therefore, it can be outlined, that the interview questions, pertaining to the PESTE+V categories, were split into different segments of the interview.

The second thematic part was concerned with identifying the foresight practices that are utilised by female entrepreneurs to realise future opportunities, which represents the **second research question**. The interview questions in this part were constructed to follow the four processes of the EROS model by Fuller & Warren (2006), specifically targeting experiments, organising domains and sensitivity to change. Hence, the questions addressed how entrepreneurs prepare for the future and what foresight tools they employ or want to utilise. Moreover, the interview questions were based on the EROS model proposed by Fuller & Warren (2006) to promote the trustworthiness of the study. By

following the EROS model, foresight practices that appear in the four processes (experiments, reflexive identities, organising domains and sensitivity to change) are analysed across different levels, such as the individual's self-identity, including their mental model and motivations, as well as the individual firm's identity, their relationships and the adopted everyday practices. In addition, the inter-firm structures with cross boundary foresight practices were included. Integrating the EROS model in the interview questions therefore ensures a structured approach to provide a detailed review of the applied foresight practices by entrepreneurs through shining a light on the relevant layers of the different processes on multiple levels to implement foresight, which strengthens the trustworthiness of this research.

Finally, in the last part of the interview, the interviewees were asked for further reflections which presented the possibility to explain their narrative based on the previous interview questions (Galletta 2013).

The semi-structured interview guide was utilised for each interview as a reference point to ensure that the phrasing of the interview questions remained uniform while following the same procedures that were reflected in the different parts of the interview guide. Thus, dependability could be assured by following a semi-structured interview guide, which also increased the trustworthiness of the research (Kallio et al. 2016), as consistency in the application of the research methods was guaranteed.

### **3.5 Data Analysis: Applying Content Analysis**

To begin the data analysis process, a qualitative content analysis was implemented to analyse data that was based on text. Moreover, a qualitative content analysis included a systematic coding process to determine recurring themes. (Hsieh & Shannon 2005.) Drawing upon Hsieh & Shannon (2005), three concepts were introduced to conduct qualitative content analysis. In this thesis, however, two approaches were applied to answer the research questions.

**Conventional content analysis** was employed to address the **first research question**, which involves the images of the future of female entrepreneurs in ICT. In line with this approach, data was read frequently to attain a general overview, after which first impressions about the data surfaced. The preliminary observations thus influenced the initial analysis process. (Hsieh & Shannon 2005.) Following Galletta (2013), a post-

interview reflection, which is conducted shortly after an interview concludes, is paramount to deliberate on thoughts that emerged during the interview. According to Gioia et al. (2012) being too familiar with the data causes a constricted vision of the main concepts. Subsequently, as the basis for the initial coding process, a post-interview reflection was performed. The reflection was compiled after each interview through audio recordings which were approximately five minutes to reflect on emerging themes and observations that were made during the interview. Furthermore, particular attention was paid to the timing of the audio recordings which were captured within the same day the interview concluded, as the observations were still remembered clearly by the interviewer.

Throughout the analysis process, codes emerged, which were then organised into categories which led to a variety of clusters (Hsieh & Shannon 2005). It is important to note that these clusters were arranged in the context of the PESTEV categories. Although the PESTE analysis was the building block of the images of the future, the value dimension was included in the analysis section, resulting in a PESTE+V analysis, since it significantly contributed to the overall theme of each image as the values encompass the mental frameworks and motivations that guide the thinking and actions of individuals. In other words, the value factor represents the foundation of each image, while the PESTE categories build upon the mentioned values as building blocks. In total, three rounds of coding were executed with the help of the data management tool, NVivo, after which a general sense of the three images of the future came to light.

To organise the codes and clusters that were assembled according to the PESTEV categories into the three images, the whiteboard tool, Miro, was utilised. To be more specific, all codes were transferred to Miro and displayed via various sticky notes, which allowed for a clearer overall picture, as the codes were nested within categories in NVivo without the possibility of viewing all codes at a glance. Furthermore, Miro supported in comprehending the connection between the codes and the clusters. Transferring the codes to Miro provided a better visualisation of the interdependencies, which resulted in an added value in recognising the complexities between the clusters. Additionally, a common variable was established within these clusters, before they were added to the images of the future in Miro. However, it was apparent that there were several clusters which could not be categorised in the context of the three images of the future. Subsequently, an effort was made to integrate these into some images of the future.



Therefore, it is crucial to highlight that material saturation was not achieved within this study, which could be explained through the small data set of eight interviewees. Drawing from the clusters that were organised within these images, three comprehensive images of the future were constructed.

Moving on to the **second research question**, which targets the foresight practices that are employed by female entrepreneurs, a **directed content analysis** was applied. The directed content analysis was implemented for the validation or extension of an existing theoretical framework (Hsieh & Shannon 2005). The foundation for this analysis was built upon the EROS model by Fuller & Warren (2006) with predetermined processes and foresight practices. During the analysis process, however, foresight practices that were noted were put into codes first and then assembled in clusters, before they were organised within the predetermined codes. Similarly to the approach with the first research question, the audio recordings supported the data analysis in the initial coding phases, leading to three rounds of coding in NVivo. After this, the clusters within the predetermined codes were transferred from NVivo to Miro to achieve a better overview of the data on foresight practices which were visually organised in the predetermined categories of the EROS model by Fuller & Warren (2006). It is crucial to highlight that apart from the practices which were adopted by the majority of the interviewees, some practices were included in the analysis that were only employed by a few interviewees. However, these practices were selected in the analysis to obtain an added value to fully grasp the depth of the data.

A visual overview of the data analysis and the different approaches that were employed to answer RQ1 and RQ2 are illustrated in Figure 6.

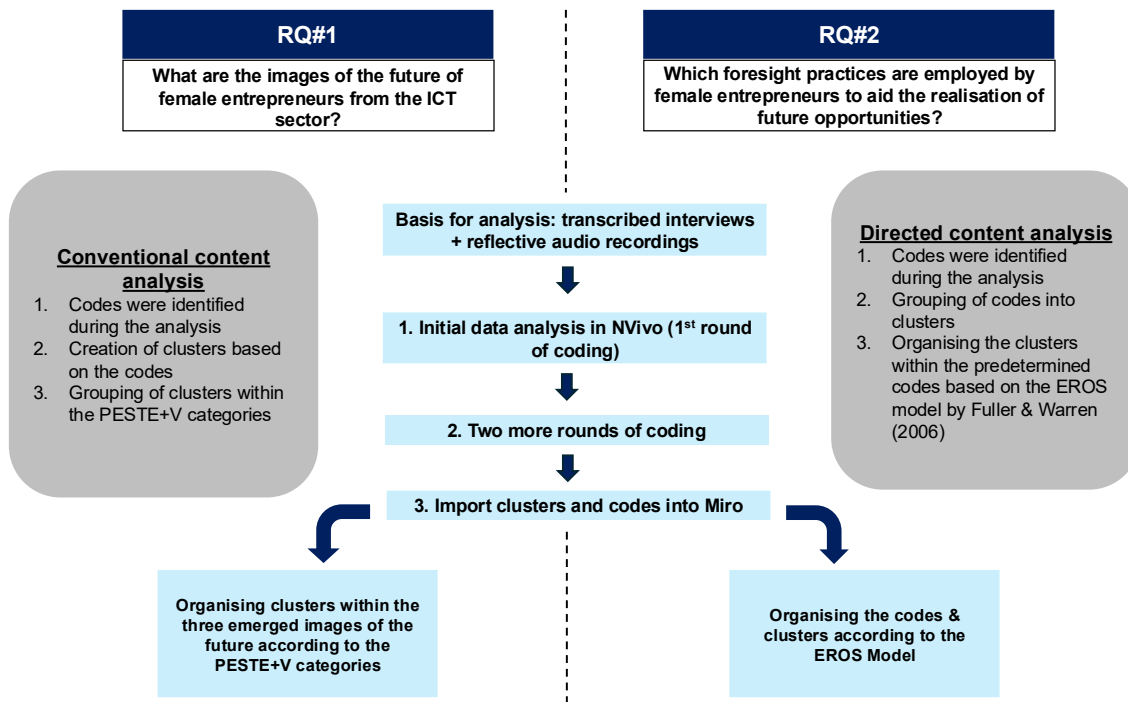


Figure 6 Data analysis process

Answering the research questions required the implementation of inductive and deductive approaches. The first research question was explored through a conventional content analysis which resembles an inductive approach by using data analysis to create a theory. On the other hand, the second research question was tackled through a directed content analysis which follows a deductive approach with a theory as a basis to reach conclusions. However, during the data analysis process unexpected research findings emerged, hence abductive reasonings were also applied to address both research questions to infer novel hypotheses or theories which were derived from creative processes. (Timmermans & Tavory 2012.)

The objective of the **first research question** was to determine images of the future of female entrepreneurs in ICT, which was primarily investigated through an inductive approach by identifying arising themes and patterns. However, abductive reasonings were incorporated as well, which is supported by Minkkinen (2020), who demonstrated that the use of abductive approaches in qualitative studies is a well-established process to examine images of the future as it proffers innovative insights and interpretations, in preference over following predetermined processes that are related to theories. Abductive approaches therefore provide a means to acquire a comprehensive understanding of the images due to their iterative nature (Minkkinen 2020).

Concerning the **second research question**, the aim was to identify foresight practices that female entrepreneurs in ICT employ by applying the EROS model by Fuller & Warren (2006). Although a primarily deductive approach was followed, an abductive analysis was implemented as observations materialised that did not align with the EROS model. Following an abductive approach, possible interpretations are created to discern the most probable explanation for the divergence of the data from the theory. Hence, new hypotheses were created as more observations were attained. (Tavory & Timmermans 2014.) Thus, in accordance with the abductive approach, novel perspectives can be collected which are beyond the predetermined elements of the EROS model.

The use of abductive reasonings is a well-recognised approach in futures studies due to several central features. Firstly, at the core of abductive approaches is imagination and involving creative processes to generate new hypotheses, theories and interpretations (Timmermans & Tavory 2012). As the field of futures studies explores possible futures, it is imperative that images of the future are created to foster new interpretations (Bell 2003). During this process, creativity plays a pivotal role (Bell 2003). Moreover, due to the exploratory nature of images of the future (van der Helm 2009), abductive processes offer an effective approach to examine unknown developments that have not been considered before (Timmermans & Tavory 2012). Secondly, abductive reasonings are grounded in iterative processes that cycle from the data and the combination of novel and well-established theory and therefore present the opportunity to revisit the constructed observations. Subsequently, the conclusions and observations are connected to temporality, which provides the means to revise and to adjust the generated hypotheses. (Timmermans & Tavory 2012.) As the future is subjected to emerging developments that are embedded in complexity and uncertainty (Masini 1993), the possibility to reassess and revise formed hypotheses and theories through abductive approaches is essential.

### **3.6 Research Ethics**

The fundament of upholding research ethics is based on the foundation of maintaining research integrity which revolves around five principles that are embedded in the reliability as well as the trustworthiness of the research and being truthful when conducting research. Moreover, maintaining respect for the study's subject and taking responsibility during the entire process, starting from the conception stage until the work is published, is fundamental to research integrity (TENK 2023). In Finland, the National

Board on Research Integrity, TENK, provided directives and guiding principles since 2009 on preserving ethical principles that are crucial for research. This is specifically important when concerning human involvement in the study through their participation. (TENK 2019.)

Following the guidelines from TENK (2019), which highlighted the significance of informing the study participants about the topic of the research, the handling of personal data, the time span of the retention of data and informing the participants about their rights. Hence, all participants were sent a privacy notice via email, prior to commencing the study. Specifically, participants were informed in the privacy notice, that personal information would be processed without direct identifiers before the data is going to be archived until 1.12.2028.

Before the interview questions were asked, the content of the privacy notice was reiterated, while underlining that the participation was voluntary and that they had the right to withdraw from the study without citing a reason. Participants were made aware that the interview would be video and audio-recorded and that the study would aim to preserve confidentiality by disguising personal details that would reveal the identity of the interviewee or the individuals the interviewee mentioned. To maintain data integrity and to safeguard the personal details of the interviewees, codenames were used, such as Interviewee 1 (short I1), Interviewee 2 (I2) etc. Furthermore, the study participants were given the opportunity after the oral explanation of the privacy notice to ask further questions, to ensure informed consent was given to partake in the study (TENK 2019). In this study, consent was given in a written form that was sent via email or orally via video, which was then recorded for documentation purposes.

## 4 Results

The following part of this thesis moves on to present the results of the **first research question**, which focuses on the images of the future of female entrepreneurs in ICT from the standpoint of future business opportunities and digital skills. This chapter introduces three images of the future that could be determined (“Community Before All”, “Green World”, and “Seeing The World Through Smart Glasses”). Particular attention was paid to displaying the overarching values of each image, while illustrating the images of the future according to the PESTEV categories.

Next, the focus is on the **second research question**, which investigates what foresight practices female entrepreneurs implement to identify future business opportunities. As explained in the introduction, the EROS model by Fuller & Warren (2006) was employed to explore the application of foresight practices across four processes (experiments, reflexive identities, organising domains and sensitivity to change) on three different levels (the individual’s identity, including the mental models and motivations; the firm’s identity, relationships and everyday practices; and lastly the inter-firm structures).

This chapter also reviews the key aspects that hinder female entrepreneurs in ICT from adopting foresight practices and implementing foresight tools.

#### 4.1 Three Images Of The Future

As indicated previously, three different images of the future could be discerned after the data analysis. To construct the images of the future, besides focusing on future business opportunities and digital skills, the PESTEV categories were implemented. Hence, common variables across all three images were determined according to the PESTEV categories, which can be viewed as a structuring frame to build the three images of the future. As shown in Table 4, the underlying structure of the frame to create the images of the future is depicted.

Table 4 Framing images of the future

	Common variables	1. Image: Community Before All	2. Image: Green World	3. Image: Seeing the World Through Smart Glasses
<b>Political factors</b>	Regulations			
<b>Economic factors</b>	Economic downfall			
	Investors			
<b>Social factors</b>	Attitude towards having an online presence			
<b>Technological factors</b>	Role of AI			
	Data identity			
	Digital skills & design skills			
<b>Environmental factors</b>	Effect of e-waste			
<b>Values</b>	Co-sharing & collaboration			
	Business orientation			

Before presenting the identified images of the future in detail, an overview of all three images in accordance with the introduced frame (in Table 4) is represented in Table 5.

Table 5 Overview of the three images ("Community Before All", "Green World", "Seeing The World Through Smart Glasses")

		1. Image: Community Before All	2. Image: Green World	3. Image: Seeing The World Through Smart Glasses
<b>Political factors</b>	Regulations	<ul style="list-style-type: none"> <li>- GDPR affects the cooperation between companies located in different countries and the entry of foreign companies into the European market.</li> <li>- There is an increase in security and privacy measures to protect the data of minors through the GDPR.</li> <li>- Large companies require smaller companies in their supply chain to also report their social and environmental impact.</li> <li>- To initiate social change, entrepreneurs unite as a collective power to achieve a change in the legislation.</li> </ul>	<ul style="list-style-type: none"> <li>- GDPR ignites more transparency within companies regarding how data is stored and managed.</li> <li>- Local data centres are established to avoid data transfers over long distances to minimise the environmental footprint.</li> <li>- Not only large companies but also SMEs are now required to report their influence on the environment and society.</li> </ul>	<ul style="list-style-type: none"> <li>- As the GDPR follows more stringent rules, companies are required to comply with the regulations.</li> <li>- Compliance with the GDPR slows the growth of companies and poses restrictions when developing new technologies.</li> <li>- The regulation to report their social and environmental impact serves as a motivator for some companies to rethink their strategy.</li> <li>- Campaigns that promote sustainability are initiated, but the main focus of large IT companies will be centred on delivering innovative technologies.</li> </ul>
<b>Economic factors</b>	Economic downfall	<ul style="list-style-type: none"> <li>- Due to an economic downturn, causing rising interest rates and increasing prices of raw materials, companies have to operate with tighter budgets that are invested into the core function of the business.</li> <li>- Collaboration and community-building are not imminent needs of companies.</li> </ul>	<ul style="list-style-type: none"> <li>- Interest rates and the price of raw materials are increasing, so companies are raising the prices of their products. Thus, decreasing the purchasing power of consumers. Consumers hesitate to realise considerable investments.</li> <li>- In particular, small entrepreneurs struggle to induce sustainable change.</li> </ul>	<ul style="list-style-type: none"> <li>- There is an increase in the unemployment rate due to jobs being automated, causing a decrease in purchasing power.</li> <li>- An economic downturn induces tighter budgets within companies resulting in less investments into non-core functions.</li> </ul>
	Investors	<ul style="list-style-type: none"> <li>- A group of investors emerge that aim to initiate a social impact, however, they are still outnumbered by profit-oriented investors.</li> <li>- The goal is to induce change on a systemic level.</li> </ul>	<ul style="list-style-type: none"> <li>- More investors emerge, who are not only interested in profit, instead their focus is centred on the environment.</li> <li>- Investors have clear requirements regarding the targets associated with the environment.</li> </ul>	<ul style="list-style-type: none"> <li>- Investors are more focused on generating profit and receiving returns.</li> <li>- The customer and the overall business are at the centre of the thinking of the investors.</li> </ul>
<b>Social factors</b>	Attitude towards having an online presence	<ul style="list-style-type: none"> <li>- Being able to create an online presence depends on the social status.</li> <li>- The government implements activities to provide equal opportunities in the digital world to bridge the gap in social status.</li> </ul>	<ul style="list-style-type: none"> <li>- There is an increasing concern about the culture of being constantly online through the use of digital devices.</li> <li>- Mental health issues arise through the high dependence on digital devices, which specifically affects the young generation. It is encouraged to reduce time spent on digital devices.</li> </ul>	<ul style="list-style-type: none"> <li>- The high dependence on digital devices and being online is reinforced by communicating with chatbots in various parts of life.</li> <li>- Social interaction between humans is now partly replaced through human and chatbot interaction.</li> <li>- Through technological advancements, immersive digital experiences can be shared online through digital avatars.</li> </ul>
<b>Technological factors</b>	Role of AI	<ul style="list-style-type: none"> <li>- AI enables trust within business operations through monitoring systems or tracking to support the collaboration between businesses.</li> </ul>	<ul style="list-style-type: none"> <li>- AI replaces expert knowledge.</li> <li>- AI operates as an intelligent support to eliminate routine work.</li> </ul>	<ul style="list-style-type: none"> <li>- Increased use of AI</li> <li>- AI is implemented to increase productivity and efficiency within companies, reaching more personalised services for customers.</li> <li>- AI replaces human interaction through the application of chatbots in various areas of life.</li> </ul>
	Data identity	<ul style="list-style-type: none"> <li>- Secure management of data is needed to be able to communicate across different countries during joint business operations.</li> </ul>	<ul style="list-style-type: none"> <li>- Some businesses follow more stringent guidelines when securing their operations, while other businesses do not prioritise this notion of data security. Therefore, causing security attacks that result in a leak of personal data.</li> </ul>	<ul style="list-style-type: none"> <li>- Businesses invest more financial resources in the training of their employees to secure their operations.</li> <li>- Security threats pose risks since valuable personal data can be retrieved from innovative devices (e.g. wearables).</li> </ul>
	Digital skills & design skills	<ul style="list-style-type: none"> <li>- Basic digital skills are addressed by governmental activities.</li> <li>- Particular attention is paid to individuals with a low socioeconomic status, who do not possess the financial resources to be able to develop their digital skills.</li> <li>- Businesses focus on developing accessible apps for various kinds of users with different levels of digital skills.</li> </ul>	<ul style="list-style-type: none"> <li>- Levels of basic digital skills are dependent on age. The young generation is more likely to be equipped with basic digital skills, while the old generation is struggling and requires extra training to support them in their everyday and professional lives.</li> <li>- Businesses rely on adaptive design to be flexible in creating solutions that can be modified easily with changing conditions and to cater to various skill levels.</li> </ul>	<ul style="list-style-type: none"> <li>- A high number of startups with technological innovations emerge, so users need to be able to master advanced digital skills.</li> <li>- The gap in differing skill levels between the old and the young generation is bridged.</li> <li>- Businesses design their products and services to provide an optimal user experience.</li> </ul>
<b>Environmental factors</b>	Effect of e-waste	<ul style="list-style-type: none"> <li>- There is an increased awareness about social injustice considering the inadequate handling of e-waste and the purchasing of resources at a minimum price.</li> <li>- Businesses support initiatives that are targeted at the better management of recycling options and at protecting marginalised groups from the negative effects of e-waste.</li> </ul>	<ul style="list-style-type: none"> <li>- IT companies make an effort to reduce their CO2 emissions and to adjust their product development process to extend the life cycles of their products, so devices can be used for a longer time frame. Hence, changes in the hardware of products allow for easier reparability through their internal structures.</li> <li>- IT companies reduce the material needed for manufacturing and they also take advantage of recycled materials.</li> <li>- Companies offer incentives through rewards, so customers are influenced to return their defective or used devices.</li> </ul>	<ul style="list-style-type: none"> <li>- Specifically, SMEs in IT often lack deep knowledge about issues relating to sustainability and climate change.</li> <li>- Digital devices are used for a short duration before they are replaced by newer devices.</li> <li>- There is a shortage of e-waste recycling options and incentives for consumers to safely dispose of digital devices.</li> </ul>
<b>Values</b>	Co-sharing & collaboration	<ul style="list-style-type: none"> <li>- Co-sharing occurs between entrepreneurs to share resources.</li> <li>- A culture of collaboration between entrepreneurs is established to initiate a social impact on communities and on a global scale.</li> </ul>	<ul style="list-style-type: none"> <li>- Co-sharing is driven by values, such as ethical consumption and living sustainably.</li> <li>- Especially, the young generation is the forerunner in embodying this culture.</li> <li>- Individuals are influenced by conscious consumption, meaning to buy less and only consume what they truly need, while resorting to more sustainable options.</li> <li>- Collaboration between businesses and the general public is enforced to build resilience and to fight against climate change.</li> </ul>	<ul style="list-style-type: none"> <li>- Co-sharing is driven due to necessity and cost efficiency.</li> <li>- Materialism &amp; ownership are the core values.</li> <li>- Businesses collaborate to increase profit, but competition between businesses continues.</li> </ul>
	Business orientation	<ul style="list-style-type: none"> <li>- Businesses are motivated to create a positive impact instead of generating profit.</li> <li>- Circular economy</li> </ul>	<ul style="list-style-type: none"> <li>- Businesses aim to contribute to a better world by taking into account how their businesses affect the environment.</li> <li>- Their purpose is to educate customers about conscious consumption while offering transparency about their own business operations and the status quo of the industry.</li> <li>- Circular economy</li> </ul>	<ul style="list-style-type: none"> <li>- Businesses value increased effectiveness and productivity.</li> <li>- The consumer is at the centre of businesses.</li> <li>- Linear economy</li> </ul>

#### 4.1.1 1. Image: Community Before All

The first image, “Community Before All”, encompasses building a community, fostering global collaboration between different nations and empowering marginalised actors. The goal of each member of the community is to initiate social change together. The following excerpts describe the emphasis on creating a committed community that utilises its collective power to enact change:

I1: “I mean, all nations will be forced to realise and accept that we must think ahead, and we must think [of] people as [a] whole. **If we want to survive as a mankind**, there can be **no nation that goes on (...) a separate path**. This is something that needs to happen fast but looks like it won’t.”

I5: “But then we know that there are **people with lower digital skills**, technical skills, and of course we need to put a lot of focus and I’m talking about like as **a society, as governments, we need to address those things.**”

I7: “(...) from a bigger perspective how we as entrepreneurs or its institutions, **how we impact our community and the society (...)**”

Starting with the overarching **values**, co-sharing is driven by the need to induce a social impact, especially through the collaboration of small entrepreneurs. These entrepreneurs work together in a community of like-minded thinkers by sharing resources which increases resource efficiency and reduces environmental waste, especially if entrepreneurs cannot rely on investors. Therefore, a culture of collaboration is established. Instead of competing with each other, businesses build a community with the idea of creating a positive impact on their communities, even on a global scale. They aim to tackle wicked challenges together as partners. However, issues can arise when establishing a common ground for all businesses to be able to collaborate. Businesses do not direct their attention towards generating immense profits, specifically at the expense of the suffering of others.

From a **political perspective**, the GDPR affects the cooperation between companies located in different countries. Moreover, the GDPR also poses a hindrance for foreign companies that intend to enter the European market. Although these differences in the regulation of data protection persist in the world, some countries aim to uphold the same standards as the GDPR. To empower marginalised groups, in this case children, who have to rely on their parents who give consent to process the personal data of their underaged children, security and privacy measures are taken more seriously. To limit the collection



of personal data from minors, companies utilise creative solutions to retain the data anonymity of children.

Companies need to explore their value creation chain and their supply chain to understand how corporate sustainability reporting can be accomplished. When large companies collaborate with smaller companies, they require a report **on the social and environmental impact of small companies** as well to comprehend the full depth of their impact. Moreover, to initiate social or environmental change, entrepreneurs unite as a collective power to achieve a change in the legislation.

With an **economic downturn**, leading to rising interest rates and increasing prices of raw materials, companies have to operate with tighter budgets that are invested into the core function of their business. Since collaboration and community-building are not imminent needs of companies, they are not the main focus at the moment. Simultaneously, a group of investors emerge that aspire to induce a social impact. However, they are still outnumbered by profit-oriented investors. Their overall objective is to promote change on a systemic level to contribute to society.

From a **social view**, being able to create an online presence depends on the social status of families, as many cannot afford to purchase digital devices. Thus, they are excluded from the opportunity to interact in an online community. This results in governmental activities that aim to close the gap between social groups to be able to provide equal opportunities in the digital world. On top of that, apps that are targeted towards creating a social impact are designed. These are tailored to support marginalised groups, such as immigrants, to discover and to learn various topics, including sensitive issues, in a gamified way. The goal is to support users to cope with different issues, even without a direct support system, which encourages them to reflect on themselves and to learn essential skills, such as stress management.

Moving on to the **technological factors**, AI is utilised mainly to enable trust within business operations through monitoring systems and tracking which fosters collaboration between businesses. Most importantly, AI affects the reskilling of professionals who acquire not only technical skills but also soft skills to be not replaced by emerging technologies. Additionally, secure management of data is needed to be able to communicate across different countries during joint business operations. Basic digital skills are addressed by governmental initiatives to improve the level of digital skills.

Particular attention is paid to individuals with a low socioeconomic status, who lack the financial resources to be able to develop their digital skills. Therefore, businesses prioritise developing accessible solutions for various kinds of users with differing digital skill levels.

In line with **environmental factors**, there is a greater awareness of social injustice due to the irresponsible handling of e-waste. Required resources are acquired at a minimum price by Western countries, after which e-waste is disposed of in countries with communities of colour or low-income communities. Therefore, leading to a hazardous environment, that negatively affects the health of all living beings in these communities. Businesses support activities that are targeted at protecting marginalised groups from the negative effects of e-waste and therefore introduce better recycling options. Thus, aiming for a circular economy is part of mitigating the impact on society.

#### 4.1.2 2. Image: Green World

The dominant focus of the second image, “Green World”, is on environmental sustainability. There is a deeper understanding of conscious consumption which arises as a culture with the young generation. Apart from technologies that are directed towards preserving sustainability, prominent technologies are developed that demonstrate the drawbacks of employing these new technologies. The subsequent interview excerpts describe the core of the image that is embedded in environmental sustainability and the negative implications of emerging technologies:

I1: “(...) **more mature generations are barely hanging** in there with their digital skills and the rising generations master complex skills faster and faster.”

I6: “(...) the **next generation** is always smarter. They don’t want to own everything. **It’s OK to rent. It’s OK to share.**”

I7: “**People will start to be more conscious about what they choose in their everyday life and also in their business life** with whom they partner and what kind of values they have when they work with other people.”

To illustrate the central themes, a closer look at the **values** reveals that co-sharing is fuelled by ethical consumption and living sustainably. Individuals are influenced by conscious consumption, meaning to buy less and only consume what they truly need, while resorting to more sustainable options. The planet and the next generations are at the

focal point of ethical consumption. As individuals are more educated about sustainability, they demand more transparency about the production, since they want to explore the hidden cost of their consumption. Especially, the young generation in the metropolitan areas in Finland is seen as a forerunner in embodying a culture of reusing and sharing physical items.

Collaboration between businesses and the general public is enforced to build resilience and to fight against climate change. Businesses strive to contribute to a better world by considering how their business affects the environment. Their purpose is to educate customers about conscious consumption while offering transparency about their own business operations and the status quo of the industry.

In connection with **political factors**, the GDPR ignites more transparency within companies regarding how data is stored and managed. These regulations also raise the topic of establishing local data centres to avoid data transfers over long distances to reduce the environmental footprint. Not only large companies but also SMEs are now required to report their influence on the environment and society, which includes the risks that are rooted in social and environmental factors. This practice facilitates transparency and counters greenwashing claims.

Moving on to the **economy**, due to the growth in interest rates and the price of raw materials, companies raise the prices of their products. As a consequence, consumers hesitate to realise considerable investments. Thus, resulting in a decrease of the purchasing power. Especially, small entrepreneurs struggle to induce a sustainable change, since they have to maintain their daily operations. More investors surface, who are not only interested in profit, instead their aim is to achieve environmental sustainability. Investors have clear requirements regarding the targets associated with the environment and they are educated on how they can drive change from their position.

From a **social perspective**, there is a viable concern about the culture of being constantly online through the use of digital devices. It results in the thinking that it is an unproductive endeavour with no added value in our lives. The adverse effect of these technologies reinforces rising mental health issues through the high dependence on digital devices, which severely affects the young generation. It therefore reveals the topic of reducing the time spent on digital devices to engage with the real world. Digital solutions or educational games at schools are combined with more traditional solutions. To reduce the

overdependence on digital devices, traditional ways of teaching is continued to foster social interactions between teachers and students. Furthermore, educational games are utilised to cover topics regarding climate change and sustainability.

**Prominent technologies**, such as AI, take a central role in this image, as AI can replace expert knowledge, specifically technical knowledge. Moreover, AI operates as an intelligent support to eradicate routine work. Some businesses follow more stringent guidelines to secure their operations, while other companies do not prioritise the notion of data security. Therefore, security attacks can result in leaks of personal data. Regarding digital skills, the level of basic digital skills is dependent on age. The young generation is more likely to be equipped with basic digital skills since they are in contact with digital devices from a young age. Part of the old generation struggles and requires extra training to support them in their everyday and professional lives. Businesses design their products and services so advanced digital skills are not required. Thus, businesses rely on adaptive design to be flexible in creating solutions that can be modified easily with changing conditions and that can cater to various skill levels.

Taking the **environmental perspective** into account, IT companies strive to reduce their CO<sub>2</sub> emissions. Through adjusting their production process, IT companies aim to extend the life cycles of their products, so devices can be used for a longer time frame. Hence, changes in the hardware of products allow for easier repairability through their internal structures. A greater emphasis is put on everyday devices, such as mobile phones or laptops, as the life cycles could be extended through their designs. To be more specific, the design should also enable repairs through third-party repair services, instead of solely being dependent on the manufacturer. IT companies also reduce the material needed for manufacturing and promote the use of recycled materials to minimise their environmental footprint. By offering incentives through rewards, customers are influenced to return their defective or used devices. Following this notion, aiming for a circular economy is a central factor in this image.

#### 4.1.3 3. Image: Seeing The World Through Smart Glasses

The last image, “Seeing The World Through Smart Glasses”, encompasses a widespread adoption of technological innovations and the use of digital devices in everyday life. It highlights advances in technology enabling an increase in productivity and connectivity.

But simultaneously the dilemma of protecting individuals' data and the substitution of manual processes is highlighted, as shown in the following excerpts from the interviews:

I2: "(...) if it would be more natural for people to see online even in 3D or like (...) these kind of meetings (...) **in this world where we are really connected** it would be easier for people to see each other from different places and feel like they are really there. Like, be in the presence of other people."

I5: "We need to understand that and accept it that **certain processes that were handled by humans before will no longer be handled [by humans]** and so what is my role then, when I have a bot contacting me instead of a human?"

I8: "(...) it will be **necessary to protect people's data**, but on the other hand it will make **new restrictions and boundaries for growing and developing things.**"

Influencing **values** include materialism and ownership. Especially the young generation is motivated by owning items. These values are distributed through the use of social media, as it further motivates the public to boost their purchasing power. Co-sharing on the other hand is driven due to necessity and cost efficiency, which affects the market of shared and used items as well as the individuals who cannot resort to other alternatives. Moreover, businesses collaborate with the intent to grow their profit. Competition is high between businesses, so understanding how to differentiate themselves and to stand out from the crowd is crucial to sustain in the market. The focal point for collaboration is to strengthen effectiveness and productivity, while the customer needs are at the centre. The mentality that drives businesses is to satisfy customers and to prepare for future demands.

From a **political point of view**, the GDPR follows more stringent guidelines, thus companies are required to comply with the regulations. However, it proves to be a challenge for companies, as compliance can slow their growth. These regulations pose as restrictions when developing new technologies. The regulation to report their environmental and societal impact serves as a motivator for IT companies to rethink their strategy towards a more sustainable and socially responsible direction. This could involve initiatives and changes within the production process or hardware of their product, that can cause fewer emissions. It also provides a foundation for these companies to market themselves as a sustainable brand. However, the principal focus of large IT companies will be centred on providing innovative technological advancements.

From an **economic standpoint**, an increase in the unemployment rate is emerging due to the automation of jobs, eventually inducing a decrease in purchasing power. An economic downturn engenders tighter budgets within companies resulting in less investments into non-core functions. Furthermore, investors are more motivated to generate profit and to receive returns, while customers and the overall business are at the core of the thinking of the investors.

Moving on to a **social viewpoint**, a high dependence on digital devices and being online is reinforced by communicating with chatbots in various parts of life that are related to teaching, health care etc. Social interaction between humans is now partly replaced through human and chatbot interaction. As technological advancements surface, immersive digital experiences unfold online. By utilising a digital avatar, individuals experience greater connectivity with their peers. The life-like interactions evoke the impression for individuals that they are truly in the presence of others. In line with that, technological advancements in the form of wearables, such as smart glasses, are enhanced through virtual reality or augmented reality and are implemented in schools to aid the learning process of students. Reinforcing this notion, educational games are applied at a larger scale to teach children by incorporating interactive elements.

From the **technological perspective**, the intensified usage of AI is supported by companies to raise productivity and to offer more personalised services for customers. This perspective is enhanced through the substitution of human interaction with the use of chatbots, as previously mentioned from a social standpoint. In connection with information security, businesses invest more financial resources in the training of their employees to secure their operations. Security threats remain a risk since valuable personal data can be retrieved from innovative devices (e.g. wearables).

Drawing upon digital skills, a high number of start-ups with technological innovations surface, so users need to be able to master advanced digital skills. As the young generation can be identified as digital natives who excel at basic digital skills from an early age, mastering advanced digital skills is a straightforward process. The gap between various skill levels between the old and the young generation is bridged. Thus, businesses design their products and services to provide an optimal user experience.

Taking **environmental factors** into consideration, it is palpable that SMEs in IT often lack deep knowledge about issues relating to sustainability and climate change. In

general, the overall consensus is that only natural disasters could cause an immense impact on their businesses. Moreover, digital devices are used for a short duration before they are replaced by modern devices that are equipped with more technologically advanced features. In a similar context, instead of repairing digital devices, they are substituted by new ones. Overall, there are insufficient options for e-waste recycling and lacking incentives for consumers to safely dispose of their digital devices.

## 4.2 Future Business Opportunities

In this subchapter, the future business opportunities that were highlighted in the interviews are going to be introduced.

The results demonstrate that the majority of the indicated business opportunities are related to technology. The **gaming industry** is viewed as a promising opportunity due to its ongoing growth during the present time. Specifically, the application of gaming within the education is seen as a complementary endeavour. Educational games or digital solutions that are further developed by applying virtual reality (VR), extended reality (XR) and artificial intelligence (AI) can be utilised in schools to incorporate interactive elements to educate children on various topics. Moreover, the application of digital solutions is supported by the acceptance within the education field to disavow traditional learning methods. As evident in the following quote, although concerns were expressed about the overdependence on digital devices, the common view surfaced that digital solutions would continue to be employed even at a broader scale in the future:

I2: “There is always this (...) **controversial side to playing games** (...) if they decided at schools that no more tablets or no more playing with (...) these kind of like digital tools [would be allowed]. (...) I think nowadays (...) it’s a bit far-fetched because the **studies also show that certain things are easier to be taught with like gaming and digital tools.**”

Another recurrent theme in the interviews was mainly concerning **emerging technologies**, such as augmented reality (AR) and AI, as interviewees foresaw a change in the exploration of content in the future. This means that phones are going to fade in the background, though they will not disappear from the market, which is stated in the comment below:

I3: “So we are really seeing that there’s a lot of things happening in the digital landscape. Maybe **a phone isn’t the go-to place for people** through the new technology.”

Digital devices that are enhanced through AR provide an additional interactive space and reflect the transition into the digital era. It presents the opportunity for entrepreneurs to incorporate AR elements within their applications to proffer a unique experience to their customers, ultimately transforming the behaviour in the digital space.

7 out of 8 interviewees reported that **AI is a crucial driver in the digitalisation**, which reinforces the importance and widespread effect of AI not only in the present time but also in the future. The majority commented that AI is going to be a game changer in their respective fields, however, two divergent views and often conflicting discourses emerged. The dominant view considers AI as an opportunity to support their businesses because it is regarded as a tool to promote efficiency and productivity which can be used in the analysis of data or to reduce routinised processes. As reflected in the following quote, interviewees also indicated that AI could provide intelligent support beyond the knowledge of an expert, so only basic technical knowledge is required in certain organisational positions:

I6: “(...) We people, **we are quite slow compared to computers** and we don't see the patterns. And I always love the example of (...) picture recognition [that] can spot (...) better than the doctors because they have been trained (...) with (...) hundreds of thousands of pictures. So, our eyes (...) cannot spot those things that the computers can already.”

Together, these results suggest that AI enables a wide variety of business opportunities that can be personalised and adapted to the needs of the companies, reinforcing the high versatility in the application of AI in various companies and solutions. Interestingly, it can be noted that AI was perceived as an assistance fostering collaboration between humans and AI, as some aspects are ingrained in soft skills, such as empathy, creativity etc. that AI cannot provide. Representing an opposing perspective, one interviewee argued that the implementation of AI in education is a threat to the creativity of young children. However, she acknowledged that it is not possible to avoid the recent developments, alluding that the integration of AI will only intensify in the future without a decline. Several interviewees attributed the high price of different tools to employ AI or other emerging technologies as a barrier to them. The accessibility of these tools would therefore greatly affect grasping business opportunities, which affects small entrepreneurs due to their limited financial resources.



Next, the theme of stressing the **value fit** between the taken future business opportunities and the principles of the business of the interviewees was expressed. There were several suggestions that business opportunities must be aligned with the values of the interviewees and subsequently the values of their companies as a precondition before certain opportunities are seized. As indicated in the subsequent quote, the interviewee stated the significance of particular values, when asked about what business opportunities she would like to seize in the future:

I1: “Everything that **focuses on [the] good among people and all living things as well as the SDGs is something that feels significant to me**. With digital solutions, we can make a real difference but there [is a need for] (...) **good people behind those solutions**, who are not greedy and only want to profit from the suffering of others.”

Taken together, examples of the illustrated values demonstrate a devotedness to social and environmental goals based on sustainability or making a positive impact in the world. This sentiment parallels several interviewees who agreed with the statement that the value fit affects their customers as well. They felt that their customers who share the same sentiments would want to collaborate with them or appreciate their commitment to specific values. What emerges from the results is the importance of the alignment of certain values that relate to the taken business opportunities. Furthermore, the significance of values has an immense impact on foresight practices as well. For more discussion on this topic, please visit Chapter 4.4.2.

When questioned about what future business opportunities the interviewees would like to seize in the future, a small number of interviewees were reluctant to discuss concrete examples. Out of this study sample, one particular interviewee stated that staying curious and open to arising developments is more vital than focusing on specific opportunities, as one cannot imagine what might occur tomorrow. In contrast, with the participants who expressed various possible ideas, it was evident that several future pathways were considered.

In summary, these results suggest that the consideration of future business opportunities is dependent on growing industries (in this case the gaming industry) and emerging technologies (e.g. AI, AR or VR). Moreover, the acceptance of digital tools in different fields (e.g. education) as well as the alignment of the opportunities to the values of the

company are considered instrumental when taking future business opportunities into account.

### 4.3 Digital Skills

A recurrent theme in the interviews was a sense amongst the interviewees that **basic digital skills are a fundamental requisite in the digitalisation**, however, several reported a gap in basic digital skills between the young and old generation. Half of the interviewees felt that the young generation is associated with the term digital native, thus they can master complex digital skills faster to adapt to the changing conditions of the environment. As a few interviewees indicated, the young generation was surrounded by digital devices during their childhood, so acquiring new digital skills comes with ease, which is evident in the subsequent segment:

I2: “(...) the **young people nowadays, they’ve grown up with cell phones in their hands**. So (...) it comes naturally to them to learn.”

One interviewee commented that although the **old generation is struggling to reach basic digital skills at this moment**, she expressed that during this time frame a transition phase will occur, thus narrowing the digital divide between old and young. There were some suggestions that living in a rural location could limit the accessibility to digital devices and therefore hinder adopting the needed digital skills. Moreover, another interviewee reported that the social background can be an immense influence on the ability of children to develop their digital skills. However, she also questioned how these gaps can be closed in the future while putting the government in the spotlight as the responsible body to target these issues.

With the different digital skill levels, many interviewees stated the **significance of design skills** to them since it enables providing user-friendly products to their customers. For example, one interviewee reported:

I1: “For me, at the moment the most important thing is to consider all levels of skills and **design my products user-friendly to all**.”

Through design, products can be accessible to different kinds of users by requiring only basic digital skills with an easily operated interface, so users are not overwhelmed and can straightforwardly navigate within the digital landscape.

Interestingly, the **demand for professionals to acquire new skills to navigate in the digitalisation** was also observed. These skills could be related to developing basic digital skills, as their jobs previously did not demand digital knowledge or the necessity to adopt more advanced technical skills. When asked about the required digital skills in the future, participants were unanimous in their views. Some felt that having substantial IT skills to understand IT architecture and networks was instrumental, while others considered programming skills or AI skills as fundamental. Depending on the specialisation of their business, interviewees emphasised different skill sets that are essential in the future. However, it is worth noting that managing data identity and achieving cyber security was a recurrent theme for several interviewees. It was indicated that both individuals and businesses are affected by these developments. Individuals gain access to the digital environment through everyday devices, such as computers and mobile phones, which reinforces the value of data security. Hence, one interviewee suggested that a general understanding about data security would not only benefit companies but also individuals. In the case of businesses, this includes an awareness of how to secure their operations online while managing a substantial number of data or communicating across different countries, thus strengthening the infrastructure to be more resilient to potential attacks. Several interviewees agreed with the statement that the increasing information security threats pose risks to the digital environment of companies, therefore precautions need to be taken by companies. One concern expressed in terms of the differences in managing information security was that some companies, that are more established and possess a dedicated ICT department persist in training their staff to adequately secure their operations online. On the other hand, there are smaller enterprises with no defined organisational structures that may lack the resources or knowledge to protect their data. Talking about this issue, an interviewee commented about the insufficient information security training in companies, as depicted in the quote below:

I8: “You can drive a car if you have a driving license, but you cannot drive it without it. But you can go and **work in a (...) system that handles all the money of your company and can be accessed from [the] Internet without any information security training.**”

The digitalisation also contributes to obsolete skills due to the use of AI, machine learning etc., however the digitalisation also leads to the adoption of new skills, which encompasses soft skills. A small number of interviewees emphasised the existence of certain skills that cannot be undertaken by new technologies, such as critical thinking

skills, creative thinking or data interpretation. In addition, empathy or collaboration, which are based on interpersonal communication were mentioned as skills, that cannot be replaced. When asked about essential digital skills in the future, the theme of acquiring so-called power skills which are based on soft skills emerged, as illustrated in the following comment:

I5: “The World Economic Forum has a list of 10 future skills, so in addition to digital skills, there [are] (...) the so-called power skills. So, self-leadership, leadership in general, critical thinking, etc. **So, it’s not just the digital skills, we need to also improve our power skills.**”

This theme illustrated the **significance of soft skills** that should not be overlooked besides acquiring technical skills to navigate in the digitalisation. The ability to connect different skill sets was considered a vital asset. Moreover, being open-minded to the developments in the digitalisation was seen as instrumental to adapting to the changing requirements.

Overall, the results suggest that technical skills are vital in the future, which could be materialised as basic digital skills or advanced technical skills. To bridge the gap in digital skills, companies have to employ their design skills to cater to all different levels, until the digital divide closes. However, it is imperative to emphasise the importance of soft skills when considering future digital skills, that must be connected to technical skills. These divergent skill sets should be viewed as a common unit to be able to operate in the digital environment.

#### **4.4 Applying The EROS Model By Fuller & Warren (2006)**

As previously stated, this subchapter investigates the foresight practices that were implemented by the eight female entrepreneurs who were interviewed for this study. Applying the EROS model by Fuller & Warren (2006) as a framework, foresight practices were identified in accordance with the four processes (experiments, reflexive identities, organising domains and sensitivity to change). A particular emphasis was put on foresight practices that were employed on three different levels: firstly, the individual’s self-identity, including the mental models and motivation of the entrepreneur, secondly the firm’s identity, extending to its relationship and everyday practices and finally the inter-firm structures.

#### 4.4.1 Experiments

In this section, experiments are at the focal centre. To provide an overview of the results of the experiments, an outline is presented in Table 6. Furthermore, the results will be discussed in detail in the subsequent sections of this subchapter.

Table 6 Foresight practices on the level of experiments, based on Fuller & Warren (2006, 962-963)

Process	Emergent Property	Foresight Practices & Themes	How many times was the theme mentioned across all interviews?	How many participants have mentioned a particular theme (n=8)?
Experiments	Individual's self-identity, mental models and motivation	<b>1. Thought experiments</b>	<b>40</b>	<b>8</b>
		<i>1.1. Discussion of ideas</i>	24	6
		- Discussion at networking events	12	4
		- Potential customers	7	4
		- Consultants & experts	5	4
		<i>1.2. Concept formation</i>	12	5
		<i>1.3. Visioning</i>	4	2
		- Imagining exercises	3	1
	- Visioning of goals	1	1	
	Individual firm's identity, relationships and everyday practice	<b>2. Discourses of possibilities (e.g. as thought experiments) between partners, groups and with external collaborators</b>	<b>4</b>	<b>2</b>
		<i>2.1. With the team</i>	3	2
		<i>2.2. With possible partners</i>	1	1
	Inter-firm structures	<b>3. Small-scale projects, often in collaboration with other stakeholders that address a particular need or utilise an emergent technology</b>	<b>2</b>	<b>2</b>
		<b>4. Small-scale projects in collaboration between members and with those "outside" the recognised community of practice</b>	<b>0</b>	<b>0</b>
<b>5. Shared visioning (thought) experiments between groups (typical "foresight" practice)</b>		<b>0</b>	<b>0</b>	
<b>6. New entrants, new firms and/or marginal activities</b>		<b>0</b>	<b>0</b>	
	<b>7. Alternative practice by "competing" models</b>	<b>0</b>	<b>0</b>	

<sup>1</sup> The main themes (e.g. 1. Thought experiments, 2. Discourses of possibilities etc.) depict the total occurrences of foresight practices relating to the subthemes (e.g. 1.1. Discussion of ideas, 1.2. Concept formation etc.) across all interviews. This means that the subthemes also reflect only a part of the identified main theme, therefore contributing to the overall total of the specific main theme.

<sup>2</sup> The subthemes are characterised by an interviewee count that mentioned specific foresight practices relating to the main theme. In contrast, the number for each main theme is reflected in the total number of interviewees who indicated utilising foresight practices concerning the main theme, which is composed of the subthemes. Since some interviewees have mentioned multiple subthemes within a main theme, their application of foresight practices within the same main theme was only counted once. Thus, the maximum sum of interviewees who mentioned the main theme is eight, meaning that all interviewees in this study utilised specific foresight practices from the subthemes of a main theme.

Starting with experiments, at the **level of the individual's self-identity, mental models and motivation**, it was evident that all interviewees applied thought experiments, as shown in Table 6. The most common practice to conduct thought experiments occurred through the discussion of ideas with others. These discussions arose at networking events where experts and a variety of companies participated. Although several interviewees expressed attending industry-specific events, one interviewee highlighted the importance of learning from other industries, which is reflected in the following quote:

I6: "I'll be **building a lot of network[s]**. For example, (...) [with] people who have done something else that I have, but they still have the vision of doing something good for the globe. So (...) **I get different ideas from different people**. It can be [about] circular economy. It can be just [about] the finance industry. **It can be any industry** but [I can] just learn from other industries. That is really important."

The emphasis in discussions was on conversing with individuals who share different viewpoints to widen one's horizons. It was viewed as a tool to think outside the box which enabled the interviewees to critically examine their own views. Even when a free discussion could not be achieved, through the interaction with other participants at networking events relevant contacts were exchanged. Thus, creating the possibility to further discuss ideas with a recommended expert. Discussions could take place with potential customers with the intent of capturing their perspectives. In line with this, one interviewee stressed the value of maintaining a close relationship with their existing customers. Through the customers' feedback, companies got a better understanding of their challenges and received suggestions for product development. The input from their customers therefore served as crucial data for further product development, which would then be discussed with the team. Moreover, discussions with experts or consultants promoted greater specialised knowledge about possible product developments that were based on emergent technologies.

The majority of the interviewees utilised concept formation to deliberate about their ideas after thorough market research. The purpose was to document arising developments (e.g. trends etc.) to examine how these could be implemented in the interviewees' existing product palette to seize future business opportunities. The following citation describes the process of considering influencing factors and the needed steps that had to be taken to realise the opportunity:

I8: “Well **I sometimes take a day or a couple of days off just for thinking.** And **I do [the] analysis [by] myself.** So, **what’s happening?** What **skills [do] I need?** What skills (...) do [I] not have? What skills [do] I have to develop? What are [the] **partnerships** I need? What’s interesting and what’s not and what [do] I really need to have, for example, what **kind of tools** so that I can work with the challenges.”

Interestingly, several interviewees reported that they pay attention to their competitors to recognise how they could differentiate themselves to stand out in the market. This process could be described as an individual practice where the interviewees reflected in solitude without the input of others, before introducing possible ideas to the entire team. As a result, discourses of possibilities were discussed on the level of the individual firm’s identity, relationships and everyday practices. Drawing from this finding, the practices at the individual level could be regarded as an antecedent of the practices which later occur on the firm’s level.

Surprisingly, only a minority of the interviewees implemented visioning as a thought experiment. Solely, one interviewee indicated applying visioning to explore the long-term future of the company, while another interviewee stated performing imagining exercises by taking the user’s perspective.

Reflecting on this practice, the interviewee shared:

I4: “**I often think about my daughter**, my own daughter. So as parents (...) who (...) [wants] the best things and the good things for our own children, so often I [like to think] “**OK, let’s be a user** “. Let’s be (...) the person, that uses the product and then (...) the **client who pays the money. Am I willing to pay for the solution?**”

Echoing this point of view, the interviewee relied on empathy to imagine herself taking the user perspective to reflect on the needs and demands of possible customer groups. Even taking the role of a mother, who would want only the best for the next generation and their well-being.

In line with the individual firm’s identity, relationships and everyday practices, only two interviewees indicated harnessing discourses of possibilities as thought experiments. Some accentuated discussing ideas with their own team to create a process after identifying a viable development, which is highlighted in the forthcoming quote:

I5: “OK, this is an interesting thing. **What could this mean to us? Discuss it with the team. Try to break it down into concrete pieces.** And think, what does this actually mean for us? **Somehow draft a process** and then create wireframes.”

The objective was to further create ideas and assess several possibilities before a decision is made to either realise the business opportunity or to deflect the attention towards another direction. Furthermore, thought experiments with partners could contribute to collaboration in small-scale projects. However, only two interviewees stated conducting small-scale projects to address a particular need or to employ an emergent technology. Following this sentiment, an interviewee stressed that lacking resources was a major hindering factor to operating projects, as her company was struggling to scale up to meet customer demands. Hence, pursuing even small-scale projects could pose difficulties for smaller firms.

Taken together, it was palpable that experiments at the individual’s level served as a preparation for thought experiments that sequentially arose at the firm’s level which resulted in discourses of possibilities and small-scale projects.

Of interest is also that no foresight practices could be identified within the **inter-firm structure**. Interestingly, no small-scale projects were initiated with partners inside and outside their CoP, thus limiting the potential to leverage synergies and to gain novel perspectives. Moreover, the results suggest that although interactions between the interviewees and those who could be part of their CoP occur at networking events, limited action to enact these discussed notions through collaboration or partnerships is performed in practice.



#### 4.4.2 Reflexive Identities

In the next section, the key results regarding the reflexive identities are presented in Table 7, thus providing a summary of the primary rationale of entrepreneurs that could be collected in this study.

Table 7 Foresight practices on the level of reflexive identities, based on Fuller & Warren (2006, 962-963)

Process	Emergent Property	Foresight Practices & Themes	How many times was the theme mentioned across all interviews?	How many participants have mentioned a particular theme (n=8)?
Reflexive Identities	Individual's self-identity, mental models and motivation	1. Moderation of personal role and identity reflecting personal circumstances and motivations embedded in the milieu of personal and professional experiences	23	7
		1.1. Providing a solution to an identified problem	18	6
		1.2. Pursuing a meaningful job	5	3
	Individual firm's identity, relationships and everyday practice	2. Evolution in the meaning of "what we are" and "what we do" to continue a coherent narrative of the meaning of the organisation in context	53	7
		2.1. Making a positive impact in the world	20	6
		2.2. Focus on the environment	10	4
		2.3. Aiming for growth	9	4
		2.4. Contributing to society	7	3
		2.5. Utilising a business advisor	5	1
		2.6. Non-profit orientation	2	2
Inter-firm structures	3. Modifications to expectations of relationships within the CoP	0	0	
	4. Modification of dominant discourses within community over time	0	0	

Moving on with the reflexive identities, as shown in Table 7, the **level of the individual's self-identity, mental models and motivation** pertains to the personal role and the thinking patterns of the entrepreneur. It was apparent that the overwhelming majority of interviewees attributed providing a solution to an identified problem as a catalyst in establishing their company.

Illustrating this point, an interviewee explained:

I3: "(...) you see a problem and there isn't a good enough solution in the market, at least something that you would want there to be. So, then you just build a solution, and you take ownership. So, I just wanted to build a better product that I would wanna use and then I realised that there is a market for it and that's why I built a company around it."

The identified problem involved a current obstacle that was recognised, which was based mostly on work experience. The objective for the interviewees was to offer a solution to an issue that did not exist in the market yet. Moreover, two divergent discourses emerged within the data set that concern the motivation behind providing a solution, which could either be founded on solving a technology-based problem or providing a human-centric solution. In line with this, almost half of the interviewees reported the significance of possessing a meaningful job by finding a sense of purpose and pursuing something that fulfils them.

Drawing from these findings, the theme of impact entrepreneurship transcends the individual's self-identity and affects the **individual firm's identity**. A supporting perspective was emphasised by the dominant view that making a positive impact in the world was imperative to the interviewees. This incorporates affecting individuals positively by being able to support them through the use of their solutions, which is evident in the following quote:

I1: "Ultimately, **I want to help people to see all the good in themselves, [and] others and in the surroundings (...)**"

Over half of the interviewees also illustrated that tackling environmental issues was significant to them. This perspective contends that leading a sustainable organisation involves being transparent and educated about its impact on the environment. In addition, several interviewees also stated aiming to contribute to society and following a non-profit approach. As noted in Chapter 4.2, social and environmental values exerted an influence on female entrepreneurs in ICT in this study, which underlines the alignment of these values with the business opportunities they want to seize. Thereby, constituting a major building block in the reflexive identity of the company.

Based on this, it can be derived that the reflexive identities at the level of the individual and the firm mutually influence each other. In the following extract, an interviewee indirectly explained the interaction between the two levels:

I6: "Well, **my personal values [are] (...) to be sustainable in environmental issues and also the human rights** need to be adequately handled for all people. So, basically, **the company is based on my visions and my aspirations.**"

This reinforces the notion that notably for small companies, the barrier between the individuals' self-identity and the firm's identity is narrow. Taken together, this finding

delineates the substantial roles that female entrepreneurs fulfil when managing their companies. Their aspirations and motivations have an immense effect on the identity of the firm. Thus, the firm can be viewed as a reflection of the values and goals that drive female entrepreneurs.

Surprisingly, when asked about how the interviewees saw their business in five or ten years, the interviewees were unanimous in their view about growing their business. Half of the interviewees aimed for international growth, after acquiring the Finnish market, while a few interviewees only expressed a desire for modest growth with the goal to obtain a sustainable living from their company.

Although only one individual stated employing a business advisor, her experience underlined the importance of seeking advice from a mentor. With personal commitments and business responsibilities, the interviewee indicated encountering difficulties in creating elaborate plans on how to proceed with her business. However, employing a business advisor helped her create a more focused strategy by aligning her and her team's values to construct the company goals. This was achieved through the business advisor who asked the team future-oriented questions and supported them in deliberating how they would imagine their company in the short- and long-term future.

Lastly, no foresight practices could also be identified within the **inter-firm structures**. Adjusting to dominant discourses within a community is a vital element, considering that the interviewees work in the ICT industry, which is subjected to rapid developments. Based on the interviews, adapting to dominant discourses, such as the implementation of AI, occurred primarily within the firm. For instance, an interviewee commented:

I1: **“AI will change e.g. the way we teach, since we don't need to have that many teachers and that intensive teaching done by humans anymore. This will be impacting my business and I need to be prepared for the changes when designing the technology in my products.”**

Adjusting to the implications of AI therefore takes place on the level of the firm's identity, relationships and everyday practices. However, another interviewee shared a suggestion that AI could be utilised for tracking purposes to aid the collaboration of entrepreneurs within the inter-firm structures.

Together these results provide important insights into the frame of mind of the interviewees, who prioritise the implementation of dominant discourses within their

internal structures. Despite that, there is an awareness of possibly extending dominant discourses within the inter-firm structures, though these ideas remain in a brainstorming phase.

#### 4.4.3 Organising Domains

In the following section, the central themes focusing on the organising domains are displayed in Table 8, before a detailed description is given in the next segments.

Table 8 Foresight practices on the level of organising domains, based on Fuller & Warren (2006, 962-963)

Process	Emergent Property	Foresight Practices & Themes	How many times was the theme mentioned across all interviews?	How many participants have mentioned a particular theme (n=8)?
Organising Domains	Individual's self-identity, mental models and motivation	1. Restructuring of daily routines, priorities, values and interdependencies on relationships	28	8
		1.1. <i>Relying on intuition during the decision-making processes</i>	10	4
		1.2. <i>Adaptability skills</i>	14	5
		- Open-mindedness	7	3
		- Flexibility	4	3
		- Improvisation	3	2
		1.3. <i>Trust during collaboration</i>	4	3
	Individual firm's identity, relationships and everyday practice	2. (Changes to) what is done; expected modes of behaviour, culture and values; rules and rewards for activities; ways of doing things. Structure of relationships and strategies associated with relationships	37	8
		2.1. <i>Lack of resources as hindering factors</i>	22	8
		- Lack of time	8	4
		- Lack of workforce	8	5
		- Lack of financial resources	6	3
		2.2. <i>Focused business approach</i>	5	4
		2.3. <i>Use of beta versions before introducing products</i>	10	3
Inter-firm structures	3. Dynamics of the strength and nature of interrelationships and dependencies, information flows, dominant actors and discourses	0	0	

Taking a closer look at the organising domains in Table 8, at the **level of the individual's self-identity, mental models and motivation**, a recurrent theme in the interviews was a sense amongst the interviewees that relying on their intuition and their gut feeling was regarded as instrumental during the decision-making process to grasp or to deter from various future business opportunities.

Highlighting this perspective, an interviewee illustrated:

I8: **“I have had some good opportunities, but I have got a gut feeling that there is something that is not matching in this case.** And as I have a lot to do, I simply did not proceed with them. I didn’t use time to find the reason why I have this gut feeling. I just put it aside and go to the next one.”

Opinions differed as to whether utilising one’s intuition was equally important as data-based knowledge (about the market etc.). There were some suggestions that depending on the circumstances, several decisions were made based on facts, while others resulted from intuition. However, a small number of those interviewed suggested that intuition was a constant companion in the decision-making process. Although the early stages of the decision-making process encompassed data-based research, which led to several indicators. The final decision was based on intuition which presented which indicator the company is going to follow. One interviewee stated that a major determinant in intuition-based decision-making relies on the stage of the firm. According to her, specifically, in the early start-up phase, decisions are based on intuition.

Over half of the interviewees reported adaptability skills as crucial when dealing with the future. The themes of being open-minded and flexible to changes in the environment that could occur in the future emerged. Improvisation skills were seen as indispensable as well, as one interviewee shared that not everything could be planned in advance. Interestingly, no further elaboration on acquiring adaptability skills was prominent in the interview data, instead, interviewees would only list these skills as vital to them.

Engendering trust was named as one of the key components to facilitate collaboration by a few interviewees. This involved trusting the leader who determined the paths to take and trusting the team by disavowing micro-managing, which is reflected in the following excerpt:

I6: **“We don’t micromanage in our company (...).** We are rather trying to keep the **environment** so that (...) **every idea is [a] good idea**, but it’s not maybe viable for the business. It might be, might not be.”

In connection with the **individual firm’s identity, relationships and everyday practices** which include expected modes of behaviour and ways of operating, all interviewees attributed the lack of resources as an obstacle in seizing future business opportunities. One interviewee indicated devising ideas daily, however, the insufficiency of resources

resulted in many opportunities remaining in the ideation process without a concrete action plan.

Half of the interviewees reported that time scarcity was a crucial factor. Due to the lack of time that was needed to invest in business opportunities, the speed at which they could pursue opportunities was reduced significantly. An interviewee commented on being restricted to focus only on one product at a time, while another interviewee expressed a desire to be freed from operational work to expand her capacity to concentrate on future business opportunities. A common view among the interviewees was to hire additional employees who could support them in pursuing business opportunities through their expert knowledge and thus lift the burden from the interviewees. This sentiment parallels the lack of a workforce as a barrier. On top of that, a shortage of skilled workers, such as programmers could also limit the company from seizing the opportunities that are arising from the environment.

The insufficiency of financial resources hinders companies from realising business opportunities at a fast pace, affecting their speed as one of the first movers in the market. Moreover, one interviewee underlined that it is necessary as a small entrepreneur to consider the balance in upkeeping the current business as opposed to exploring future business opportunities, which is stated in the comment below:

I7: “But it’s always the balance that how you invest the money you have now, what type of people you need to hire. **Is it like upkeeping the operations now or doing some new things? In an ideal world, I would not need to think about it.** I would just have a possibility to have a lot of people around and do changes faster.”

Specifically, applying emerging technologies, that are based on AI or VR etc., requires a vast sum, so several interviewees expressed the hope for these technologies to become more accessible for smaller companies in the future.

Not being able to attain resource slack<sup>3</sup> is linked with difficulties that demand creative solutions. For example, one interviewee referred to crowdsourcing, finding investors or sharing resources with other entrepreneurs as a viable option to bridge the gap.

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<sup>3</sup> According to Bradley et al. (2011) resource slack refers to firms that are able to acquire a surplus of resources, including financial resources. Thus, attaining resource slack can significantly affect the growth of companies.

Due to a shortage of resources, several interviewees reported resorting to a focused business approach to concentrate the available resources towards a niche. Concerns were expressed about working in a competitive market which is clustered and challenging to navigate in. Hence, several interviewees directed their attention towards a unique business idea to attract customers. The comment below illustrates a metaphor for making a difference and finding a place in a saturated market:

I5: “We’re just focusing on that. **We’re not shooting everywhere**, but rather trying to make a small (-) if you think of a dam where you have like a concrete wall. So, **we’re trying to poke a small hole where the water starts coming through and then hoping that with pressure that hole will get bigger, and the more water will flow.**”

Regarding finalising their product, a few interviewees indicated creating beta versions to test the customer response and to adjust the products according to the received feedback as part of their product development process. The process resembles an iterative activity, which undergoes multiple rounds of testing and receiving feedback, before finalising a product that is sold to the customer.

Finally, no foresight practices could be determined within the **inter-firm structure**. Based on the interview data, there is limited evidence of collaborations or partnerships that cross the boundaries of the interviewees’ firm. Instead, the overwhelming majority of the interviewees were focused on developing their intra-firm structures. It is worth noting, that one interviewee expressed a desire to foster a culture of collaboration between businesses to eradicate the mindset of competitiveness between firms, which is illustrated in the following quote:

I7: “I have learned how much value (...) the **collective power of businesses** [can create] when they come together and when they work towards some specific goal. But I have also learned that there is a **very little share of entrepreneurs who actually collaborate** because it’s complicated and there are **many obstacles** to running group projects.”

However, she attributed the change towards collaboration as a development that might occur in the future. Therefore, the results indicate that a cultural shift has to transpire before inter-firm structures can be devised.

#### 4.4.4 Sensitivity To Change

Finally, the foresight practices that were implemented in connection with the process, sensitivity to change, are illustrated in Table 9.

Table 9 Foresight practices on the level of sensitivity to change, based on Fuller & Warren (2006, 962-963)

Process	Emergent Property	Foresight Practices & Themes	How many times was the theme mentioned across all interviews?	How many participants have mentioned a particular theme (n=8)?
Sensitivity To Change	Individual's self-identity, mental models and motivation	<b>1. Awareness of changes in environment and in imperatives of stakeholders, sensed through language and observations of mainstream and alternative (precursor) activities</b> Significance of psychological safety and motivation associated with change	56	8
		<i>1.1. Horizon scanning</i>	39	8
		- Connections from networking	9	6
		- Networking events to learn about new developments	9	5
		- Relying on research	8	4
		- Resources from media	5	4
		- Following the news	4	4
		- Market research on social media	4	3
		<i>1.2. Present orientation of entrepreneurs</i>	11	4
	<i>1.3. Skill of connecting dots to comprehend future developments</i>	6	3	
	Individual firm's identity, relationships and everyday practice	<b>2. Testing of everyday recursive practices as to their fitness with the environment</b>	0	0
		<b>3. Measures of effects of, and degree of, decoupling from environmental structure</b>	0	0
		<b>4. Assessment of salience of (new) experiments relative to existing recursive activities</b>	0	0
		<b>5. Desensitising resistance of internal structures to change</b>	0	0
Inter-firm structures	<b>6. Openness of community to wider networks, emerging technologies and competing structures, increasing sensitivity</b>	0	0	
	<b>7. Degree of lock-in to particular courses of action, reducing sensitivity</b>	0	0	
	<b>8. Connections to and availability of "experiments" with other CoPs milieu</b>	0	0	
	<b>9. Evidence of responsiveness and learning from experiments (e.g. individual firms) and adoption of novel practices on wider scale</b>	0	0	



It can be seen from the data in Table 9 that the sensitivity to change at the **level of the individual's self-identity, mental models and motivation** is represented by all eight interviewees who employed horizon scanning, despite the fact that the majority was not familiar with this term.

The overwhelming majority of the participants shared that they took advantage of the connections they have made from networking to learn about recent and future developments. Through networking the interviewees acquired helpful connections from experts that led to different ideas and viewpoints, as mentioned previously in the Subchapter 4.4.1. Moreover, attending networking events supported the interviewees not only in obtaining new connections but also in receiving the opportunity to listen to expert seminars that directed the interviewees to follow certain developments in the environment.

Half of the interviewees highlighted the importance of research for their own work. Some took an active approach by starting to collaborate with universities to understand emerging technologies, while others referred to reports by organisations that provide data about trends and insights concerning arising developments. It is worth noting that the majority of the interviewees referred to research organisations that operate within their own industry. Only a minority, to be specific two interviewees, refer to reports and research from the field of futures studies. Commenting on looking for weak signals in research, one of the interviewees said:

I7: "So I find looking into different reports and research interesting. **Because researcher[s] identified many things much before they become implemented** and there is a quite large, in my opinion, **gap between all the amount of information that we have actually based on the research and what is being put in life**. Because sometimes it's also quite complex to understand all the findings that researchers discovered and how it relates to our life and the business. So, what I do, I look for different signals [to see] what is happening."

However, a concern was expressed by an interviewee who was critical of utilising research from futures studies, as these would apply to developments on a global scale. Nonetheless, she showed interest in observing futures studies related research, as it might also be useful to smaller companies.

Several interviewees shared that they would follow the news to identify trends and signals. Some reported following industry-specific newsletters, while others relied on

general news releases that could include foreign news as well. When asked about other resources, the interviewees shared resorting to options related to the media, such as listening to expert interviews, reading magazines or attending webinars.

The view of having a presence on social media came up for example when discussing the monitoring of the developments that occur in the world. Some suggestions attributed to using social media specifically to observe their competitors or trailblazers to keep a watch on their activities as a way to gain more knowledge.

A recurrent theme in the interviews that greatly influenced the perception of the environment was the present orientation of the female entrepreneurs, that were interviewed in this study. Whilst one interviewee highlighted the importance of exploring the long-term perspective, the overwhelming majority of the interviewees alluded to the notion of prioritising the short-term future or the present time.

Referring to this issue, an interviewee stated:

I4: **“So I think preparing for the future is (...) not ignoring the current things.** So, I think (...) [about] what we face [and] what (...) the challenges and [the] **difficulties at the moment [are] (...)**, but [if] we concentrate on these things and then plus a **bit of open-minded[ness]** then this is my first kind of plan for the future.”

Interestingly, another interviewee commented that the most common future time span she focused on for her business was limited to six months, while the longer timespan was reserved for her own personal future.

Drawing from these findings, it has to be elucidated that apart from small exceptions, the majority of the interviewees did not outwardly express that they were present-oriented. However, when questioned about future developments, most were reluctant to address long-term developments, as apparent in the following quote:

I1: **“Ten years feels a bit too long [of a] time span for me (...) again, ten years is so far in the future** and especially thinking about digitalisation (...)”

Several interviewees referred to current trends and signals to answer future-oriented questions. For example, while answering a question about future technological developments, one interviewee stated AI is a vital influence, as it has already affected our jobs today, so she felt that AI would continue to impact us in the future. Based on this, it

can be inferred that the extrapolation of trends of the current time is often utilised to comprehend future changes.

The theme of leveraging the skill of being able to connect dots appeared from the analysis. A common view among the interviewees was that this skillset would help them to understand the entirety of a problem field and thus they could propose a prediction based on the information that they could collect from the news etc. However, divergent views emerged when outlining how to unlock this skill. Some commented on applying particular methods, such as mind maps and flow charts to achieve an overview of critical developments, while an interviewee could not describe how she developed this specific skill, as it is an ability that comes naturally to her. The interviewee further elaborated on this in the subsequent passage:

I3: “**I do have a skill set of combining dots** (...) that has helped a lot when it comes to future predictions (...) It’s just something that I’ve done in practice before and **I think it’s just something that I just somehow know how to do** (...) but I think that’s like knowing when you talk with different stakeholders and learning and reading about things that are happening and just the ability to connect dots and form predictions (...)”

Finally, issues related to foresight practices within the **inter-firm structures** as well as the **individual firm’s identity, relationships and everyday practice** were not prominent in the interview data. On the level of the individual firm’s identity, relationships and everyday practice, the focal attention is on assessing the fitness of the everyday practices to the operational environment of the firm and adjusting the structures to changing conditions, while the inter-firm structures describe a variety of practices that are interlinked with other CoPs and networks to increase sensitivity to change. Based on the interview data, the interviewees solely conducted foresight practices that fostered their awareness of emergent changes in the environment. However, they neglected the long-term future orientation of building structures within the firm that reflect arising changes in the environment that are mirrored in the individual firm’s level and within the inter-firm structures.

In summary, these results suggest that female entrepreneurs of small businesses indeed employed foresight practices in their everyday activities to keep account of the changes that are arising from the environment. Especially to be emphasised is the role of the reflexive identity of the entrepreneurs, as the embodied values (e.g. contributing to society, caring for the environment) have an immense impact on the future business

opportunities they pursue, the partners they collaborate with, and which projects they initiate. The values are an orientation point for female entrepreneurs, who are motivated by social and environmental values. This sentiment parallels the notion that for small entrepreneurs the level of the individual's identity and the firm's identity are tightly intertwined. Thus, reinforcing the immense influence of an individual's identity on the firm. Moreover, a closer look at the inter-firm structures reveals that no foresight practices across all four processes (experiments, reflexive identity, organising domains and sensitivity to change) could be identified. Instead, the interviewees focused on developing their internal structures.

#### 4.4.5 Foresight Tools

Although utilising specific foresight tools are not directly part of the EROS model, the application of foresight presents an active approach of dealing with the future. When asked about the implementation of foresight tools, the majority of the interviewees indicated not utilising any foresight tools. Nevertheless, horizon scanning was adopted by all of the interviewees, despite not following a structured approach.

Concerning the reasons for not utilising foresight tools, it has to be mentioned that three reasons could be determined from the analysis that hindered entrepreneurs from actively engaging with the future through the application of foresight tools. Figure 7 displays the barriers to the implementation of foresight tools in an entrepreneurial setting that could be identified in this study.

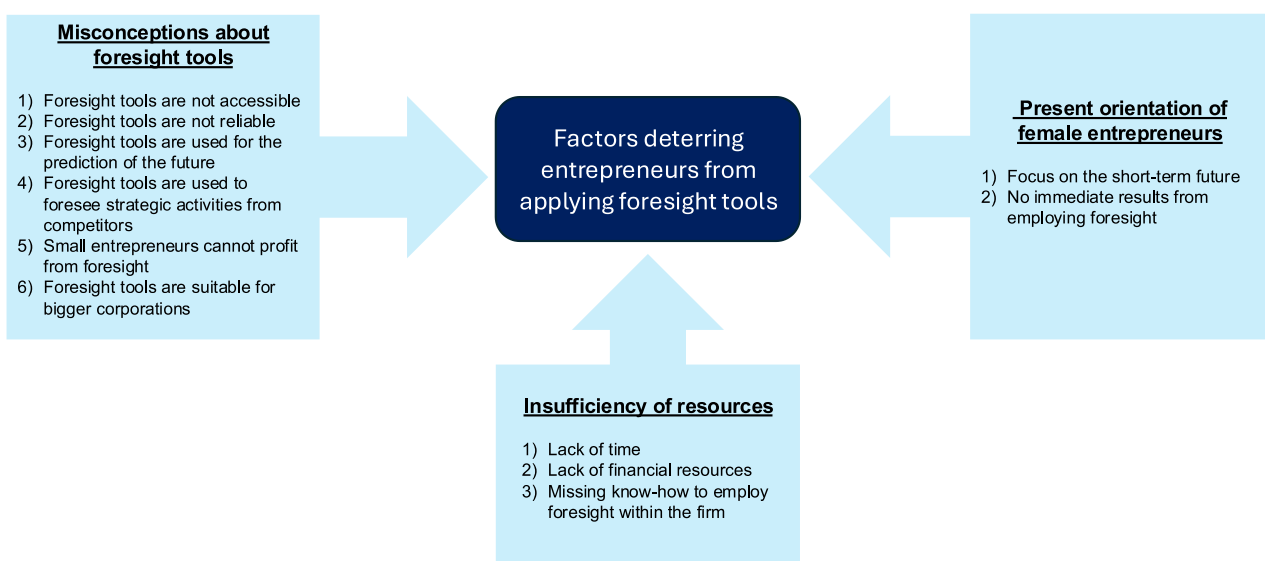


Figure 7 Factors deterring entrepreneurs from applying foresight tools

Firstly, the lack of resources, such as time or financial resources were the main reasons to not invest in foresight, as mentioned earlier in Chapter 4.4.3. However, one interviewee also mentioned the lack of knowledge on how to apply these foresight tools as one of the principal factors. She suggested employing a foresight manager with the necessary know-how to utilise various foresight tools. Referring to the use of foresight, the interviewee stated:

I2: “(...) but I think maybe (...) if it was just me, **I would doubt that I have enough (-) inside our skills to do it.** Would be maybe good to have somebody who knows a bit more about it.”

Furthermore, the present orientation of the entrepreneurs, which was illustrated in the previous Subchapter 4.4.4, played a crucial role in the interviewees’ focus on the short-term future. There were some suggestions that the orientation towards the present is due to the multitude of uncertainties that small entrepreneurs face. The challenges that especially small entrepreneurs encounter are based on upkeeping their operations and ensuring the survivability of their business, leading to the notion that investing in foresight might not precipitate a return in the future, as evident in the following quote:

I7: “(...) **you just have so many uncertainties, especially when you are starting the business or** [when it’s] very small, whether you have funding, whether you find enough customers for your project. Maybe your project does not exist in five years, so **it feels like a waste of resource (...) to think about the future** [when] you don’t know even what will be in one year.”

This perspective contends that existing foresight tools were not suitable for early-stage entrepreneurs who are in the development stage of their business, which was also supported by another interviewee who expressed that introducing foresight tools should occur when a product has been launched, so data would depict the fundament for foresight activities.

In addition, an interviewee raised the concern that implementing foresight does not immediately generate results that could benefit the company, which is illustrated in the comment below:

I7: “[As a] **small entrepreneur, you don’t have much funding** and then you have to decide where do you invest. Into marketing? Into promotion of your service? Or into foresight? And then you think like **from marketing, I can get customers today and from foresight, I don’t know.** And it most likely costs a lot. And what [do] I get in the end?”

With limited financial resources, entrepreneurs had to carefully consider how to invest in these. This means allocating the available resources towards an area which directly leads to returns. Due to these various challenges, entrepreneurs were putting the spotlight towards the present. This result also indicates the issue that foresight tools are perceived as costly, which acts as an additional barrier to a practical application.

The most surprising aspect that emerged from the data was that entrepreneurs possess misconceptions about foresight. The most common idea was that foresight is usually applied to larger companies, as smaller companies lack the resources to make use of the available data, as apparent in the subsequent passage:

I1: “All kinds of helping foresight tools would be great to use! **But only if they are affordable to use and still reliable and safe, and that is not usually the case.** The data is out there but at least for now **as a “nobody” you really cannot utilise it;** you just have to **surrender to be part of the machine.** And mostly people don’t even know it, or even care.”

Another notion that was accentuated in this passage was that the results from foresight were not reliable and could not be trusted fully. This sentiment parallels the idea that was expressed by several interviewees which elucidates that foresight was applied to obtain predictions of future events or utilised for the monitoring of competitors that are interacting in the market.

Overall, these results demonstrate that the misconceptions about foresight, the shortage of resources, as well as the present orientation of female entrepreneurs in ICT, affected the limited use of foresight tools that were employed within the firm. Identifying trends and weak signals through horizon scanning was the most adapted foresight practice for entrepreneurs, although a structured approach was not followed. More importantly, practices regarding actively shaping the future were not undertaken.

Together these results provide important insights into the future orientation and mindset of entrepreneurs in light of the digitalisation.

## 5 Discussion

### 5.1 Main Research Findings

As female entrepreneurs are underrepresented in the ICT sector (Dyvik 2024a), this study's first aim was to explore what images of the future this specific group forms about the digitalisation. The purpose was to determine the future images of female entrepreneurs through the lens of business opportunities and digital skills that are needed to turn their imagined future into reality.

The second aim of this study was to investigate how foresight is implemented in an entrepreneurial setting. The study was also undertaken to assess how foresight practices are integrated within the everyday processes of small and medium-sized companies.

A qualitative study was adopted to interview eight female entrepreneurs from the ICT sector who operate with less than 20 employees and are based in Finland through a semi-structured interview approach. The PESTEV categories were introduced in the interviews to get a better understanding of the images of the future. Moreover, the EROS model by Fuller & Warren (2006) was employed to determine foresight practices that were utilised by the interviewed entrepreneurs. After this, a content analysis was applied to analyse the data, while following an abductive approach.

The main findings elucidated three different images of the future regarding the digitalisation. The first image "Community Before All" embodies fostering a community and promoting global collaboration, while the second image "Green World" is focused on environmental sustainability. Lastly, the third image "Seeing The World Through Smart Glasses" encompasses the technological innovations that will be part of everyday life in the future. The research has also shown that the participants perceived future business opportunities in the field of educational games. Moreover, utilising emergent technologies, such as AI, AR and VR could represent viable business opportunities. The relevance of a value fit was supported by the current findings, as the alignment between the values of the entrepreneur and the seized business opportunities indicate a necessary precondition. The study has found that generally basic digital skills and cyber security skills are required, while professionals require obtaining a more advanced digital skill set. Apart from developing technical skills (e.g. AI skills), the data suggests that soft skills are indispensable as well.

According to the results from the EROS model by Fuller & Warren (2006), the data indicated that experiments predominantly occur through discussions, while the reflexive identity underlines the importance of the tight link between the individual's and the firm's identity. Regarding the organising domains, the study demonstrated that the lack of resources is a hindering factor in conducting foresight. The most obvious finding to emerge from this study is that the majority of the interviewees asserted that they did not utilise any formal foresight tools. However, all interviewees employed horizon scanning within their everyday practices to identify trends and future developments. The data suggests that sensitivity to change primarily arises by attending networking events and utilising other sources from the media. One of the more significant findings that emerged from this study are the factors that deter female entrepreneurs from implementing foresight tools. Due to the insufficiency of resources, their present orientation and the misconceptions they possess about foresight, foresight practices were not employed at a great scale.

## **5.2 Interpretation Of The Results**

### **5.2.1 Assessing The Three Identified Future Images Of The Digitalisation**

Concerning the **first research question**, which focuses on investigating images of the future of female entrepreneurs from the ICT sector, three different images of the future could be determined across the PESTEV categories. It was evident that the overarching values in each image established the different directions the image would be centred on. For instance, the first image "Community Before All" involves building a community to collaborate globally to induce social change, while empowering marginalised actors. Hence, it is certain that the values of female entrepreneurs influence: firstly, the way they perceive the future and secondly, their underlying principles dictate the direction of the three identified future images. Therefore, these results are consistent with prior research, as Polak (1973) and Mau & Bell (1971) reported that values have an immense impact on the created images of the future. Furthermore, the central findings of this study appear to suggest a value fit between the personal values of the female entrepreneur and the business opportunities the entrepreneurs seize. Thereby, it indicates a close link between the identity of the individual and the identity of the firm. This sentiment parallels the findings that were gathered based on the EROS model since the reflexive identity reflects the guiding principles and values that surfaced in the images of the future. It is possible



to conclude, that specifically in small and medium-sized companies, the voice and identity of the entrepreneur is considered as a north star to guide the business. Therefore, it can be deduced, that in terms of the values, no boundary exists between the entrepreneur and the firm.

It was surprising that the majority of the identified business opportunities were related to emerging technologies and the field of educational games. Moreover, these findings seem to indicate that technology can be considered as a double-edged sword. On the one hand, some of the participants, for example, were aware of the negative consequences of the usage of AI. On the other hand, the majority of the participants expressed an openness to utilise new technologies to seize business opportunities or to integrate these within their products and business portfolio. It may demonstrate that the advantages of the usage of particular technologies outweigh the disadvantages. Having established that a wide variety of digital skills are needed to navigate in a digitalised world, it was interesting that the need for soft skills was noted. Therefore, it further displays the importance of skills that cannot be replicated by technologies. The digital transformation induces tides of change, thus engendering not only new business opportunities but also the necessity for society and businesses to adapt to arising developments from the digital landscape. The results from this research, regarding the images of the future of female entrepreneurs in ICT, demonstrated that the digital transformation shapes organisations by transforming how businesses operate. For instance, the integration of emerging technologies, such as AI or machine learning, facilitates optimised processes. In addition, the digital transformation enables the adoption of new digital skills to adapt to the changing digital landscape. Altogether, the emerging technologies and the developed digital skills proffer tools for entrepreneurs that could support in promoting resource sharing, providing customer-friendly products or assisting design optimisation. Hence, entrepreneurs can not only benefit from efficient processes, but they also receive the opportunity to reach additional goals that are based on establishing a community or preserving environmental sustainability. This corroborates that technologies can be applied to realise a diversity of objectives of female entrepreneurs, which are driven by their values.

Based on the analysis, it was remarkable to discover that the first and the second image seem to possess mutual elements across a variety of variables, while the third image does not seem to correlate with the other images. The first image is centred on building a like-minded community to induce social change, while the second image represents

environmental sustainability that leads to conscious consumption and addresses climate change. Taken together, it is likely that these results demonstrate a profound aspiration of female entrepreneurs to address global issues with the intention to take action to evoke a change towards a better world. It supports the idea that female entrepreneurs are dedicated to social and environmentally focused goals, which corroborates the culture shift in light of the digital transformation towards businesses aiming to achieve value-driven objectives. As previously mentioned, Masini (2002) emphasised that women perceive the world differently than men and that they can provide new perspectives. She illustrated that futures created by women are characterised by a like-minded community and the preservation of natural resources while building a non-materialistic society. Thus, the first and second image of the future, that were identified in this study, are in alignment with Masini's (2002) deliberations. On top of that, Kubberød et al. (2021) explained that female entrepreneurs take advantage of their otherness and not belonging to a field to create new rules, which may be supported through the first and second image, as these depict images of the future that pave the way for novel and unique paths. However, the third image is inconsistent with Masini's (2002) notion, as it revolves around businesses being profit-oriented and price-driven with an amalgam of values that are ingrained in materialism and ownership. An underlying factor may be that the third image exhibits traits of the current, male-dominated ICT industry and the patriarchal society, that we currently live in. This could be attributed to a projection of a continuation of the present into the future. Taken together, the first and second image of the future can be seen as an antithesis to the third image, highlighting the ambiguity of the future.

A noteworthy finding that emerged is that the identified images of the future represent a future that occurs in the short-term, despite the interview questions encouraging the interviewees to imagine a future that would take place in five or ten years. This may be due to the present orientation of female entrepreneurs, who prefer to consider the short-term future. One potential explanation would be that female entrepreneurs view the present as more important than the future. These results are astonishing since the ICT industry is regarded as a dynamic field with high volatility, so it was expected that female entrepreneurs in high-technology sectors would be characterised by a farsighted view that would consider the long-term future. Moreover, the participants in this study were aware of the multiplicity of futures, as they reflected on several pathways when deliberating on future business opportunities.

### 5.2.2 Examining Foresight Practices Across The Levels Of The EROS Model

Moving on to the **second research question**, which aims to determine what foresight practices female entrepreneurs utilise. Contrary to expectations, this study could not identify foresight practices connected to the inter-firm structures which are a considerable element of the EROS model by Fuller & Warren (2006). In regard to practice-oriented foresight, inter-firm structures play a major role in representing the social processes that are needed to implement foresight in everyday practices. As learning occurs in a social context (Corradi et al. 2010), the inter-firm structures can offer collaborative foresight opportunities in which collective know-how can be shared to explore different pathways with the objective of implementing the learnings from the discussions into the daily practices of the firm.

Within the EROS model, the inter-firm structures pertain to developing a community which extends to wider networks of the entrepreneurs that foster collective learning. Establishing inter-firm structures promotes sensing dominant discourses, which supports entrepreneurs to acquire the capability to actively shape not only their own future to gain a competitive advantage but also the future of their respective industry with the potential to rise as forerunners. By entering mutually beneficial collaborations and sharing practices, entrepreneurs are able to embark on a common journey of exchanging knowledge and information, instead of learning and experimenting in isolation.

The inter-firm structures are relevant for the sample of this study, as the interviewees are operating in the ICT industry which is subjected to forces that lead to volatility and uncertainty. As identified in this study, there is a paucity of resources which hinders entrepreneurs from conducting foresight. By entering collaborations with other entrepreneurs or other institutions, resources and most importantly knowledge could be shared to build resilient structures against change.

To summarise, this study has been unable to demonstrate that foresight practices on the level of the inter-firm structures arise in all four processes (experiments, reflexive identities, organising domains and sensitivity to change) of the EROS model by Fuller & Warren (2006). Therefore, the lack of inter-firm structures in this study establishes that female entrepreneurs in ICT seem to limit their foresight collaboration with others while favouring working in isolation towards their specific goals. Consequently, these results

present an imperative for entrepreneurs in ICT to join collaborative networks to share practices and to learn about dominant discourses.

However, these findings must be interpreted with caution because the study did not focus on CoP, hence no direct questions concerning being part of a CoP were asked. Therefore, it is possible that these results may underestimate the role of inter-firm structures that are connected to foresight practices. Nonetheless, the possibility of the interviewees not mentioning establishing inter-firm structures to conduct foresight practices, despite being engaged in a CoP cannot be ruled out. Especially, since several interviewees mentioned collaborating with universities. Taking a different perspective, one potential explanation could be that the participants may have not applied foresight practices to a certain extent that could lead to establishing inter-firm structures dedicated to foresight. Due to focusing on building their internal structures, the inter-firm structures were not further developed.

It is crucial to note that all interviewees employed foresight practices that are targeted towards all four processes (experiments, reflexive identities, organising domains and sensitivity to change) on the level of the individual's and the firm's identity of the EROS model, albeit with limitations concerning the inter-firm structures. In line with the previous deliberations in Chapter 5.2.1, the reflexive identity emphasises a close connection between the identity of the entrepreneur and the type of business that is established, which supports the arguments by Fuller & Warren (2006). Notably, the value fit between the individual's identity and the firm's identity needs to be outlined. This can be explained due to the immense influence the entrepreneurs exert on their firms, as several participants have founded the firms that they are representing in this interview.

Additionally, it was evident that the EROS model solely focused on activities that centred on horizon scanning. Prior research from Tilley & Fuller (2000) illustrated that small firms are more inclined to not utilise formal foresight methods, which is consistent with this study, as only horizon scanning was implemented. Even so, none of the participants indicated using a structured approach when employing horizon scanning. However, it is imperative that even small entrepreneurs should actively deal with the future and take advantage of different foresight methods, especially when operating in an uncertain environment with rapid changes, such as the ICT sector. In connection to Inayatullah (2008), employing futures thinking creates the opportunity to build futures capacity and it also increases the confidence of organisational members in encountering the future.

Thus, futures thinking has an immense impact on the individuals who are utilising foresight methods since they have to scrutinise the status quo and the assumptions that they have about the world. Subsequently, their frame of mind about reality is shifting greatly. (Inayatullah 2008.) In the end, it can be deduced that it is not about predicting the future as precisely as possible, instead, it is about exercising a better judgement about the changes in the environment. Thus, more active approaches to engage with the future are needed for entrepreneurs to deliberate about alternative pathways. Therefore, adding an additional layer to the EROS model, that would suggest an active engagement with the future could engender another process, that could enrich the understanding of the implementation of foresight practices.

However, this may run counter with the identified present orientation of the female entrepreneurs who are focused on the present time or the short-term future. The insufficiency of resources, such as lack of time, workforce or financial capabilities, considerably slows their business, while facing the dilemma of investing in the future or maintaining their current operations. This suggests that the exploitation of the present and the exploration of the future is a delicate balancing act, which is difficult to attain as a small entrepreneur with limited critical resources. These results are consistent with the research by Hines & Gold (2015), who state that foresight activities require time and may disrupt the usual business operations. Moreover, the lack of financial resources was noted by Ruff (2015) as well. Consequently, further underlining the barriers to implementing foresight practices within small companies.

This study has also demonstrated that female entrepreneurs value improvisation and intuition, which is in line with Cunha (2004). Moreover, the skill of combining dots was also stressed as crucial. However, it is interesting, that these skills cannot be easily taught, instead these are engrained in implicit knowledge.

The results also establish that research does not seem to constitute a considerable role in the everyday foresight practices of the interviewees. Only half of the interviewees asserted to draw upon research, while only two interviewees underlined the significance of the field of futures studies specifically. This could explain the misconceptions about foresight practices and tools that the majority of the interviewees seem to possess, as a gap between the research of futures studies and practitioners exists.

### **5.3 Limitations**

The current study is limited by a relatively small sample of eight interviewees with strict criteria. Being limited to eight female entrepreneurs from ICT who are based in Finland and with less than 20 employees, this study lacks generalisability which poses a major weakness of this study. A small sample was chosen because of the unexpected difficulty in obtaining interviewees who would be willing to participate in this study. Besides that, several issues also arose when contacting possible interviewees who fit the set criteria.

The small sample did not allow for a broad picture of the images of the future, leading to more restrictive images of the future. The same applies to the employed foresight practices as well. Despite its limitations, the study offers some insight into the future orientation of a specific study sample, while adding to our understanding of their images of the future and applied foresight practices. Moreover, whilst the study did not achieve material saturation, the study still discussed a number of variables that were mentioned in the interviews. For those variables that could not be incorporated within clusters, a considerable effort was made to integrate these within the images of the future.

One source of weakness in this study which could have affected the data analysis is that the study was restricted to an average interview time of one hour. As a high number of interview questions were raised, it was not possible to go into detail with each question. Another uncontrolled factor is the possibility that not every thought of the interviewee was expressed in the interview, thus it could not be documented and analysed.

The scope of this study was limited in terms of only including female entrepreneurs, however, this study cannot confirm that these results apply solely to female entrepreneurs, as a comparative study would be required. This notably affects the findings in relation to the images of the future that are based on community-building and environmental sustainability, as consistent with Masini's (2002) research.

### **5.4 Implications**

The study has raised important questions about the nature of values that affect the future orientation of female entrepreneurs in ICT. These values are focused on forming a community, inducing social change, embodying conscious consumption, but also prioritising materialism and productivity. The findings of this study suggest that there are

primarily two streams of possible developments in the future that engender social and environmental change or are aimed at providing technologies that support productivity. The current data highlights the importance of entrepreneurs who contribute to a future that guides us towards a better world. Thus, these findings have significant implications for the understanding of the aspirations and motivations of female entrepreneurs in ICT that are based on their reflexive identity. This further underpins the prominent role the reflexive identity of an entrepreneur exerts on their business. The findings of this research provided new insights into the perspectives of a specific set of study participants who are underrepresented within their industry. Moreover, this study offered an increased awareness of the future orientation and the mindset of female entrepreneurs in light of the digitalisation.

This thesis has also provided a deeper insight into practice-oriented entrepreneurial foresight. The findings reported here align with the processes and foresight practices of the EROS model by Fuller & Warren (2006). Furthermore, the findings of this study complement those of earlier research, that depict the barriers to employing foresight within an organisation. This study raises critical questions about the present orientation of female entrepreneurs and offers a clearer understanding of the impediments to applying foresight. Although the EROS model suggests that sensing environmental changes is a foresight practice to induce sensitivity to change, this study strengthens the idea that more active measures must be taken by entrepreneurs to deliberate on the future of their business and the industry. While previous studies have focused on how to conduct foresight in organisations, the results of this study demonstrated how foresight practices are included in the everyday practices of a firm at an operational level. By addressing the research gap in the integration of foresight practices in the everyday practices of small and medium-sized businesses, this thesis adds to the growing body of research on entrepreneurial foresight. Another crucial challenge is to create foresight tools that could even be suitable for early-stage entrepreneurs who deal with high uncertainty. Moreover, a greater number of foresight tools should be made available for small enterprises that lack the resources to apply these tools, thus providing more easily accessible foresight practices.

The findings of this study have a number of practical implications. There is a definite need for conducting foresight at companies in the ICT sector, as a present orientation of female entrepreneurs could be identified. These findings suggest several courses of action

for researchers of futures studies. Providing easy-to-use and simple foresight tools would enhance the number of entrepreneurs who would be willing to employ foresight. Greater efforts are needed to ensure that these foresight tools do not require expert knowledge about foresight or futures studies. Continued efforts are needed to target the accessibility of foresight tools to small entrepreneurs by encouraging foresight experts to offer courses to interested businesses, for example. In return, the information that is gathered through the entrepreneurs could be utilised in research.

Concerning small and medium-sized firms, a suggestion would be to appoint an employee as an internal foresight expert. The tasks of this foresight expert pertains to building foresight competences by attending webinars or workshops that could support the company to obtain the relevant skillsets in order to implement foresight and to foster a future-oriented culture. The employee acts as a foresight expert within the firm and guides the members of the firm to conduct foresight practices, while ensuring that the practices and methods are accurately implemented, thus ensuring the quality of the foresight procedures. Due to the misconceptions about foresight tools, a reasonable approach to tackle this issue can be achieved through foresight experts who could offer more education about foresight to allow entrepreneurs to prepare for future challenges and to increase their resilience to environmental changes. An additional suggestion is to integrate foresight practices within the existing structure of firms. In regard to firms operating in software development, agile methods, such as Scrum or the OKR method could be complemented with a future-oriented approach. Foresight practices, such as horizon scanning, could be implemented with the objective to discuss the findings before each sprint or OKR cycle, as these offer a flexible approach due to their short cycle to adjust to changing conditions in the environment that were identified. It proffers the opportunity to rethink current approaches and to avoid a lock-in situation within the strategy of the firm.



## 6 Conclusion

### 6.1 Significance Of The Findings

This thesis has provided a deeper insight into how female entrepreneurs in ICT perceive the future of the digitalisation. Images of the future were constructed that portray in what manner the interviewed participants interpreted the world. The findings reported here shed new light on the values embedded in the constructed future images. The first image encompasses creating a like-minded community to enact social change by harnessing collective power, while the second image entails an environmental consciousness that is targeted towards preserving natural resources. In contrast, the third image is composed of materialism and productivity. The findings on these images of the future provide new perspectives into the future outlook of female entrepreneurs that address global challenges and include their readiness to transform the world towards a brighter future, which is primarily reflected in the first and second image.

The present study offers a new understanding of how entrepreneurial foresight is implemented in the everyday processes of a business. The research has shown that female entrepreneurs in ICT utilise several foresight practices across different levels that affect the individual's self-identity, the individual firm's identity and the everyday practices that are established within the firm. However, the foresight practices related to the inter-firm structures were not considered by the female entrepreneurs in this sample. Therefore, the results indicate a principal focus of entrepreneurs on the internal development of their own firm in which knowledge is acquired in isolation, instead of engaging in CoPs that offer collaborative learning opportunities while sharing practices to leverage synergies between companies. This study demonstrated that the implementation of foresight tools is impeded due to a paucity of resources and knowledge about foresight, resulting in false premises concerning foresight. Therefore, the necessity of proper training as a prerequisite to employing foresight within a firm is underlined. Moreover, one of the more significant findings to emerge from this study is that female entrepreneurs in ICT are defined by an orientation towards the short-term future which influences the foresight practices that are applied in the recurrent activities of their firm.

As entrepreneurial foresight often transpires outside of formal systems, the findings reported here can provide a clearer understanding of the implementation of foresight

practices and foresight tools. Furthermore, this study contributes to existing knowledge of operational-level foresight by presenting a comprehensive investigation of foresight that is embedded in the processes of an organisation. By incorporating the long-term future, this study determined that continuous efforts are required to implement foresight for the anticipation of future needs in order to actively shape the future.

## **6.2 Further Research Recommendations**

Future studies should explore the influence of gender on images of the future by employing a comparative study. In addition, a further study could evaluate what characteristics female images of the future embody and how they differ from the male perspective of an image of the future. A large study sample of participants could also yield more definitive evidence of the findings that resulted from this study to achieve a clearer understanding of images of the future of the digitalisation and the application of foresight practices. Hence, further studies should be undertaken to validate the results of this study.

Moreover, further research in the field of practice-oriented entrepreneurial foresight, while utilising the EROS model by Fuller & Warren (2006), should be carried out to examine the application of foresight into the everyday practices to acquire a profound comprehension. This research raised questions that require further investigation, such as foresight tools that may be unconsciously employed by the entrepreneur without knowing the specific term or following a structured approach. Additional insights into this topic would help to establish a greater degree of accuracy in the implementation of the EROS model to assess which foresight practices are employed by entrepreneurs.

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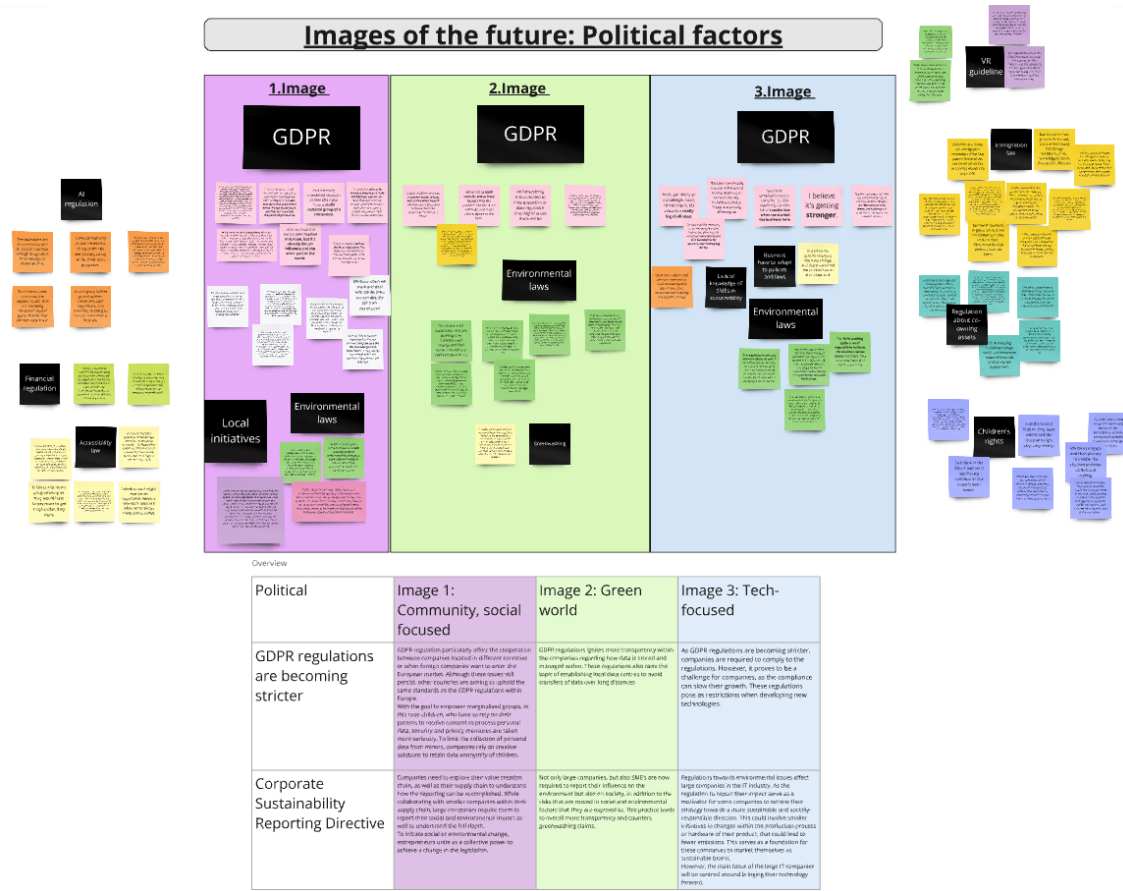
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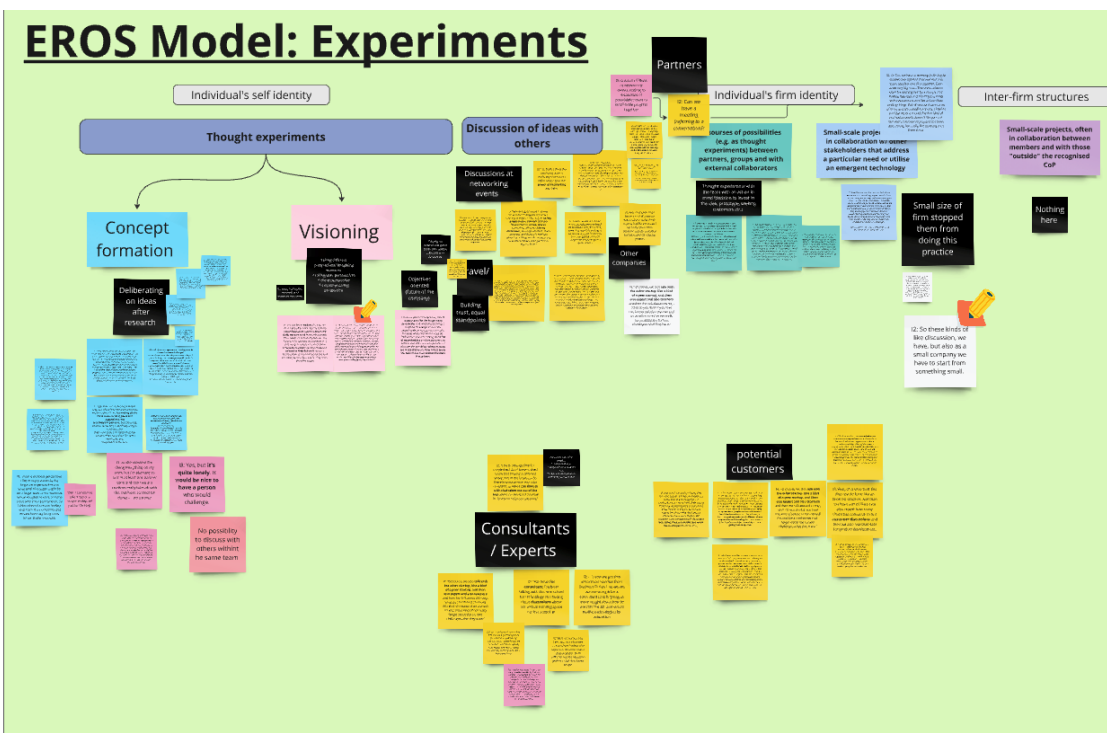
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# Appendices

## Appendix 1: Transferring Codes To Miro



## Appendix 2: Overview Of The EROS Model In Miro



### Appendix 3: 1. Image: Community Before All

		<b>1. Image: Community Before All</b>
<b>Political factors</b>	Regulations	<ul style="list-style-type: none"> <li>- GDPR affects the cooperation between companies located in different countries and the entry of foreign companies into the European market.</li> <li>- There is an increase in security and privacy measures to protect the data of minors through the GDPR.</li> <li>- Large companies require smaller companies in their supply chain to also report their social and environmental impact.</li> <li>- To initiate social change, entrepreneurs unite as a collective power to achieve a change in the legislation.</li> </ul>
<b>Economic factors</b>	Economic downfall	<ul style="list-style-type: none"> <li>- Due to an economic downturn, causing rising interest rates and increasing prices of raw materials, companies have to operate with tighter budgets that are invested into the core function of the business.</li> <li>- Collaboration and community-building are not imminent needs of companies.</li> </ul>
	Investors	<ul style="list-style-type: none"> <li>- A group of investors emerge that aim to initiate a social impact, however, they are still outnumbered by profit-oriented investors.</li> <li>- The goal is to induce change on a systemic level.</li> </ul>
<b>Social factors</b>	Attitude towards having an online presence	<ul style="list-style-type: none"> <li>- Being able to create an online presence depends on the social status.</li> <li>- The government implements activities to provide equal opportunities in the digital world to bridge the gap in social status.</li> </ul>
<b>Technological factors</b>	Role of AI	<ul style="list-style-type: none"> <li>- AI enables trust within business operations through monitoring systems or tracking to support the collaboration between businesses.</li> </ul>
	Data identity	<ul style="list-style-type: none"> <li>- Secure management of data is needed to be able to communicate across different countries during joint business operations.</li> </ul>
	Digital skills & design skills	<ul style="list-style-type: none"> <li>- Basic digital skills are addressed by governmental activities.</li> <li>- Particular attention is paid to individuals with a low socioeconomic status, who do not possess the financial resources to be able to develop their digital skills.</li> <li>- Businesses focus on developing accessible apps for various kinds of users with different levels of digital skills.</li> </ul>
<b>Environmental factors</b>	Effect of e-waste	<ul style="list-style-type: none"> <li>- There is an increased awareness about social injustice considering the inadequate handling of e-waste and the purchasing of resources at a minimum price.</li> <li>- Businesses support initiatives that are targeted at the better management of recycling options and at protecting marginalised groups from the negative effects of e-waste.</li> </ul>
<b>Values</b>	Co-sharing & collaboration	<ul style="list-style-type: none"> <li>- Co-sharing occurs between entrepreneurs to share resources.</li> <li>- A culture of collaboration between entrepreneurs is established to initiate a social impact on communities and a global scale.</li> </ul>
	Business orientation	<ul style="list-style-type: none"> <li>- Businesses are motivated to create a positive impact instead of generating profit.</li> <li>- Circular economy</li> </ul>

## Appendix 4: 2. Image: Green World

		<b>2. Image: Green World</b>
<b>Political factors</b>	Regulations	<ul style="list-style-type: none"> <li>- GDPR ignites more transparency within companies regarding how data is stored and managed.</li> <li>- Local data centres are established to avoid data transfers over long distances to minimise the environmental footprint.</li> <li>- Not only large companies but also SMEs are now required to report their influence on the environment and society.</li> </ul>
<b>Economic factors</b>	Economic downfall	<ul style="list-style-type: none"> <li>- Interest rates and the price of raw materials are increasing, so companies are raising the prices of their products. Thus, decreasing the purchasing power of consumers. Consumers hesitate to realise considerable investments.</li> <li>- Especially, small entrepreneurs struggle to induce sustainable change.</li> </ul>
	Investors	<ul style="list-style-type: none"> <li>- More investors emerge, who are not only interested in profit, instead their focus is centred on the environment.</li> <li>- Investors have clear requirements regarding the targets associated with the environment.</li> </ul>
<b>Social factors</b>	Attitude towards having an online presence	<ul style="list-style-type: none"> <li>- There is an increasing concern about the culture of being constantly online through the use of digital devices.</li> <li>- Mental health issues arise through the high dependence on digital devices, which specifically affects the young generation. It is encouraged to reduce time spent on digital devices.</li> </ul>
<b>Techno-logical factors</b>	Role of AI	<ul style="list-style-type: none"> <li>- AI replaces expert knowledge.</li> <li>- AI operates as an intelligent support to eliminate routine work.</li> </ul>
	Data identity	<ul style="list-style-type: none"> <li>- Some businesses follow more stringent guidelines when securing their operations, while other businesses do not prioritise this notion of data security. Therefore, causing security attacks that result in a leak of personal data.</li> </ul>
	Digital skills & design skills	<ul style="list-style-type: none"> <li>- Levels of basic digital skills are dependent on age. The young generation is more likely to be equipped with basic digital skills, while the old generation is struggling and requires extra training to support them in their everyday and professional lives.</li> <li>- Businesses rely on adaptive design to be flexible in creating solutions that can be modified easily with changing conditions and to cater to various skill levels.</li> </ul>
<b>Environmental factors</b>	Effect of e-waste	<ul style="list-style-type: none"> <li>- IT companies make an effort to reduce their CO2 emissions and to adjust their product development process to extend the life cycles of their products, so devices can be used for a longer time frame. Hence, changes in the hardware of products allow for easier reparability through their internal structures.</li> <li>- IT companies reduce the material needed for manufacturing and they also take advantage of recycled materials.</li> <li>- Companies offer incentives through rewards, so customers are influenced to return their defective or used devices.</li> </ul>
<b>Values</b>	Co-sharing & collaboration	<ul style="list-style-type: none"> <li>- Co-sharing is driven by values, such as ethical consumption and living sustainably.</li> <li>- Especially, the young generation is the forerunner in embodying this culture.</li> <li>- Individuals are influenced by conscious consumption, meaning to buy less and only consume what they truly need, while resorting to more sustainable options.</li> <li>- Collaboration between businesses and the general public is enforced to build resilience and to fight against climate change.</li> </ul>
	Business orientation	<ul style="list-style-type: none"> <li>- Businesses aim to contribute to a better world by taking into account how their businesses affect the environment.</li> <li>- Their purpose is to educate customers about conscious consumption while offering transparency about their own business operations and the status quo of the industry.</li> <li>- Circular economy</li> </ul>



### Appendix 5: 3. Image: Seeing The World Through Smart Glasses

<b>3. Image: Seeing the World Through Smart Glasses</b>		
<b>Political factors</b>	Regulations	<ul style="list-style-type: none"> <li>- As the GDPR follows more stringent rules, companies are required to comply with the regulations.</li> <li>- Compliance with the GDPR slows the growth of companies and poses restrictions when developing new technologies.</li> <li>- The regulation to report their social and environmental impact serves as a motivator for some companies to rethink their strategy.</li> <li>- Campaigns that promote sustainability are initiated, but the main focus of large IT companies will be centred on delivering innovative technologies.</li> </ul>
<b>Economic factors</b>	Economic downfall	<ul style="list-style-type: none"> <li>- There is an increase in the unemployment rate due to jobs being automated, causing a decrease in purchasing power.</li> <li>- An economic downturn induces tighter budgets within companies resulting in less investments into non-core functions.</li> </ul>
	Investors	<ul style="list-style-type: none"> <li>- Investors are more focused on generating profit and receiving returns.</li> <li>- The customer and the overall business are at the centre of the thinking of the investors.</li> </ul>
<b>Social factors</b>	Attitude towards having an online presence	<ul style="list-style-type: none"> <li>- The high dependence on digital devices and being online is reinforced by communicating with chatbots in various parts of life.</li> <li>- Social interaction between humans is now partly replaced through human and chatbot interaction.</li> <li>- Through technological advancements, immersive digital experiences can be shared online through digital avatars.</li> </ul>
<b>Technological factors</b>	Role of AI	<ul style="list-style-type: none"> <li>- Increased use of AI</li> <li>- AI is implemented to increase productivity and efficiency within companies, reaching more personalised services for customers.</li> <li>- AI replaces human interaction through the application of chatbots in various areas of life.</li> </ul>
	Data identity	<ul style="list-style-type: none"> <li>- Businesses invest more financial resources in the training of their employees to secure their operations.</li> <li>- Security threats pose risks since valuable personal data can be retrieved from innovative devices (e.g. wearables).</li> </ul>
	Digital skills & design skills	<ul style="list-style-type: none"> <li>- A high number of startups with technological innovations emerge, so users need to be able to master advanced digital skills.</li> <li>- The gap in differing skill levels between the old and the young generation is bridged.</li> <li>- Businesses design their products and services to provide an optimal user experience.</li> </ul>
<b>Environmental factors</b>	Effect of e-waste	<ul style="list-style-type: none"> <li>- Specifically, SMEs in IT often lack deep knowledge about issues relating to sustainability and climate change.</li> <li>- Digital devices are used for a short duration before they are replaced by newer devices.</li> <li>- There is a shortage of e-waste recycling options and incentives for consumers to safely dispose of digital devices.</li> </ul>
<b>Values</b>	Co-sharing & collaboration	<ul style="list-style-type: none"> <li>- Co-sharing is driven due to necessity and cost efficiency.</li> <li>- Materialism &amp; ownership are the core values.</li> <li>- Businesses collaborate to increase profit, but competition between businesses continues.</li> </ul>
	Business orientation	<ul style="list-style-type: none"> <li>- Businesses value increased effectiveness and productivity.</li> <li>- The consumer is at the centre of businesses.</li> <li>- Linear economy</li> </ul>

**Usage of AI tools**

The basic version of Grammarly was utilised in this thesis to correct grammar mistakes during the editing process.