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Finland: AI, policy innovation and the future of work and learning

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Abstract

Finland is perceived as one of the most innovative countries in the world, resting on high trust, well-being and global engagement. In a small open economy, the ability to navigate and build strategic relations in a growing economic and geo-political complexity, strategic foresight has over time become deeply embedded in policy making. Through the lens of the Finnish AI strategy process and the recent continuous learning reform, the paper discusses the deployment of foresight as a means to address critical uncertainties and plausible futures as means of long-term policy making. Secondly, the paper illustrates that even though Finland has built substantial futures capabilities, challenges remain when it comes to policy implementation. Issues emerging relate to who is invited to the table and the latent risks of groupthink. More importantly however, Finnish experiences suggest there is a need to consider how foresight methods can inform policy implementation processes, and what that would entail in terms of institutional arrangements and capabilities.

Keywords: foresight in policy making | AI Strategy | lifelong learning | digital transformation | futures of work

Introduction

In the international literature Finland has been one of the top performing economies and education systems for more than two decades. Its innovation performance rests on a high trust model of business innovation and quality public services funded through the public purse in areas such as education, research and social welfare. Today, the sustained success of its approach now depends on creating the building blocks for a better future of work in a context of rapid technological advances in AI and related technologies, where it seeks to be a world leader of human-centred digital innovation. Finland therefore provides a unique opportunity for understanding the narratives, policy interventions, which shape perceptions the future of work and education in Finland. This working paper provides an overview and discussion of policy interventions in Finland in the context of future of work, and it was prepared as the basis for data collection in Finland.

Developments in Finland - evolution of policy thinking

Until around the 1950s Finland was primarily an agrarian economy. The industrialization of Finland commenced in the 1970s through massive public investments in forestry. Parallel to these developments Finland saw reforms of its basic education system (Centre for Public Impact, 2019). By the 1980s Finland had built unique capabilities in forestry technologies and services. As the companies became more specialized and the technology base more complex, the dependency on human capital and a well-functioning labour market grew, leading to the foundation of the Finnish welfare state (Sahlberg, 2009). However, the economic and social progress rested on a strong dependency on the Soviet Union as an export market, so when the Soviet Union collapsed a deep economic recession with high unemployment followed

(Taron, 2006). To regenerate the economy the Science and Technology Policy Council was created in 1996 to stimulate job creation and growth through broad based innovation policies and with ICTs, which had evolved from the forest industries, as a perceived new lever of innovation (Halme, et al., 2014).

The period that followed after the collapse of the Soviet Union was characterized by austerity policies with major cuts in public expenditure apart from investments in public-private research and innovation partnerships. From the mid-1990s onwards, Finland saw a marked growth in the ICT sector, with Nokia as its flagship with government in a central steering role as an advanced buyer of ICT services through public procurement, and through policies to improve framework conditions for the emerging ICT industries notably through regulation, investments in digital infrastructures and education where degree programmes were established to meet the needs of the new electronics industry. The *Finnish miracle* had also become the DNA of the Finnish identity (Sabel & Saxenian, 2008).

The macro-oriented innovation policies were complemented by micro-oriented policies with focus on enabling framework conditions, notably with an emphasis on human capital and its role in productivity and growth. For that purpose, the TYKES program (2004-2009) (TYKES, 2004), was implemented aimed to improve human capital management practices in companies by addressing the demand side factors which impact a firm's motivation to invest in their workforce as a strategic asset (Alasoini, 2019). The program laid the foundation for a human centric understanding of digital innovation, which continues to characterise Finnish policy making in its emphasis on organisational learning and skills utilization.

The policy interventions played a central role in repositioning Finnish firms as global leaders in mobile technologies and in forest technologies accounting for 40% of the export and 8% of the Finnish GDP, and with substantial spillover effects also to growing engineering industries (Halme, et al., 2014, p. 40). The evolution of the Finnish innovation economy was strongly intertwined in a human capital logic and the rationale of the welfare state in shaping the human resources base from early childhood interventions to lifelong learning (Miettinen, 2013; Andersson, et al., 2016).

Globalization and steps towards a service-intensive innovation economy

Over time the nature of competitiveness changed, which put a squeeze on Nokia, and caused by developments in software as a service for both professional and leisure purposes - and with new players in the field such as Apple and Google and South Asian companies like Huawei and Samsung. Digital servitisation brought the kingdom of Nokia to an end, and exposed the limitations of a "picking winners" innovation strategy, which had characterized Finnish policy making, failing to recognize that the fall of Nokia marked a disruption of business models and value creation (Linden, 2021, pp. 167-176; Zysman, 2004).

Following Nokia's fall Finland saw again a substantial shift in innovation policies from sectoral priorities to an emphasis with more decentralized approaches to cross-sectoral experimentation and collaboration through open models of innovation. The innovation strategy from 2008 represents an explicit recognition that Finland as a small open economy must be deeply embedded in global value networks, and key to future competitiveness is therefore a question of "*which areas of competence are the ones in which Finland is able to provide added value and become a country in which it pays to invest in order to be able to share such competence and as a means of building a globally renown brand*" (Ministry of Economic Affairs and Employment, 2008, p. 7). Subsequently, a more networked view and demand orientation has characterized Finnish innovation policies since 2008 with a stronger emphasis on entrepreneurship and the capabilities to exploit knowledge capital, and hence also a need for policy coordination, notably education and labour market policies (Aho, et al., 2008; Ministry of Economic Affairs and Employment, 2008).

An educational policy that supports innovation activity would enhance top expertise and extensive competence simultaneously, regarding them as parallel targets. Alongside theoretical competence, innovation activity needs many other abilities created by the educational system, including interactive skills, professional expertise, art and cultural competence and manual skills. On the basis of foresight results, education must undergo continuous re-targeting in order to correspond with the changing needs of competence requirements (Ministry of Economic Affairs and Employment, 2008, p. 31).

The innovation policy framework aimed to spur the creation and growth of companies with an internationalization potential to mitigate over-dependency on a few industrial locomotives (Stenholm, et al., 2008). To address inefficiencies in innovation and entrepreneurship capabilities incubators, innovation platforms, and enterprise accelerators, were created to stimulate the deeper linkages between the higher education system and companies. These outreach and linkages mechanisms were complemented by reforms in the higher education system that led to a number of mergers to better exploit opportunities emerging from digital transformation and globalization.

Changes are also seen in the traditional manufacturing industries, especially machinery and equipment, as they now embrace a strategy of product servitization. In order for Finnish firms to successfully navigate this changing landscape, digital transformation is not merely perceived as a change in technology base *for Industry 4.0 and the internet of things*; the ability to understand and navigate in a changing market through agile organisational practices and more open forms of collaboration is perceived as a critical factor which calls for new leadership practices (Tihinen & Kääriäinen, 2016; Jari, et al., 2015). Parallel to these developments, a range of new platform-based businesses has been developed around the concept of circular economy (SITRA, 2017).

Policy governance has evolved with an emphasis on strategic agenda setting and a more active form of governance with a broad involvement of stakeholders as a means of consensus building across stakeholder interests. Here 'futures thinking' has become a central policy tool.

Futures thinking in Finnish policy making

The use of futures methodologies was first introduced in Finnish policy making in connection with the economic crisis in the 1990s with the creation of the *Parliament's Committee of the Future*, although prior to the financial crisis there was a culture of futures-making in Finland such as the Finnish Society for Futures Studies (1980)[1,2]. The Committee's main task is to prepare Parliament's response (Parliament's Future Report) to the Government's reports on the future so that the Finnish Government and Parliament can have a diverse perspective on important policy themes and explore different policy alternatives at an early stage prior to policy making processes (Parliament of Finland, n.d.; Finnish Committee for The Future, 2013).

As part of the governance structures, the Finnish Government produces a report on the future during each electoral term. The futures report is intended to identify issues that are perceived central to decision making and require thorough exploration. The reporting is structured in two parts. The first part aims to create an understanding of plausible future developments around a certain topic. The second part focuses on key challenges and uncertainties identified and explores possible solutions. During the prior government a report on the *Future of Work* was published. The first Government Report, *A Shared Understanding of the Transformation of Work*, spells out plausible scenarios which could challenge the foundations of the Finnish

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[1] https://www.tutuseura.fi/english/
[2] For a more detailed coverage of the Finnish methodology see: (Heo & Seo, 2021)

welfare model, but which could also open up opportunities aligned to central values in the Finnish society (The Prime Minister's Office, 2017b). The second report, - S*olutions to the Transformation of Work* - outlines pathways forward and envisions an AI-intensive economy that enables augmentation of humans: "*the great promise of artificial intelligence is that people will be able to combine their skills seamlessly with both machines and other people* (The Prime Minister's Office, 2018a, p. 26).

The thrust of the two reports is to spell out and create a shared understanding of complex challenges looking ahead to calibrate a future societal model that can sustain innovation opportunities afforded by platform-based business models without erosion of the tax system, and hence the economic foundation for the Finnish welfare model (The Prime Minister's Office, 2018, p. 38). Lifelong learning is seen as a policy lever that could reduce risks of inequity, but that changes will be needed to allow for learning spaces that spur meta skills development and continuous learning opportunities throughout life and as key to employability (The Prime Minister's Office, 2018, p. 12).[3]

In response to the Finnish Government's Future of work reports, the Standing Committee of The Future proposed to further examine future jobs that could emerge from AI applications and in that process ethical challenges emerging from changes in work processes and technology adoptions should be examined. On a similar note, it is proposed to assess the resource implications if Finland is to keep its global status as a technological pioneer (Committee of the Future, 2018, pp. 83-84).[4]

The Standing Committee of the Future is comprehensive in its analysis of the future of work and the potential impacts and critical uncertainties associated with the diffusion of AI, which ultimately could challenge the economic and social fabric of the Finnish society and the materialization of a human centric AI-intensive scenario of the future of work. The reports lack detail when it comes to spelling out what a human centric pathway would entail strategically and operationally, given that Finland is a small open economy, highly networked in global value chains (The Prime Minister's Office, 2018a, p. 21). Nevertheless, the 'Futures' reports may play an important agenda setting role in Finnish society.

In 2021 the Standing Committee of the Future produced a new report which frames the future of work and lifelong learning in the context of the UN's Sustainability Goals. One of the key messages of the report is that technological diffusion of radical technologies will not automatically support sustainable development, but hinges on policy choices and strategic decisions across the society, going beyond traditional and more narrow metrics used to assess technologies such as carbon footprint. The committee suggested that policy options should be analysed through the lens of socio-economic ecology interlinked to the work and everyday life of people in a way that creates new ways of doing things, taking into consideration global connectivity, well-being, and sustainability as a global agenda.

Some of the key messages are that opportunities for acquiring professional skills will be improved when access to information networks enables telepresence and crowdsourcing and personalised learning and guidance is supported by AI. Developments in technologies are also expected to improve conditions for micro-entrepreneurship, for example through location independent manufacturing technologies facilitated through the increasing use of location-independent production technologies such as 3-D printing (Standing Committee of the Future, 2021).

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[3] See also the most recent foresight event FinnSight 2020 foresight forum, https://valtioneuvosto.fi/en/-/10616/finnsight-2020-foresight-forum-explores-the-finland-of-future-generations

[4] See also (The Standing Committee of the Future, 2021) for a deeper understanding of how futures methodologies are framed in the Finnish society in their response to the European Commission recent foresight report on European resilience.

In December 2019, there was a change of government. In the spring 2020, the office of Prime Minister Sanna Marin initiated the preparation of a Futures Report. As part of an aim to engage a wider audience, especially of younger people, she adopted a new model of local consultation and engagement across Finland[5]. The first part of the report was expected to be published in the second half of 2021, and the second part autumn 2022. As of September 2022, neither part had been published, possibly due to the impact of Covid and more recently the Ukrainian war.

Futures thinking and skills anticipation

Futures thinking is also engrained in Finnish education and lifelong learning policy development. A great wealth of anticipation tools and processes are employed throughout the country, focusing on different governance levels and using different methods and time-horizons. The Government Institute for Economic Research (VATT) undertakes a long-term structural forecast through the VATTAGE (econometric model). Since 2017, the new National Forum for Skill Anticipation (*Osaamisen ennakointifoorumi*) has served as an expert body for skill anticipation, and coordinates nine sector-specific anticipation groups. Nine anticipation groups are responsible for the anticipation of competence and skill needs in their specific sector, the development of recommendations to improve education and training, and further research. Each anticipation group is composed of the social partners, representatives of educational providers, trade unions of teaching staff, researchers, and members of the education administration. The model is similar to approaches in Denmark for labour market training.

The anticipation process involves a series of five workshops, supported by preparatory exchanges on electronic platforms and a series of background studies. The VATT industry forecast[6] estimate of workforce demand until 2035 is one of the key inputs to the exercise and is adjusted using qualitative information (OECD, 2020b)[7].

At the regional level, anticipation is carried out in regional councils and centers for economic development, transport, and the environment (ELY Centers). These anticipation measures typically have a shorter time duration and are meant to address labour market imbalances.

In 2017 steps were taken to simply processes through a new structure with nine sectoral groups constituting the Skills Anticipation Forum. Although the Finnish skills anticipation approach is participatory and based on mixed methods that provide rich data sets and a long-term perspective, the sectoral approach has its limitations.

- The methods adopted by the Skills Anticipation Forum are highly resource-intensive and are not suitable to capturing issues linked to cross-sectoral changes.
- As a small open economy, the supply and demand of skills cannot merely be understood within a national context, but needs to take into account the dynamics of global value chains.
- The dissemination of anticipation studies occurs at times with substantial delays, which could be critical particularly in sectors that are technology intensive
- The outcomes of the anticipation studies do not take into account skills deployment in a context and how the demand for skills is ultimately impacted by enterprise strategies and work organization practices. The result is that the anticipation studies are rather generic, which could be one reason for a limited uptake by companies and education providers, raised as an issue by different stakeholders.

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[5] For more information on the Timeout method and tools, please see: https://www.timeoutdialogue.fi/tools/
[6] https://vatt.fi/en/frontpage
[7] Chapter 3

New data-driven approaches to skills anticipation

In the Tampere Universities' community, an artificial intelligence-based tool is being tested with the aim of identifying individuals' skills and competences and comparing these with the needs of working life, and to explore artificial intelligence (AI) as a tool which can enhance the matching of student learning outcomes with labour market needs. To that end the university has implemented an action-learning-based research project ending in 2023, piloting a tool developed by the Finnish AI company HeadAi[8] together with social science, business, and ICT students at Tampere University and the Tampere University of Applied Sciences (TAMK). Based on various textual data sources, the tool compiles students' competence profile. HeadAi uses AI (natural language processing algorithms) to analyse job advertisements and extract real-time information on the demand for skills in the labour market. This information is then compared to the skills conveyed in existing education programs, extracted from curricula and study programs. Both skills demand and the skills supplied through existing education programs are visualised in competence maps. Findings regarding the value added are so far mixed. While the method seems to work well in ICT-related fields, this is not the case when it comes to humanities and social sciences, likely because the curriculum is more generic and not tied to any specific occupational roles. Moreover, taxonomies for ICT skills are more developed than for other fields. (Tampere University, 2020; Äyväria & Hirvikoski, 2021).[9]

Finnish AI policies

Parallel to the Futures of work reports, the Finnish government set the goal of making Finland one of the top countries in the world in AI applications. It subsequently appointed an expert group to prepare a proposal for Finland's AI Program[10]. As the work progressed, the following reports were published:
- Finland's Age of Artificial Intelligence – Turning Finland into a leading country in the application of artificial intelligence (Ministry of Economic Affairs and Employment, 2017);
- Work in the Age of Artificial Intelligence, Four perspectives on the economy, employment, skills and ethics (Ministry of Economic Affairs and Employment, 2018);
- Leading the way into the era of artificial intelligence: Final report of Finland's Artificial Intelligence Programme 2019 (Employment, 2019a).

First AI report – setting the agenda

Finland's age of artificial intelligence – Turning Finland into a leading country in the application of artificial intelligence - spells out a positive vision for Finnish life in an AI-intensive economy:

"In another five years' time, artificial intelligence will be an active part of every Finn's daily life. Finland will make use of artificial intelligence boldly in all areas of society – from health care to the manufacturing industry – ethically and openly. Finland will be a safe and democratic society that produces the world's best services in the age of artificial intelligence. Finland will be a good place for citizens to live and a rewarding place for companies to develop and grow. Artificial intelligence will reform work as well as create wellbeing through growth and productivity" (Ministry of Economic Affairs and Employment, 2017, p. 14).

Even though the report discusses the potential effects of AI in terms of job polarization, it underlines that if AI applications are made available to as large group of the population as possible it could lead to a more equal society. The argument rests on the assumption that AI

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[8] https://headai.com/
[9] See also HeadAI (2022) Future proofing skills with open data and semantic AI https://headai.com/wp-content/uploads/2022/01/headai-futureproofing-skills-with-open-data-and-semantic-ai.pdf
[10] https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/160391/TEMrap_47_2017_verkkojulkaisu.pdf

can enable that more complex jobs could be easier to learn to master, and this could offset eventual skills biases. Through intelligent and intuitive interfaces and tools the worker could receive real-time visual and auditory support as piloted in industry 4.0 contexts (Brunetti, et al., 2022; Automatica, 2022). The policy response to a more AI intensive economy is a reform agenda in the education system (Ministry of Economic Affairs and Employment, 2019a, pp. 38-39).

Second AI report - the role of institutions

The second report - *Work in the age of artificial intelligence, four perspectives on the economy, employment, skills and ethics* - is a collection of four main articles that discuss the effects of artificial intelligence on employment and transformation of work in a context where an advanced adoption of AI across the public and the private sector is perceived as an imperative for future prosperity (Ministry of Economic Affairs and Employment, 2018). The report underlines reforms will be needed in the education sector to enable Finland to develop a competence base in order to fully embrace opportunities afforded by AI (ibid). The report concludes that automation effects of AI will lead to skills obsolescence in some areas, but it also underlines employers must be ready to engage with employees on renewal of job tasks as a strategic choice, which can pave the way for a scenario of augmentation with employees being able of undertaking more complex tasks or entirely new jobs augmented by AI applications. The report underlines a labour augmentation scenario also hinges on policies where innovation funding is targeted at *at innovations that generate new types of production, as they create new tasks and jobs rather than being deployed to further automation.* (ibid p 36).

The second report foresees that AI could accelerate the transformation of business models towards platform businesses. It is noticeable the lens on the platform economy is mainly informed by early thoughts on *a sharing economy* which would facilitate new forms of enterprising (ibid p. 29). The narrative of the successful adoption of AI is presented as a matter of adaptation of existing institutional structures. Education and lifelong learning policies are extensively covered, and have since been followed up by an OECD assessment of the Finnish continuous learning system (OECD, 2020b)
While the report recognizes that multinational platforms could undermine the government's tax base which lays the foundation for the Finnish welfare economy, it does not into a great detail in covering issues such as how developments in the platform economy could ultimately erode labour relations and impact the quality of the trust-based hybrid and remote working practices which are deeply engrained in Finnish society (Akava, SAK et al., 2019; Poutanen, et al., 2020; Gacia, et al., 2022; OECD, 2021). However, although Finland is rated as a country with a high trust in public institutions and governance structures, the OECD found the country is on a downward trajectory. How the future of work and the nature of labour relations unfold could in that respect shape the social fabric of the Finnish society. At present the Institute for Occupational health is undertaking a research study to explore which kinds of operating models platform companies use in their operations in Finland, and how workers perceive the fairness of their work and how the fairness of platform work could be promoted (Institute of Occupational Health, Finland, n.d.) with around fifty Finnish platform companies in operations in 2022 (Finnish Institute of Occupational Health, 2022).

Third AI report - opportunities ahead

The third report concludes that AI technologies are developing at such a speed and are moving into a third wave so that Finland must take action (Ministry of Economic Affairs and Employment, 2019a, p. 28). The report states that debate about the ethical consequences of AI should not lead to delays in implementation. Instead, AI implementation needs to be approached in ways that balance data privacy with the benefits to be accrued across Finnish society. Whereas the second report touches on broader societal challenges associated with

AI and how to address these, the third report is largely focused on how Finnish society can harvest the full growth and competitiveness effects of AI as the foundation for the future Finnish welfare society. In that respect the report presents a narrative of technological optimism presented as a scenario that could pave the way for a human centric trust-based AI society.

In the Finnish context, human centric AI is founded on quality of data in the underpinning algorithms, solutions that are of benefit to people and are meaningful and ethically sustainable, along with the use of soft regulation in the form of standards and certifications. It is characteristic for the Finnish model of adoption that users are involved early in the development. One example provided by a Finnish AI expert is how AI is used in recruitment: "*When artificial intelligence makes assessments on how well a person is suited to a position, for instance by analysing micro-expressions on the person's face, then there's reason to consider whether it will lead to discrimination, and how that could be avoided*" (Välimäki, 2019).

The third report, *Leading the way into the era of artificial intelligence*, (Ministry of Economic Affairs and Employment, 2019a) foresees an adaptation of the social security system in ways that promote employee welfare (the augmented view of AI). To that end it is proposed that national action plans on AI must prioritize AI innovations that complement human capabilities. Moreover, it is underlined that implementation of AI must be underpinned by changes in work organization and social security systems, stating that only in this way can the full productivity and welfare effects of AI be reached. It is interesting to see that in contrast to Denmark, where policies to accelerate automation have been seen as key to future prosperity and the Danish welfare model, the Finns have a more nuanced view in that respect. The Finnish AI strategy and policy discourse underline a need for wider policy coordination than is seen in the other Nordic countries, reflected in the proposed steps for action following the publication of the final report in 2019. As part of the process of preparing the final report, an international expert group was invited to comment on the strategy, becoming the spearhead legitimizing the technological 'push' policy agenda of the Government: "*Artificial intelligence is conquering the world, and the opportunities offered by artificial intelligence have been globally recognized." Leading the way into the era of artificial intelligence*, (Ministry of Economic Affairs and Employment, 2019a, p. 22).The recipe for success is in many ways a continuation of Finnish techno-optimism that technologies should be embraced through *pioneering projects to shape artificial intelligence the way we want* (ibid, p. 9-10). Ways to build trust are embedded in the Finnish tradition of governance of change processes through involvement, and also in an AI-context it is understood as a process *in order to make the Finnish society AI-ready* (ibid, p. 10). The report states that also *people with limited technological insight should be part of the discussion*. However, whereas the report includes a number of cases that provide a rationale for a cross-sectoral business value-added, this is less the case when it comes to wider societal benefits.

Key recommendations from the experts consulted illustrate the tensions between democratic processes and the technological push rationale (ibid, p. 35). The report states that the expert panel "*proposes that a balance must be found between the protection of privacy and other rights of the citizen on the one hand, and the benefits generated by artificial intelligence on the other*" (ibid, p.35-36), without addressing what that really entails in a Finnish context.

In the third report (Ministry of Economic Affairs and Employment, 2019a), a vision of Finland 2025 spells out a positive future where all potential challenges related to AI seemed to have been overcome, which could be questioned given the global dominance of USA and China regarding the research and innovation effort in AI:

"In 2025, in the age of artificial intelligence, Finland is a trusted and safe digital economy pioneer. A balance between the interests of individuals, companies and society has been found in the use of the new technology, which also means that AI is used in an innovative and

ethically sustainable manner. An advancing regulatory environment encourages parties to test and introduce new practices. By constructing a strong and distinctive digital economy, Finland is at the forefront of European development and is also exporting its model to the rest of the world (ibid p.120) […] *By 2025 in the age of artificial intelligence Finland can also be the most relevantly educated nation, which will provide us with protection against the technological wind of change"* (ibid, p. 121).

AI as a trusted technology is deeply engrained in the Finnish vision of an AI-intensive society. With the advance of a global platform economy and the strengths of the big techs setting both the research and implementation agenda for AI - none of them being Finnish - it is a hard to see how the Finnish vision will come to play a globally leading exporting role in the rollout of a human-centered AI trajectory, and whether the Finnish investment in education, training and lifelong learning can counteract inherent risks of *technological unemployment*. January 2022, the unemployment rate in Finland is at 6.7%[11], compared to Denmark at 1.2 %[12] with low skilled Finns in particular impacted by the automation effects of a high-tech economy (OECD, 2020). As the Finnish economy begins to pick-up following the pandemic growing skills mismatches are reported (Kostiainen, 2021). [For an overview of the timeline of AI policy initiatives please see Annex.] As part of the preparation of the third report a policy brief was commissioned to take stock of the Finnish AI competence base measured by the number of publications in 10 sub-fields of AI, the diffusion of AI technologies according to sub-fields across the private and the public sectors, and the number of courses and programmes offered by higher education in each of the sub-fields. The policy brief concludes that Finland in general is on par with similar countries (Ailisto, et al., 2019). It is noticeable that the report does not include an assessment of the competence base in the vocational education system, given the relative importance of advanced manufacturing in Finland and even though the third report explicitly recommends taking *account of the opportunities to use AI and its impacts on various work tasks in vocational education and training as well, to enable creating solid foundations for applying it in working life* (Ministry of Economic Affairs and Employment, 2019a, p. 73).

Implementation of the Finnish AI strategy

Since the launch of the Finnish strategy for AI, the concept of *the citizen's AI assistant* - somewhat similar to the commercial digital assistant SIRI - has evolved into an AuroraAI program led by the Ministry of Finance (Ministry of Finance, 2019a). A key aim of the AuroraAI is to enable the real-life testing and development of an ecosystem of human-centric services targeting both citizens and companies through their involvement, in addition to the involvement of public sector actors and NGOs (Ministry of Finance, 2019b). One of the user cases envisaged is that citizens will be able to continuously monitor the relevance of their skills and be informed when they need updating, and to receive support through the systems in conjunction with job search and job applications.

The AuroraAI initiative is set in a context where the Government aims to improve the efficiency and reduce costs in public sector services through AI-enabled automation, whilst discussions about privacy and ethical issues related to AI have grown in Finnish society. Digital upskilling is therefore seen as a key parameter in ensuring a human centric and participatory approach to AI uptake.

The implementation plan for AuroraAI 2019- 2023 foresees that "*all citizens should have strong information literacy skills: the ability to source, interpret, understand, modify, produce, present and use information and assess its usefulness and accuracy. Creative use of information requires internalised knowledge and comprehension. Competence development also requires the ability to understand ethical questions relating to the use of information and*

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data. People will need to be able to make informed personal decisions in a digital world. And more generally, from the point of view of both inclusion and trust, competence development is also needed in areas such as data and platform economies, data protection, cybersecurity, use of personal data (MyData) and new technologies (Ministry of Finance, 2019b).

In 2020, Finland launched the Artificial Intelligence 4.0 program (AI Finland program). The aim is to respond to the specific challenges regarding digitalization in Finland, such as the relatively low levels of investments in digitalization, the regeneration of value creation in small or medium sized enterprises, and the need for strategic leadership in the fourth industrial revolution. It is based on the results of the AI Finland program and aims to promote the implementation of Artificial Intelligence as part of the Fourth Industrial Revolution, while also endorsing the new skills demanded during this digital transition. In the Artificial Intelligence 4.0. program, AI-technology is combined with a wide range of other digital technologies such as IoT (Internet of things), 3D-printing, robotics, quantum computing, and virtual and augmented reality. Together, these digital technologies enable change in the general functioning and practice of businesses, regenerate value creation, enable the detection of societal challenges, and encourage sustainable growth (OECD AI policy Observatory, 2020a; Sivonen, 2017).

To stimulate the uptake of AI technologies at the enterprise level, a tool was launched so that companies can assess and benchmark their AI maturity (Saari, et al., 2019). The question is, however, whether the model in fact mirrors the more open and exploratory approaches to AI adoption which is seen across sectors of the economy. A recent study of Finnish companies and their views on the platform economy suggests that businesses in general perceive the platform economy as an opportunity that could promote a more circular economy. However, some concerns have been raised regarding the mitigating effects of national and European regulations given the 'rules of the game' of the platform economy are defined by players in the USA and China, and the technology trajectories are in no way linear, and interdisciplinary research is therefore needed to fully understand and capture impacts and potential risks (Auvinen & Koivisto, 2020; Mucha & Seppala, 2020).

A central tenet of the Finnish AI strategy is that if Finns are going to embrace AI and the potential transformative effects AI may have on the Finnish society, the population at large must understand what AI is not only as workforce and/or future workforce, but as citizens as well. The premise is that if people do not understand the properties of AI, then mistrust will grow. Following the publication of the third policy report on AI described above, the Finnish consultancy company *Reaktor* and the University of Helsinki came up with a joint proposal on how to kickstart the uptake of AI in the wider population. The idea was to start teaching 1% of the country's population, or about 55,000 people, the basic concepts at the root of artificial intelligence technologies, and gradually from there increase the number over the next few years (REAKTOR, n.d.).

The course is designed as an open online course offered for free. During the first 9 months more than 140,000 Finns signed up. So far around 40% of participants have been women, more than double the average in computer science courses. Over 25% of students are over the age of 45. Since the course was launched, the Finnish Government has offered it to free of charge to EU Member States. By early May Finland had published the course in 21 languages, with Latvia being the first foreign country to implement the course (Finnish Government, 2021). Finns see it as an example of how AI policies can promote inclusion.

Most recently the Finnish Government commissioned a study to the Finnish think tank Demos to prepare an assessment framework for AI. The assessment framework combines the evaluation of discriminatory risks of AI systems with the promotion of equality. It thereby seeks

to aid governments and public officials to steer technological innovation and development while protecting the fundamental rights of citizens (Ojanen, et al., 2022).[13]

Finland's 'trust' in AI for all - policy tensions?

In all the Nordic countries trust is deeply ingrained in the societal fabric and its institutions. In the latest global scoring of happiness, Finland comes out at the top with Iceland and Denmark respectively second and third, and Sweden and Norway as number 6 & 8 (Helliwell, et al., 2021). Finland and the other Nordic countries as preferred destinations for living and working is extensively used by the Finnish Government, both in the national and the international narratives. Much is therefore at stake in the government's strategizing effort around AI, as the risk of eroding trust at the very foundation of social systems in Finland is potentially substantial, given the problems machine-learning and data-driven models pose in terms of a "black-box"- the challenge of explaining the logic and results of data-driven models of AI algorithms.

It is therefore interesting to understand how Finland has approached this potential policy tension. Having described how Finland was among the first countries to launch an Artificial Intelligence Program (Finnish Government, 2017a; Ministry of Economic Affairs and Employment, 2017), a report was published on the progress made during the program, with recommendations for future actions (Ministry of Economic Affairs and Employment, 2019a). The 124-page report plus annexes mentions the word *trust* 235 times, transparency 128 times, and ethics 78 times, whereas involvement of citizens only appears 4 times.[14] Underpinning the message of trust is a series of cases aimed to reassure people that AI is not something radically new and is in fact already implemented across Finnish society, indirectly suggesting that the government will be able to shape an AI-intensive society in a human centric way and stating that artificial intelligence should be seen as a "*means of reinventing society and increasing citizens' participation in decision making and participation processes*", but this report does not offer any clues as to how that would occur (Ministry of Economic Affairs and Employment, 2017, p. 39).

Futures thinking framing reforms

In April 2021, the Finnish Government submitted its plans for future education policy to Parliament (Julkaisumyynti, 2021), based on extensive public consultation. As part of the consultation an open brainstorming forum was launched, and it generated more than four thousand responses. During its preparation policy-makers met with stakeholder groups all over Finland (Ministry of Economic Affairs and Employment, 2020). It included targets for education and research looking ahead to the 2040s, and the necessary changes in resources, structures, and guidance, to achieve the targets set. In a Nordic context, the systematic use of futures thinking is unique to Finland. It not only provides a guiding framework for policy planning, but just as importantly, the use of extensive consultation, is a consensus making mechanism in terms of identifying which issues are at stake and in terms of defining common grounds for plausible and feasible policy measures in the short to medium term.

Recent education reforms

Finland has seen several reforms in recent years drawing on reviews undertaken by the OECD (OECD, 2020e). This includes reforms of the compulsory education system (Drew, 2020), and a comprehensive reform of the Finnish VET system to improve parity of esteem of the VET system (Kartunen, 2018). However, there are concerns that VET reforms have re-enforced the academic/vocational divide by strengthening the role of the matriculation examination at the end of upper secondary-education (Haltia, et al., 2021).

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[13] DEMOS FI 2022: To access the research underpinning the policy brief please see: *Avoiding AI biases: A Finnish assessment framework for non-discriminatory AI systems.* https://demoshelsinki.fi/referenssit/avoiding-ai-biases/
[14] Word count from (Ministry of Employment and Economic Affairs, 2019a)

The Finnish Government has also presented a vison for higher education 2030 through a consultation process with stakeholders (Ministry of Higher Education & Culture, 2017). Subsequently, a roadmap has been presented guiding the implementation of this vision (Ministry of Higher Education & Culture, 2019; Finnish Ministry of Education, 2020a).

The goal is for learners with different status – degree students and lifelong learners to be able to study flexibly, selecting courses from all Finnish higher education institutions, irrespective of organizational boundaries or geographical location. Other measures relating to higher education focus on opening up education to improve flexible learning offered to both Finnish and international students. The vision and roadmap for higher education has since been followed up by *Digivision 2030*. Digivision 2030 is a joint development project between all Finnish universities including universities of applied sciences. The aim is to develop an AI-enabled digital service eco-system, which ultimately would be part of a national centre for continuous learning. From the outset the Government has stated its aim of being a model country for flexible learning, which will likely entail more fluid boundaries between the ordinary provision and continuous education and training. The Ministry of Education and Culture has awarded a special grant of €20 million to the Digivision 2030 project. In addition to the special grant, the Ministry of Education and Culture is allocating €17.8 million from the strategic funding for higher education institutions to the project for the years 2021-2024 (Ministry of Education and Culture, 2021).

A range of large-scale collaborative projects have been initiated to spur further digitalisation in higher education with the aim of mainstreaming innovative pedagogical models and services. One example is the MeDigi project, which was initiated to explore the feasibility of a common national digital online service for jointly produced digital content and solutions for medical and dental education (Levy, et al., 2019). However, there are higher education professionals that are concerned that the Digivision 2030 effort mainly prioritizes flexibility in delivery infrastructures and content, although programme objectives entail the development of a digital pedagogy and guidance based on the learner's pathway and shared data (Ministry of Education and Culture, 2021).

The Continuous Learning Reform

The Finnish continuous learning reform, which is now under implementation, is a direct follow-up of the futures reports from the Finnish Government (Finnish Government, 2018b). The reform was announced at the end 2019 as a direct response to a changing world of work. The continuous learning reform was presented at the end 2020 where a new government had taken office but had continued the reform agenda which as previously mentioned had been agreed through a consensus shaping process in Parliament in 2019 (Finnish Ministry of Education, 2020a; Ministry of Economic Affairs and Employment, 2020). It was led by a *Ministerial Working Group on Competence, Education and Innovation*, representing all political parties in the Parliament, and it was also discussed by a Ministerial Working Group on *Promoting Employment*. One of the key issues emerging was how to engage persons with a lower level of skills and weaker positions in the labour market in continuous learning. Secondly, the working group was charged with finding ways to better diversify and broaden the concept of learning by improved support of learning in the workplace. In preparation of the reform, the Finnish Government undertook a study to assess the structures and process of continuous learning in five peer countries in Denmark, Ireland, Korea, the Netherlands, and Singapore (Oosi, et al., 2019).

Parallel to the other initiatives, SITRA, the Finnish Innovation Fund, convened a working group representing key stakeholders in the Finnish society in a process that started in 2018.[15] The outcomes of that process were a shared vision of where Finnish lifelong learning policies should be heading, and what the key challenges were that should be addressed. Key gaps identified concerns:

- the funding formula, which at present is heavily frontloaded with the majority of public funding allocated to established educational responsibilities;
- the need to have a broader perspective of lifelong learning, laying the foundation in pre-school education;
- a need to ensure coherence between informal, non-formal and formal learning with a greater emphasis on the work place as a learning space (SITRA, 2019b)

Even though Finland, and in general the Nordic countries, have a long tradition of lifelong learning, there is a well-known challenge in the tension between keeping a long-term view and the need to implement reforms within the government's term of office if the reforms require major financial reallocation. The Finnish continuous learning reform aimed to address emerging needs arising from changes in the world of work and to seek solutions to combine work and study (Finnish Government, 2022; Ministry of Education and Culture, 2020a)). The reform is part of the wider government program that was presented by the new government under the heading of "An Inclusive and Competent Finland – a socially, economically and ecologically sustainable society."[16] It occurred in a context where employment rates had improved in Finland, at 72.4%. Since then, employment rates have increased to 76 % as of June 2021 (Statistics Finland, 2021), and ICT industry concerns about barriers to growth due to a lack of high skilled specialists had become more prominent like in other OECD economies (Finnish Ministry of Education, 2019).

In December 2020, the Finnish Parliament adopted a common policy approach to continuous learning in order to promote opportunities for working-age people to develop their competences relevant to the labour market. The reform is aimed to further workplace learning opportunities, and it is underpinned by plans to develop a service system for continuous learning, though it is unclear what the nature of this service system would be (Ministry of Economic Affairs and Employment, 2020). The reform was set in a context of around 300,000 adults who only have basic skills, and a reduction in the number of jobs that only require basic skills (Polo, 2020).

In that respect the latest Finnish reform strategy contains three elements worth noting:

- The policy dialogue and the Parliamentary working group that was formed in advance of the reform involving all political parties focused not only on the content of the reform, but also on implementation process and future funding model. The consultation process aimed to ensure a long-term strategic shared view on the continuous learning reform regardless of changes of government.
- An inherent risk in reform processes is the narrative of being leaders in innovation and lifelong learning, which is deeply engrained in the Finnish identity. To overcome risks of indigenous 'group-think', Finland commissioned the OECD to undertake a review of its lifelong learning processes. Even though the OECD in various contexts again and again has promoted Finland, the review is quite critical in areas where Finland has perceived themselves as leading the way. Examples are the elaborate skills anticipation system in place, but where the OECD finds that in spite of this

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[15] For insights into how they arrived at common conclusion see page 56 (SITRA, 2019b)
[16] Link to government program: https://valtioneuvosto.fi/en/marin/government-programme

Finland has substantial challenges to adopt forward-looking skills strategies due to a lack of mechanisms to use skills anticipation in practice.
- The review also found that in spite of the equity agenda being prominent in the Finnish policy narratives, Finland has the largest gap of all OECD countries between learning participation by adults with low basic skills compared to those with higher skill levels, and this was reinforced by a lack of mechanisms to bring the different services and actors in the space of lifelong learning together in a user-centric service model (Aho, et al., 2008; OECD, 2020b).[17]

Reform elements

The reform of continuous learning examines especially the potential for upskilling, reskilling and developing competence over the course of people's careers. The vision and objectives of the reform are that:
- *Everyone develops skills and competence during their careers.*
- *Everyone has the knowledge, competence and skills required for employment and a meaningful life.*
- *Competence renews the world of work and the world of work renews competence.*

As a central feature of a successful implementation, the reform foresees a digitally enabled distributed continuous learning service system based on a one-stop-shop principle with the aim of improving cooperation between education and training, employment, business services, and networks and to improve skills matching at the regional level. It is foreseen that the digital service infrastructure will be operational from 2023 (Finnish Ministry of Education, 2020b).

It is notable that even though the Finnish policy narrative emphasizes well-being as an overarching value, the reform of the lifelong learning system clearly emphasizes skills for working life, even though both PIAAC and other studies have found substantial wider societal and personal well-being benefits to be accrued from participation in lifelong learning beyond labour market purposes (Schuller, 2017; OECD, 2016).

The renewed Finnish strategy for continuous learning is embedded in the Nordic "high-road" narrative of a responsive matching of skills through collaboration between employers and trade unions as a systemic feature of governance at the national, regional, local, and enterprise level. This incremental approach to renewal reflects the findings of a Nordic study on digitalization effects across a range of sectors which found that Nordic labour markets are characterized by gradual adaptation rather than disruptive changes (Rolandsson, et al., 2020; Juhani; Helaakoski, et al., 2020).

The parliamentary reform for continuous learning is currently being implemented. Central aims are to further work-based learning, to increase system efficiency and responsiveness through clearer horizontal and vertical pathways, and to address issues around funding. As is the practice in the Nordic countries, the reform of continuous learning is implemented through tripartite cooperation with education providers. In Finland, this is underpinned by a National Association of Skills Anticipation (Ministry of Education, n.d.).[18] However, there are widely shared concerns the implementation of the reform will not meet central aims:

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[17] This is now being implemented as a digitally enabled service
[18] For an overview in English of methods, please see
https://minedu.fi/documents/1410845/4150027/Anticipation+of+skills+and+education+needs/d1a00302-8773-bbe0-39a0-46e0d688d350/Anticipation+of+skills+and+education+needs.pdf

- The National Service Centre for Continuous Learning and Employment does not sufficiently take into account the diversity of needs in regional clusters and networks across the Finnish economy.
- An increase in the provision of short courses is founded on a narrow perception of barriers to continuous learning as a supply side gap. Concerns are that this will not enhance institutional strategies and capabilities to explore partnerships with the world of work to promote learning beyond formal settings.
- The implementation of the continuous learning reform occurs disconnected to the Work 2030 programme which addresses demand-side factors that could influence employers' motivation to invest in their labour force as a strategy priority.

The policy rationale of the National Service Centre for Continuous Learning and Employment is a need to increase the supply of flexible provision of short courses based on sector skills studies to stimulate individuals as a *homo economicus* to take upon them the duty to be futures-ready for the labour market. Interviewed stakeholders are concerned it will lead to a supply-driven service mode and an immnent risk is that key stakeholders from both the private and the public sector will perceive the continuous learning reform as having limited legitimacy and relevance due to a misalignment between national policies and the multiple models of continuing learning which are evolving through bottom-up collaboration. To be able to commit to change such as the continuous learning reform and carry it through effectively, anticipatory innovation processes need to be legitimate (Tönurist & Hanson, 2020, p. 102) and this is not perceived to be the case because the governance model of the Centre does not take into account how continuous learning is distributed over multiple actors at all system levels. It could also be the reason why the anticipatory skills intelligence measures are having a limited impact on actors in the continuous learning system at the national strategic, regional, and local levels and across the public and private sector. It is moreover argued the rephrasing the policy reform from an emphasis on *lifelong learning* to *continuous learning* will not contribute to fundamentally challenging the mental models which underpin the current provision and its challenges.[19] Both companies, employer organisations and education providers point to a gap between the visions and ambitions embedded in the continuous learning reform and the nature of implementation. Challenges identified relate to the dominance of the public sector in the actual implementation of reforms and policy strategies, the centralised approach adopted, and a lack of policy coordination between the different institutional players at the national level.[20]

In that respect, it is interesting that SITRA, an independent public innovation fund, represents an alternative transformative scenario on how the visions of the continuous learning reform could materialize. From 2018-2021 SITRA implemented a project to explore lifelong learning and its futures roles in competitiveness and well-being, involving 30 stakeholders from the world of business, education providers, and the public sector. They were charged with elaborating the building blocks for the development of cross-sectional policy for lifelong learning, drawing also on the experiences from a range of pilot projects from across Finland.

The outcome of the SITRA project is a scenario that fundamentally challenges the thrust of the implementation of the continuous learning reform. The report from SITRA (Arola, et al., 2021) states that systemic and sustainable change requires that current structures, relations, and mental models be challenged, including the nature of policy development, resource flows, and power dynamics, and implicit conditions such as mental models and that the existing hierarchical leadership must devolve to envision a shared pathway forward The first report on preconditions to change (ibid) was followed up by a second report published May 2022 (Arola & al., 2022) *Future Skills are Created in Ecosystems*[21] The second report concludes that if a

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[19] Interviews conducted in 2021 and 2022 as part of the research programme

[21] For a summary in English see: (SITRA, 2022)

reform is to drive systemic transformations, actors at all system levels must be involved in a collective process of formulating higher order goals and objectives, while they maintain the flexibility to elaborate their approaches in collaboration with their relevant stakeholders in response to specific circumstances and needs.

As such the collaborative effort of the SITRA project represents a distinct alternative to how the continuous learning reform could be approached. This would have implications not merely on the governance model and the use of anticipatory skills intelligence. The model of implementation would be more iterative in order to learn from bottom-up innovations and integrate this in the policy cycle, and this in turn would have implications on funding models since resources and activities could potentially need to be adapted to accommodate for emerging findings. Ecosystems such as DIMECC and the competence platform Demola represent in that respect dynamic models of how networks may evolve into rich ecosystems of digitally enabled boundary crossing collaborative learning where participants play an active role in shaping the future and the use of digital tools that enable human augmentation. From a business model perspective, the collaborative environments become a rich test and development space for user-centric innovations serving both market and societal purposes due to the multiple perspectives which are put to play in the facilitated learning processes.

Work organization practices and continuous learning

Parallel to- but disconnected from the reform of continuous learning, a new program has been implemented under the title *WORK2030*, addressing changes in work organisation practices and technology uptake strategies conducive to well-being at work and the quality of jobs and workplace innovations. The objective is to make Finland the leading developer of working life innovations and the world leader in well-being at work by 2030. The program can be seen as a long term strategic orientation of Finnish lifelong learning and innovation policies acknowledging that supply side lifelong learning polices will not in themselves further innovation capabilities in society if they are not accompanied by measures which actively support work organisation practices that are based on employee involvement, effective skills utilisation, and well-being at work as a strategic priority (Ministry of Social Affairs and Health, 2021).

The Work2030 program rests on a long Finnish tradition for designing and implementing programs that are conducive to integrative work organization practices, underpinned by views that well-being at work, productivity, and innovation go hand in hand (Alasoini, 2012; Kennisbank sociale innovatie, 2018). However, AI technologies raise another set of questions, challenges, and options when it comes to integrating these technologies in an enterprise context compared to earlier forms of technology-driven change (see for example (Ebben, 2020). Nokia's demise demonstrated the limitations of a government's ability to drive technological innovation through a funding model based on picking selected companies with the expectations they can become motors of technology diffusion and upgrading (Linden, 2021, pp. 167-176; Zysman, 2004). Since then, Finnish innovation policies have tended to focus on improving framework conditions with education policies as a central vector and an emphasis on competence platforms and ecosystems. These are not sectoral constructs, but tend to be based on both horizonal and vertical integration of firms, start-ups, and research environments. The government may play a role as a co-funding body to accelerate developments, but it refrains from a direct role in orchestrating or facilitating the interaction between ecosystem participants. The evolution of ecosystems is a way of overcoming limitations of size, they also function as dynamic internal labour markets, which increase their ability to attract and develop national and international talent. The ecosystems are facilitated by a neutral orchestrator, at times established as a company. At present there are more than 40 such ecosystems, some still emerging, the majority mirroring the diversity of the Finnish regional economy –the city of Tampere for example having a traditional stronghold in manufacturing.

One of the proposals that has emerged in Finland for handling complex digital transformation is that continuous learning activities should be implemented through a network approach to generate shared learning opportunities across firms that are also connected through transactions (Alasoini, 2018). DIMECC, established as an ecosystem company, is owned by forerunning companies in manufacturing and ICT technology and research organizations. DIMECC has developed an interesting model for in-company collaborative learning which has now been deployed for some years. The approach builds on the idea of having opportunities to experiment hands-on with digital technologies in real-life scenarios as a means to explore how work processes can be organised in ways that are human centred and create value from an end-user, employee, and enterprise perspective (Shapiro, 2018).

Box 1: DIMECC

The DIMECC Academy model was first developed in the field of AI, and runs over a period of 2.5 months. The concept is based on a networked and collaborative approach. In a combination of short training sessions and application of learning in the context of the specific firms participating in the training, employees have opportunities to investigate how machine learning could be deployed in their company in a way that would add value. In that process employees explore what kind of opportunities, challenges, requirements are related to the deployment, and they also have opportunities to discuss implications of possible approaches with management, as they draw up a potential project plan for implementation of AI. Through the teaching and learning process participants acquire

- A basic understanding of the principles, methods, abilities and limitations of AI and ML.
- Current knowledge of related tools, commercial implementation and business models.
- Ability to specify, design, and lead activities aiming at applying ML methods, algorithms, and technologies into your business operations
- An Initial plan on when, where, and how you can deploy ML methods and technologies in your business.

Throughout the course participants from the same company collaborate on the project plan stimulating organisational learning linked to complex innovation processes; across companies within DIMECC learners have plenty of opportunities to discuss common challenges and exchange ideas, thereby stimulating the network density of the ecosystem.

Source: Interviews with the ecosystem organisation -DIMECC

Company demands to continuous learning tend to be reduced to a question of hyper flexibility, but the DIMMEC model and numerous interviews with Finnish companies suggest that a key issue is how learning can be integrated in the flow of work in ways so digital transformation and more broadly innovation processes are orchestrated as a collective learning process and in ways that also strengthen existing network collaboration. For universities it opens up opportunities to create stronger synergy between collaborative R& D and innovation and their teaching efforts, but it also poses new demands to academic staff. Not only does it require strong facilitation skills online and face-to-face as a pre-condition to inter-and intra- firm learning. To foster authentic learning opportunities, which also build the capability of company

employees to engage in innovation processes facilitators should have an in-depth understanding of the industry they target in its wider business environment.

Open Platforms

Open innovation platforms (OIPs) have emerged as a new generation of co-creation spaces that bring together companies and other actors in the ecosystem in ways that enable collaboration, experimentation, and knowledge sharing in user-driven forms of innovation. The platforms are often cross sectoral, interactions are often facilitated by a mediating organisation, and data constitute a source of business and services innovation (Rho, et al., 2021). The platforms will often engage both students and end users, and they represent changing models of innovation which are highly conducive to learning due to the nature of interaction that occurs in the design, testing, and feedback processes that occur during the development of artefacts or services, at times in the form of living labs (Raunio, et al., 2018, pp. 62-76).

In contrast, university innovation services have traditionally focused on knowledge and tech-transfer and matchmaking in the early phases of an innovation process, and disconnected from users and the user context.

A reform of state research institutes and research funding occurred in 2014–2017, leading to a number of institutional mergers. This is perceived to have strengthened the strategic capabilities of HEI's to priorities external collaboration. The reform on basic funding for the universities in 2017 moreover had an explicit aim to reinforce government ability to coordinate research policy. However, Finnish higher education institutions have a significant level of autonomy, which has stimulated stakeholder engagement with the region of Tampere, the University of Tampere and Tampere University of Applied Science often being referred to as an exemplary case.

The Tampere Region, a local learning and open innovation platform

The Tampere region is centrally located in southwestern Finland. Together with the capital city region of Helsinki it forms the most dynamic regional economic zone in the country in terms of population growth and investments. The administrative Tampere region has approximately 500,000 inhabitants, of which about half live in the city of Tampere. In 2019 the University of Tampere and the Tampere University of Technology merged to become the second largest in Finland. Other HEI's in the region are Tampere University of Applied Sciences, and VTT, the Technical Research Centre of Finland which has a local base in Tampere with several hundred experts in different technology fields. The Tampere region has a strong multi-disciplinary life sciences cluster with substantial private investments in the growth and innovation of the health, wellness, and biotechnology sectors in recent years, and they have a strong position in ICT and in automotive. Both the city of Tampere and the Tampere region (Regional Council) have fostered a strong place-based innovation platform policy since 2008.

The competence platforms become the nexus for bringing together a diverse group of companies, students, and start-ups in highly localized collaborative processes which focus on the end users and their community. Learning, discovery and prototyping are intertwined through a problem and design- based facilitation process. In that respect the competence platforms become a collective learning and co-creation space for a better living and local prosperity. (Anttiroiko, 2016). The human and social side of such collective learning processes builds on assumptions that a heterogeneous group of people can build solutions that are generally more sustainable because of the embedded diversity in the design process. In that sense the competence platforms with their focus on democracy, and conceptualisation of user-centered wellbeing, and what that entails in terms of empowerment, have the potential to become experimental citizens' labs and vectors of inclusive innovation.

Tampere's current city strategy: *Working Together for a Bright Future -Tampere City Strategy 2025* (Tampere City, n.d.) places emphasis on innovation environments designed to serve particular economic sectors, including the creative sector, ICTs, health technology, and the media sector, and based on a participatory innovation culture. As a reflection of Tampere's need to renew its industrial past by moving it in a new direction, the economic development policies from 2006-2011 were guided by the Creative Tampere program. The program marked a shift in innovation models towards a greater emphasis on creativity, sharing, and co-creation, which was further enhanced, building on the previous strategy OPEN/SMART/CONNECTED with its emphasis on open innovation platforms, open data and interfaces, and open participation.

The cross-sectoral open innovation collaborative platform approach evolved over time into the establishment of *New Factory* in 2012 as a model of collaboration where higher education capabilities were paired with the development projects provided by companies. The New Factory comprises four engine rooms – *Demola, Protomo*[22]*, Suuntaamo and StartupStairs*, which offer students, professionals, growth enterprises, and citizens open access to the New Factory community (Matikainen, 2012). The same people can take on different roles such as developer, entrepreneur, advisor, user, or sparring partner, and participate in the activities conducted in the different environments. The extensive community provides peer support and creates networks and collaborative relationships at no cost. In return, the community expects its members to be enterprising and willing to share ideas. The engine rooms provide a quicker and more affordable platform for processing ideas and start-up companies. For students, participation in projects is a valuable asset in the job markets. For businesses, the community offers an effective, low-risk and low-cost process for carrying out customer-driven and customer-oriented product and service development projects.

Finnish University Property Ltd. (SYK) is also an example of a new type of services company in the Tampere region. It facilitates new forms of collaboration and learning, engaging companies, students, and university personnel in collaboration on solutions to a range of local challenges and opportunities. In this context, companies may make use of laboratory facilities at the university with its physical location on the campus arena of the Tampere University of Applied Sciences[23], focusing also on implementation of solutions. An additional example is Mediapolis, an innovation platform which has grown out of a large local media company; today it is a bustling hybrid space for innovation and learning, and the location for a network of established and start-up companies in digital media and content production, as well as students in higher education and in vocational education and training enrolled in digital media programs. The platform constitutes a hub with strong networks to industry, education, research environments in the media industry, and digital content production and related services around the world. The platform offers a unique learning environment with rich opportunities for students to learn through applied projects and to test innovative ideas in a real company environment.

The open innovation platforms build on the belief of the value of inclusion and that everyone has important contributions to make regardless of their formal knowledge base, because subtle and often tacit insights in user contexts are critical parameters in successful innovation. The exploratory and involving nature of collaboration around authentic challenges becomes a way of building the capability of individuals and firms that have traditionally not put a premium on innovation. In that respect, the open innovation platforms become a pathway to improved

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[22] The four spaces are connected. Protomo provides a range of support services. The idea is that you can bring in a business concept and you will get support free of charge as needed spanning from help with product development and market launch to help with identifying a business team. *Suuntaamo* provides testing facilities; and Startup Stairs is the newest service and provides coaching and mentoring and training for potential start-ups.
[23] https://www.tuni.fi/en/about-us/kampusareena

skills utilization, as the processes engage employees across internal firm boundaries so that they are stimulated to think 'out of the box'. Moreover, through the facilitated processes participants have rich opportunities to develop social and cognitive skills in competence fields that are perceived to be of increasing value, being more robust to the impact of automation.

In a Singapore context the concepts of Open Innovation Platforms such as Finnish University Property and Demola represent promising models in their ways of combining co-creation, collaborative learning, and place-based innovation entrepreneurial capabilities across traditional sectoral contexts, which could be relevant for Singapore. The New Factory platform spans physical and digital interactions and processes in ways that could facilitate students having opportunities to acquire skills conducive to entrepreneurship and innovation.

Box 2: Demola - learning and innovation environment in New Factory

Demola is a global publicly funded open innovation platform of university students, education institutions, organisations and foresight experts driven by common focus on developing products and services as prototypes and setting up experiments with user communities in order to find novel solutions to address real life issues, under the heading "We explore the world out of curiosity to build alternative futures". The set-up is a 3-month project with clear structure and milestones, where students work on the actual prototypes based on a thorough understanding of latent or explicit user demands. In that process students work with companies and selected stakeholders, and supported by the consultancy of a Demola future analyst. Demola takes responsibility for project management, clarification of the deliverables, and the total quality of the project. Students receive experience working in real-life business projects as part of their studies, and companies get new perspectives and ideas. In Finland, Demola is coordinated by a private mediator company, Hermia, which conceptualized Demola in collaboration with Nokia. The first Demola was established in Tampere in 2008; since then, the concept has been extended successfully to Vilnius (Lithuania), Budapest (Hungary), and Oulu (Finland, in 2012). So far, approximately 1,500 students and 100 corporations have participated in approximately 250 projects, of which more than 90% have been claimed for business use.

Source: (DEMOLA, n.d.)

Conclusions

A considerable part of Finland's success in the past was attributable to the long-term commitment to education, research, and technological innovation. While this policy mix is still a top priority in Finland, R&D intensity, educational attainment, and technological innovation are in themselves no longer bullet-proof pathways to long term growth and societal prosperity due to the changing nature of competition and geopolitical volatility in a connected global economy. The impact of these changes is mirrored in Finnish policy making. When Finland held the Presidency of the European Council, it introduced in an October meeting the notion of an Economy of Well-being, which was adopted by the European Parliament (Finnish Prime Minister's Office, 2019). When the new Government took office at the end of 2019, it presented the strategic framework for its coming period under the heading: *Inclusive and Competent Finland: a Socially, Economically and Ecologically Sustainable Society* (Finnish Government, 2019)). In Finland and across the Nordic countries the scoping of policies explicitly refers to well-being as a societal and economic imperative (Nordic Council of Ministers, 2021).

Looking to how Finnish policy making has evolved, the systematic use of futures methods is quite unique to the Finnish model. In Finland, futures methodologies are deployed to grasps with complex societal challenges through a long-term view exploring plausible scenarios of the future. This has been systematically carried out in a way that not only spells out a desirable future, but also addresses critical and undesirable uncertainties as a means to build strategic

systems thinking capabilities. This is for example the case with Finland's strategic approach to AI, which on the one hand seeks to embrace economic growth and innovation opportunity emerging from new technologies such as AI, while on the other hand emphasising that AI enabled economic growth must not lead to reduced equity and institutional trust. In that respect well-being and a digitally intensive future of work are deeply intertwined in the Finnish political discourse. Futures processes can be conducted top-down or they can be based on more participatory methods, the latter exemplified through the approach SITRA more recently adopted to explore how a learning intensive society as a shared reality could evolve through an ecosystem approach (Arola & al., 2022; Observatory of Public Sector Innovation, 2022).

Even though Finland excels in futures methods, the lessons learned from the most recent Finnish efforts to design a long-term post-pandemic vision for Finland raise questions about who are invited to the table in the foresight exercises. Even when futures methods are deployed in ways that address critical uncertainties and risks, they may still serve legitimising purposes and/or groupthink if engagement processes are designed in ways that end up giving voice to those, which represent traditional power structures, and the use of digital channels for consultation purposes may further exacerbate existing inequalities (OECD, 2019; OECD, 2021, pp. 147-156).[24]

Finland has more recently introduced three major strategic initiatives, which have been explored in this paper, and which have been informed by futures thinking:
- The AI strategy: Finland's Age of Artificial Intelligence
- The Future of work 2030
- The reform of continuous learning

The vision is that Finland can become a globally leading country by pursuing a strategy where sustainable economic growth, well-being, inclusion, and quality of work go hand-in-hand enabling a human centred approach to AI transformation. But what will it take for Finland to pursue a trust-based pathway to a more AI-intensive society, particularly when it comes to governance structures?

In Finland futures processes are highly institutionalised exemplified by the Standing Committee of the Future embedded in the parliamentary processes. They may impede *political myopia* as futures methods are a means of exploring plausible alternative views and critical uncertainties at an early stage of a policy cycle. In that respect futures methods are features of anticipatory governance and can sustain an involving, holistic, and long-term exploration of policy alternatives, and an approach to implementation of new initiatives typically based on an iterative model of implementation based on a user journey approach and systematic experimentation. However, to succeed it requires new capabilities among civil servants and models of funding as well as innovations in models of governance to allow for a close horizontal and vertical collaboration and based on user centricity (Tönurist & Hanson, 2020; Observatory of Public Sector Innovation, 2022)[25]. The previous government implemented new approaches to stimulate a systematic approach to participatory policy experimentation, and to sustain such methods different approaches were adopted. The Ministry of Energy offered for example funds up to 10.000 US dollars to stimulate a wider crowdsourcing to gather new insights to approach climate challenges through specific experiments. However, the initiative

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[24] For a wider discussions on models of engagement, see the Finnish government's plans to pilot national dialogues starting autumn 2023 to spur wider citizen engagement in policy dialogues around issues of common concern, and drawing on experiences during Covid 19 https://valtioneuvosto.fi/en/-/10623/new-model-developed-for-dialogues-between-citizens-communities-and-authorities
[25] See (Tönurist & Angela, 2020[25]).for how governments in practice can build anticipatory governance capabilities through a policy cycle

Experimental Finland was closed down when the former Prime Minister resigned (Experimental Finland, 2019).[26]

Finland is on one hand well suited to pursue an anticipatory governance approach to a digital future of work given the mere size of the population, the general high trust in public institutions and policy making, the nature of labour relations, and the embedded capabilities in futures thinking. On the other hand, even if people's trust in public institutions is high, and among rural citizens, low-income households, and lower educated trust-levels are significantly lower. Moreover, while trust in public institutions generally is high, the percentage of Finns who believe they can influence policy processes either due to a perceived level of competence to understand politics or because they believe they have a say in what government is low compared to countries with similar levels of trust.

In that respect, the government's approach to the implementation of the continuous learning reform with the establishment of the National Service Centre for Continuous Learning to stimulate further supply of short skills-based courses, and the strategy and vision proposed by the innovation fund SITRA through a model of localised ecosystems of skills formation and based on systematic experimentation present two distinct scenarios for realisation of Finland as a learning intensive society. The latter model could situate Finland as a globally leading country showing new avenues to a digitally inclusive society and a future of work underpinned by a sense of personal agency, competence, and personal meaning. In such a scenario learning in ecosystems may materialise in ways so that working life renews competence and competence renews working life.

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[26] For examples of policy experiments and approaches see: https://www.kokeilunpaikka.fi/en/kokeilut

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Annex - AI-related Finnish policy initiatives – timeline

2017

Government Report on the Future, Part 1 "A Shared Understanding of the Transformation of Work"
Artificial Intelligence pilot program (AI Finland program 2017-2019

Ministry of Economic Affairs and Employment: Finland's Age of Artificial "Intelligence Turning Finland into a leading country in the application of artificial intelligence"

2018

Government Report on the Future, Part 2 "Solutions to the Transformation of Work"

AI Finland report: "Work in the Age of Artificial Intelligence"

Finland's Artificial intelligence accelerator

REAKTOR "The Elements of AI" AI-intelligence open course

Report. "Ethical Information Policy in the Age of A" Ministry of Finance

2019

Finland Fit for Digital program

Aurora AI network of smart services and applications 2019-2023

Policy brief: "Finnish AI Competences and How to Make them Stronger"

Final report steering group AI: "Finland leading the Way into the Age of Artificial Intelligence"

2020

Artificial intelligence 4.0 program. 4th industrial revolution.

Regulation on automated decision making AI register

Common policies continuous learning.

2021

Digivision 2030 Higher Education

Interim report AI 4.0 program- a vision for the future of Finnish manufacturing (in Finnish)