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INFLUENCE OF DIGITALIZATION IN ECONOMY OF EUROPE: FINLAND

Abstract. This article supports the factors that influence the process of digitization of the public and private enterprises, and in economy in general. Through a statistical analysis at his level in one of the most development country in Europe, Finland how the entrepreneurs in private and public sectors is facing to this process, is the main substrate of this research, which aims to determine these factors, in society in general, and in human capital. The process of digitalization is faced in different ways depending on the culture, the educational level, the scientific-technological development, the economic level, the security of digital services, etc., The interest of stakeholders of public and private sector are factors that influence the level of assimilation of technological change towards the digital era. In short, this whole process of change and how humanity faces it, make up what we know as digital Culture.

Key words: digitization, digital culture, innovation, internet, digital economy, technology.
JEL: O32

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Introduction

According to the European Commission, Finland is the third most advanced European country in business digitalization.

Finland is the most innovative, trustable and safest partner in critical communication, cyber security and smart finance solutions and technologies. As a partner Finland will enable digitally safe society and a predictable environment. Finland´s experience and talent of critical communication is the best in the world.

In Finland everything is connected. From traffic lights to the electricity grid, connected infrastructure supports innovative digital solutions across all main sectors of the economy. When everything is connected, safety and security is more important than ever. That is why it is built into the design of products, services and processes from the beginning. Digital Trust means peace of mind that comes from doing business in a secure and predictable digital society with world-class cyber security, public safety and fintech solutions. Digitalization will challenge the societies safe and trustable digital environment globally. In order for society being able to operate efficiently and utilize the possibilities that digital transformation can offer digital solutions need to be safe and trustable. Quickly gaining experience with new technology like IoT, machine learning and artificial intelligence helps create digital trust.

With only about 5 million native speakers and reputation for being difficult to learn, the Finnish language is a powerful encryption protocol in itself. Finns also benefit from an education system built on mathematics, science and technology. No wonder innovations like the SSH encryption protocol were originally developed in Finland. Today, Finland continues to be the undisputed cyber security leader, with nearly 100 companies operating in the sector. Whether global player or determined startups, these companies cover the entire cyber-security ecosystem, from virus prevention and identity management to vulnerability analyses and compliance testing. Strong partnerships between research, government and business create digital trust through technology-based ecosystems built around sharing and cooperation. All Finnish public safety authorities use the same national radio communications network and mobile field command solutions to provide real-time situational awareness.

90% of the world's data centers use SSH Communications Security as their solution provider. SSH was invented in Finland. 60 cyber security innovations from Finland are used around the globe. The Finnish government, JYVSECTEC (Jyväskylä Security Technology) and JAMK (Jyväskylä Polytechnic University) conduct annual national cyber security exercises

together. Finland has core expertise in encryption, data privacy, threat prevention and identity management solutions – all of which are key drivers of the digital trust that is required for successful fintech companies. Findy is a decentralized identity network for individuals, organizations and things. It is governed and operated co-operatively by Finnish public and private organizations. There are 170 fintech startups in Finland. 93% of the Finnish population uses online banking services and innovations such as mobile wallet. F-Secure is probably the best-known Finnish security and data-protection company – a pioneer in end-to end cyber security solutions for business and consumers. Finland has earned a formidable reputation in the cyber security field, with core expertise in encryption, data privacy, threat prevention and identity management solutions. The Finnish cyber security sector comprises close to one hundred companies, from global players to innovative startups. Finland offers an exceptional communications technology ecosystem for global companies, with outstanding connectivity expertise, mastery of new technologies and top-notch cyber security skills and R&D capabilities. The first SMS and wearable heart-rate monitor were created in Finland. A pioneer in mobile phone technology, Finland is now ready to lead the world with 5G. Finland is the biggest contributor to global innovation in the world (ITIF 2016). The R&D expenditure in Finland was 2.9% of GDB in 2015. The R&D framework builds on a strong emphasis of IPR protection. It is noteworthy that in a joint R&D project, the IPR is the property of a company, not a research institution or a university in Finland. This encourages companies to develop and test their new digital services in Finland. The most advanced 5G test network brings together, for the first time, the "big three" – Nokia, Ericsson and Huawei – proving the ultimate openness of the ecosystem.Numerous studies confirm that Finland is well-placed to unlock this huge potential. as a result of high broad-band connectivity and citizens' digital literacy, Finnish businesses and public organizations have a head start developing digital strategies and driving digital transformation in business¬es and society. The transparent and secure way in which personal data is managed is also crucial for building people's trust in the digital world. This ever-increasing amount of data, generated and harnessed, is a priceless asset for many organizations. It's hardly surprising then that CEOs believe that technology will transform their business more than any other global trend. Digital leaders outperform their peers in every industry, and most global CEOs consider 'digital' their number one priority. To understand how Finland is performing in the fast-moving digital era, the opinion of some leaders from leading organizations in Finland were analyze and we share their views and insights on what their organization is doing to reimagine the future. In comparison to the previous barometer, digitalisation has moved forward especially in the public sector. However, according to Etlatieto it still poses an unutilised opportunity to Finland. The Digibarometer measures the degree of digitalisation in a given country on 36 variables, and three different levels: preconditions, current utilisation and the effects of the utilisation, as well as in three different sectors: companies, citizens and the public sector. According to this year's survey, Finland has globally the best preconditions to take an advantage of deepening digitalisation. In the current utilisation Finland ranks fifth and in the effects of utilisation third. In the private sector Finland is the clear frontrunner, followed by Denmark and South Korea[3].

Finland ranks 2nd out of the 28 EU Member States [5] and in 3rd with a score that is virtually identical to both the 2nd and 4th place. Its overall score regularly progresses more or less in line with the EU average, which is maintaining its outstanding position. In addition to its leadership position in digital skills, which Finland has already held for several years, it also became the top scorer in digital public services. Moreover, it improved its score on the integration of digital technologies, where it is closing in on the frontrunner. While it remained steady in 5th place for the use of Internet services, it went down two places in the connectivity dimension, which is partly due to the introduction of a new indicator on ultra-fast broadband, where Finland does not score very well. Overall, Finland remains a world leader in digitisation and one of the best EU countries in this domain. Finland belongs to the High-performing cluster of countries [Digital Economy... 2018].

About the connectivity Finland is one of the country in EU with most high score Finland have already adapted their NBP targets to the new EU broadband targets for 2025 proposed by the Commission in its September 2016 Communication 'Connectivity for a Competitive Digital Single Market – Towards a European Gigabit Society' [Digital Economy... 2019].

Some strategies of Government

The public sector ICT department within the ministry of finance is tasked with digitising Finland's

3 Finland No 1 in digitalisation. URL: https://helsinkismart.fi/finland-no-1-in-digitalisation/

public services. It is collaborating with local governments to develop new and consistent operating practices and public services that are user-oriented and fundamentally digital. The objective is to create an agreed framework between central government and municipalities covering the digitisation of all public services [O'Dwyer 2018].

Statistical analysis

In this research were carried out some statitstical analysis about the process of digitalization in the public and private sector in Finland with the aim to define how the level of importance in each sector and society is. Every company wants the technology it uses to transform its business. Executives see the potential for using digital technologies to achieve transformation, but they're unclear on how to get the results. They look at high-profile examples of companies using technology to galvanize their business, and wonder what they need to do to follow suit [Embracing digital technology... 2013].

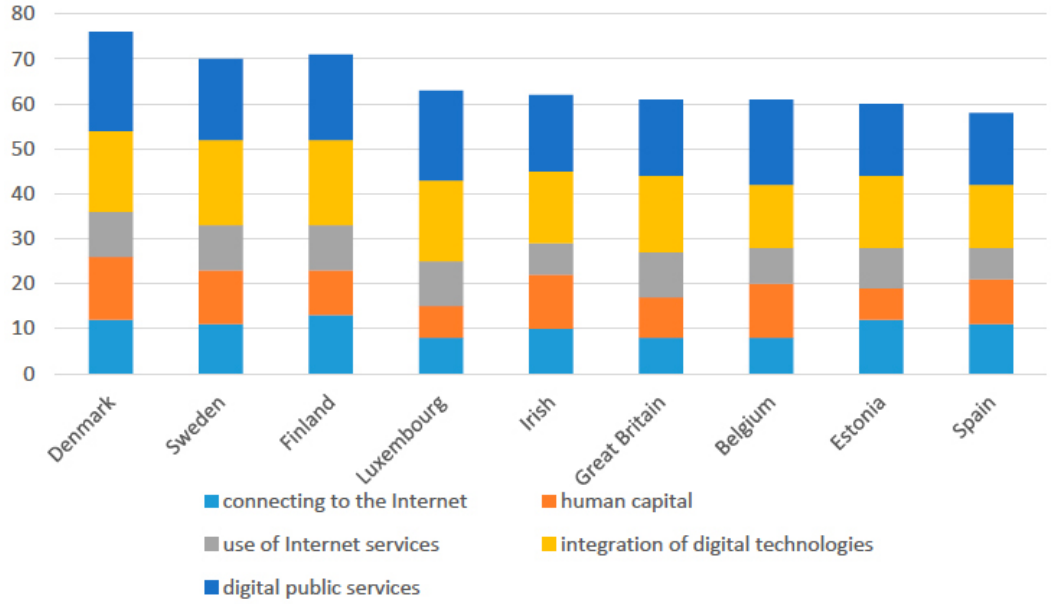

Fig. 1. Digital economy and society index (DESI) 2018 Ranking
Source: [Digital Economy... 2018]

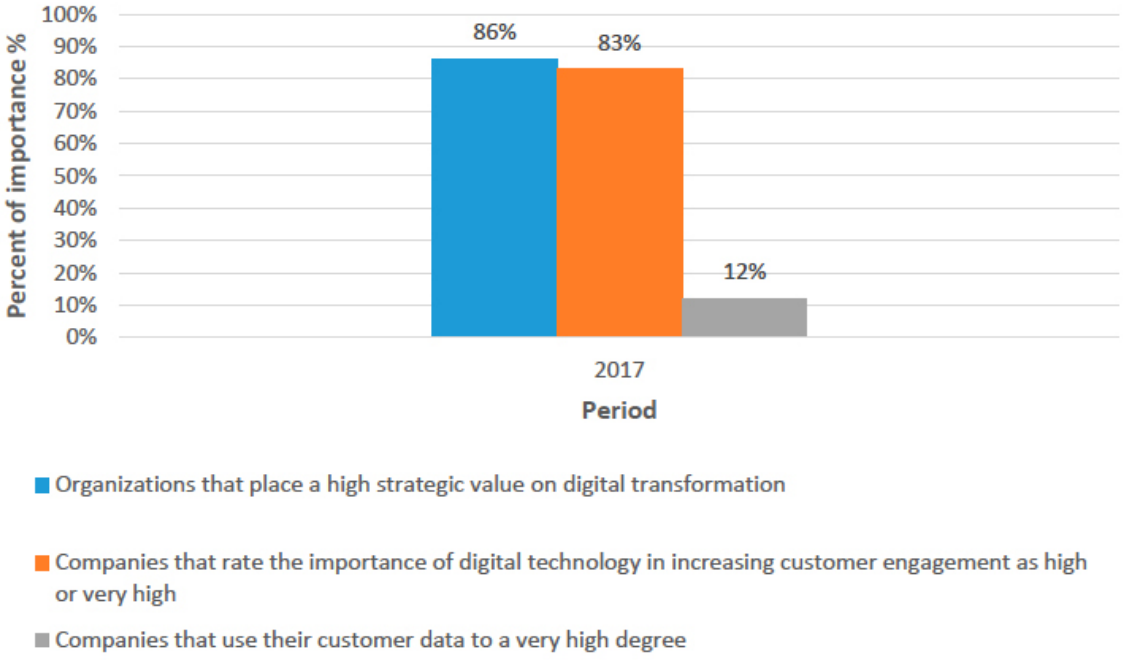

Fig. 2. The importance of digitalization to organizations and companies
Source: [How Finland... 2017]

- Research has shown that CEOs believe one thing will transform their business more than another global trend: technology.
- Businesses with a high digital IQ Score are likely to enjoy faster revenue growth and broader profit margins.
- 15% of Finnish organizations achieve the highest level of performance in the global digital IQ test.

The most relevant areas for the development of digital business environments are communication strategy, data usage, and evaluation of results.

25% see digital transformation as almost related to technology or only related to investment in the it sector, and 44% see it as a holistic approach to business development [How Finland... 2017].

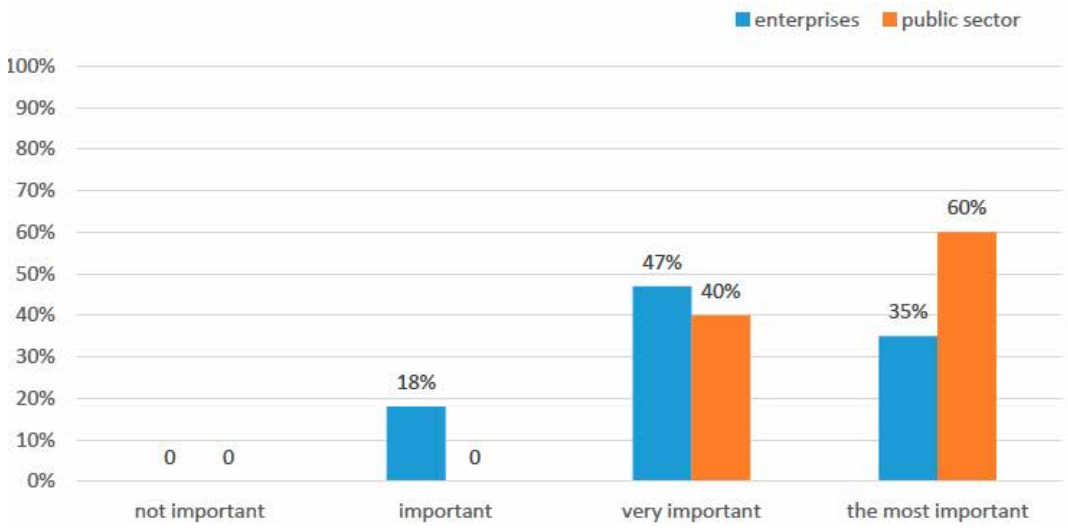

Fig. 3. Importance of digital transformation in public and private sectors

Source: [How Finland... 2017]

No matter how they define it, almost every enterprise had addressed digital transformation in their strategies. Alternatively, they'd deliberately emphasized its importance by leaving the term out of the formalized agenda, as they see it as a vital part of everything they do. A small parts of the enterprises didn't see digital transformation as a key driving point in their agenda. Interestingly, compared to the enterprises, the public sector respondents gave greater emphasis to the key role digital transformation plays. This clearly showed how the cultural shift to digital-first does not only affect industry silos but society as a whole.

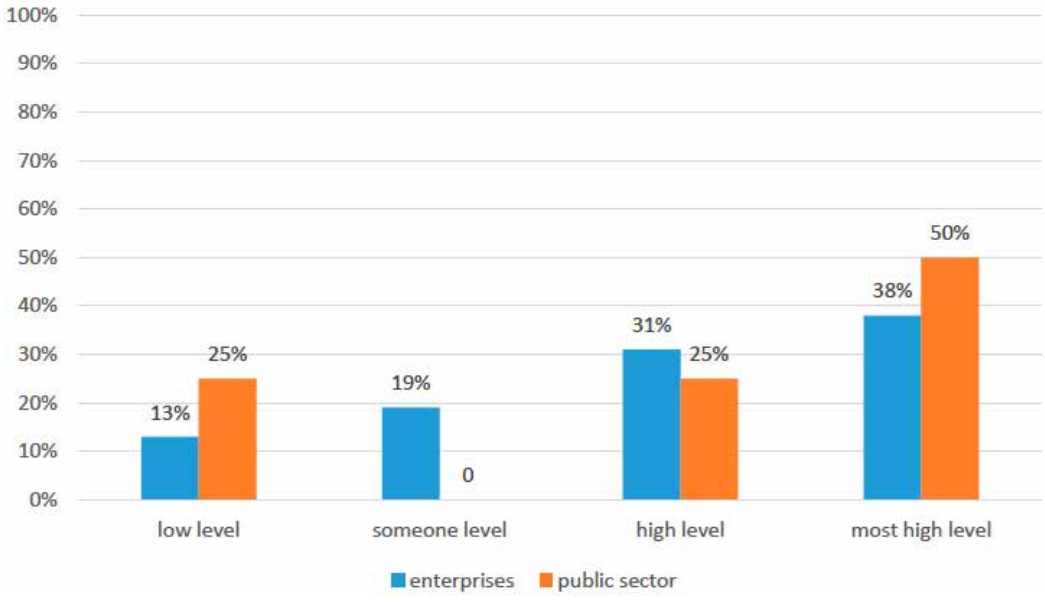

Fig. 4. Influence in new business

Source: [How Finland... 2017]

70% of enterprises are looking for new business lines through digitalization. 70% of businesses expect digitalization to affect their core business to a high degree within two years. A lot of organizations are looking to increase their main offer for introducing digital value-adding services to their portfolios [How Finland... 2017].

In line with the expected impact on core business areas, executives see gaining efficiencies through digital transformation as the most promising strategic goal. Most of the enterprises also see sustaining current market position as an important driver for digital transformation. Many of them said they're looking to transform their business to keep up with competition.

The desire to streamline current functions is even more pronounced in the public sector, where many organizations find it difficult to significantly increase resources. Instead, they focus on improving their efficiency in the near future. This is reflected in the emphasis they give digitalization when it comes to remaining relevant.

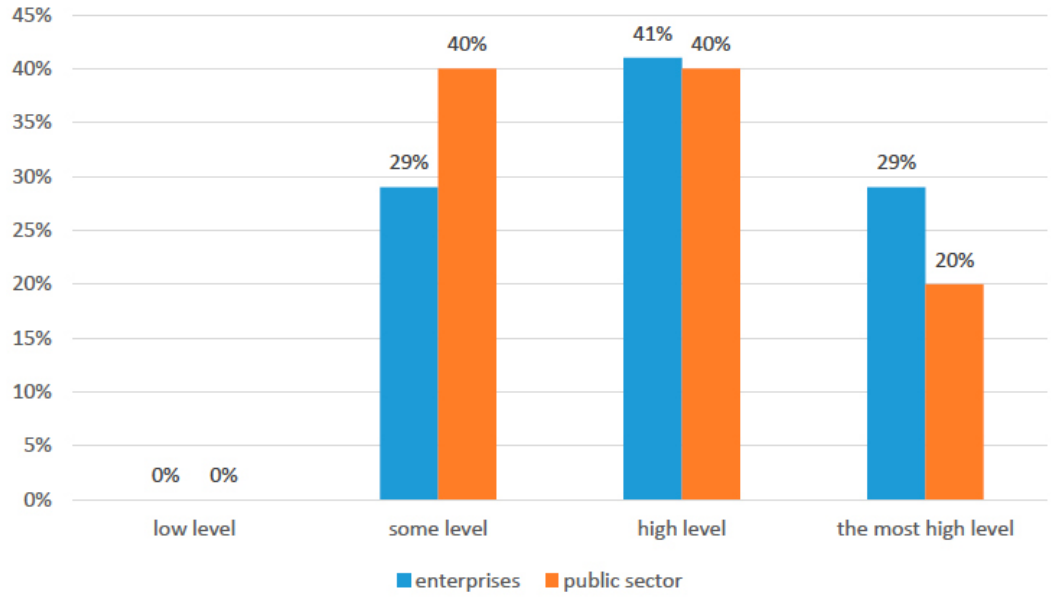

Fig. 5. The impact on the core business
Source: [How Finland... 2017]

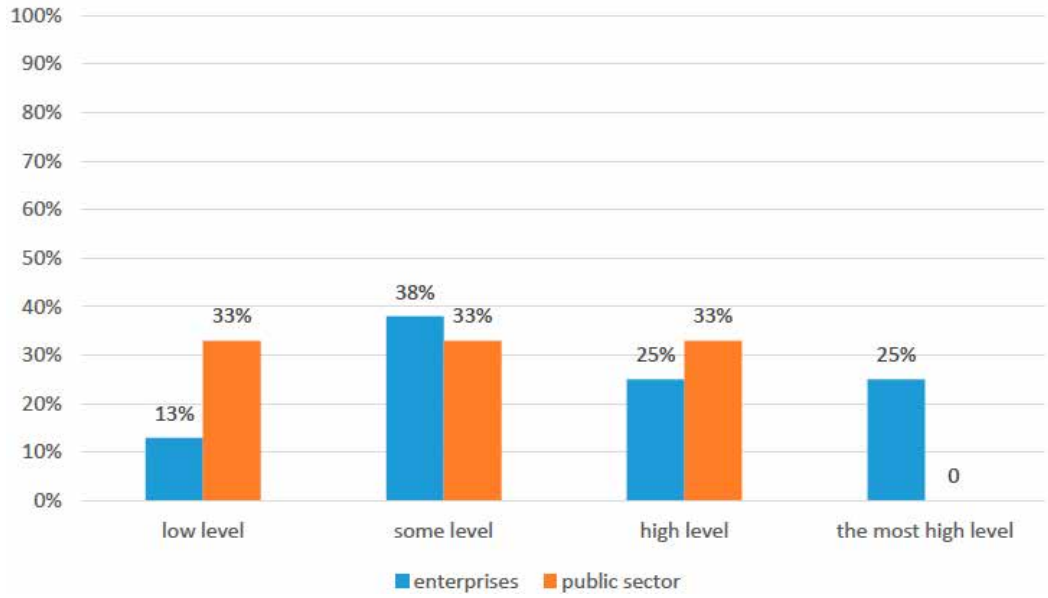

Fig. 6. The impact on the core business
Source: [How Finland... 2017]

In order to fully understand enterprise digitiztion, it is necessary to internalize that the maximum approach to it is wrong technology. And while it plays a stellar role, it is objectively, a process of evolution of organizational culture. All departments of a company will be involved in this process.

Customers are also prioritized, and it's about thinking more about them and what their needs are entirely. However, no one said that it is a simple process to adapt to a digital society or the digital economy.

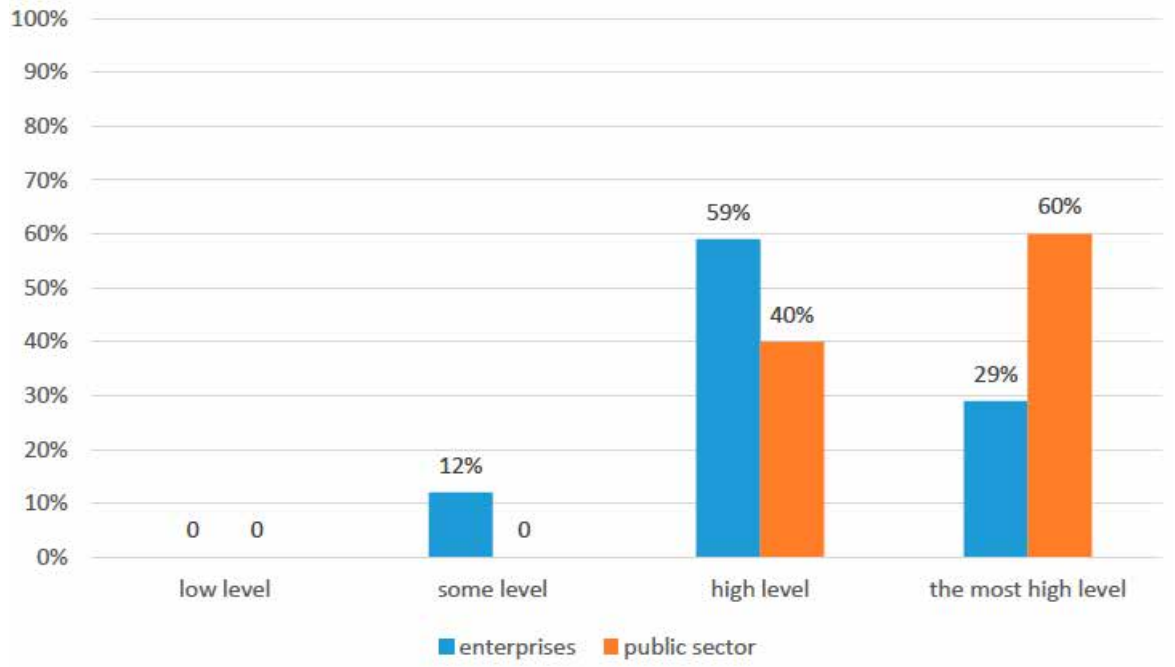

Fig. 7. Leverage in getting efficiency
[How Finland... 2017]

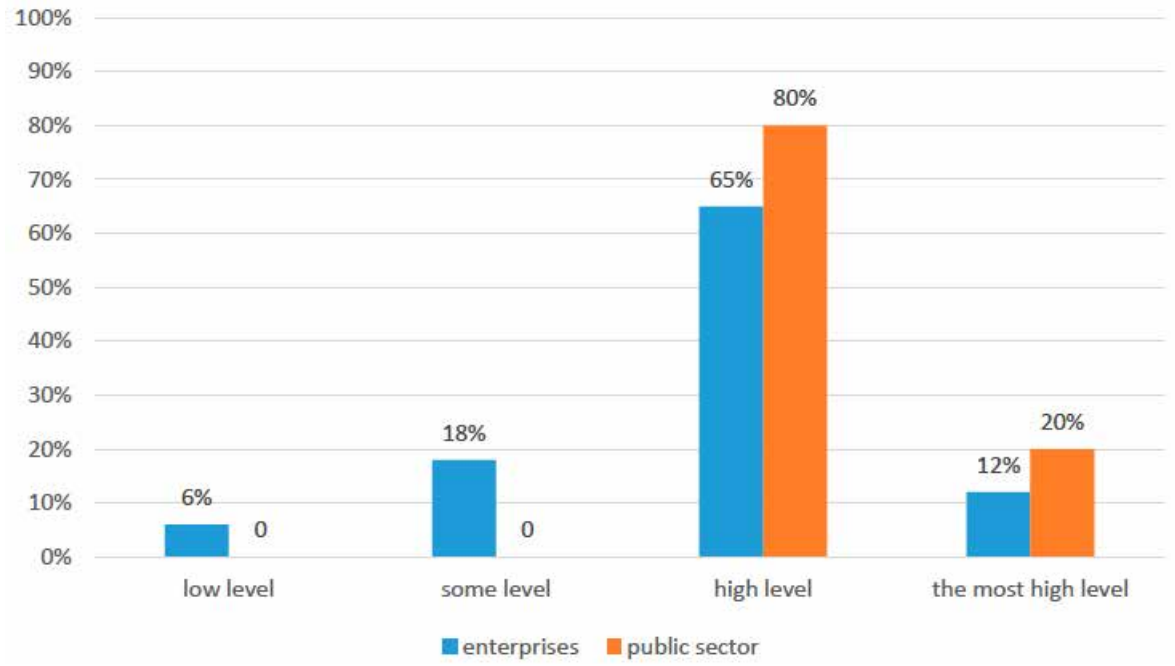

Fig. 8. Leverage to protect the market position
Source: [How Finland... 2017]

90% of organizations expect to use digitalization in making their activities more effective in the future. 60% of organizations prioritize digitalization over traditional means in the search for growth in

the future. 80% of organizations expect digitalization to be a key lever in protecting their current market position [How Finland... 2017].

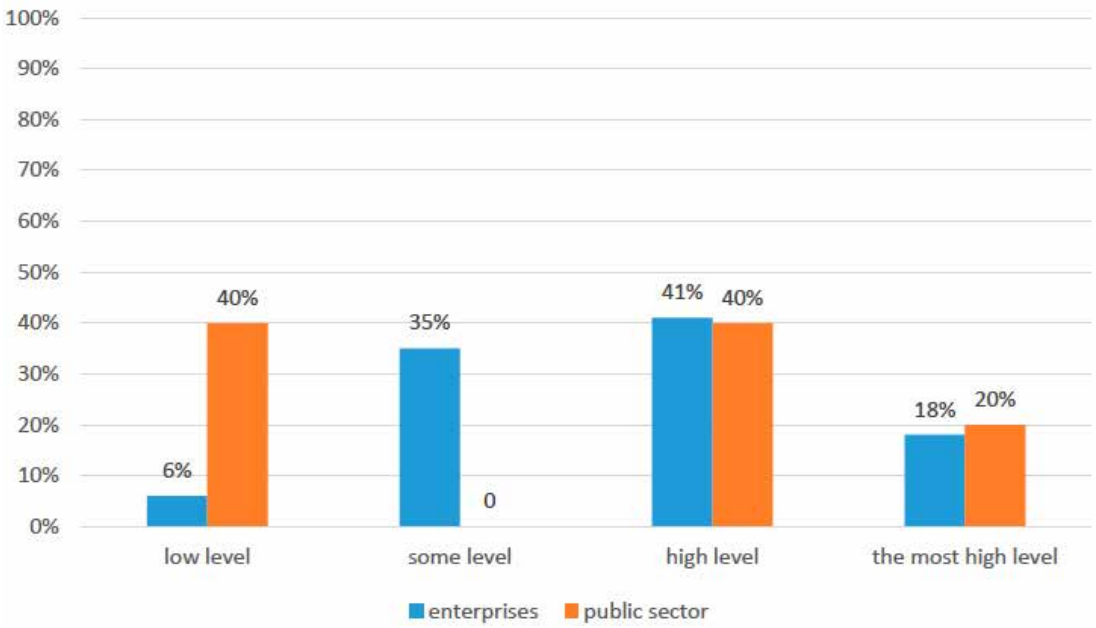

Fig. 9. The lever in the growth
Source: [How Finland... 2017]

The implementation of digitalization

Today, Finland's government agencies are implementing artificial intelligence (AI) technologies and other new technologies for improving public services, as well as streamlining government support functions. Check out #AuroraAI on Twitter, for example[1].

The Government has agreed that public services will be primarily digital in the future. No-one will be left behind though. The Government has launched projects with the private sector to support those who are unable to use digital services. There is a lot of cross-sectoral collaboration and the Government adapts fast to new circumstances.

The Government is accelerating the development of better services by creating ecosystems around peoples' life events and the life cycles of businesses. These ecosystems include both public and private sector organizations. The Government is also building customer-centric cross-sectoral service models for people and companies arriving in Finland.

Trust is a pivotal factor for successful digital government. In Finland, citizens and businesses trust government agencies to provide services in a reliable, impartial and timely manner. Government trusts citizens and businesses. Finland has one of the least corrupt government sector in the world.

We are eager to learn from and work with other countries. The exchange of experiences, best practices and promising new practices supports the digitalization of government and public services in Finland. Finland is also happy to share its best practices and experiences of various digital services and solutions.

The digital transformation of Finnish society is happening fast, and we are all helping to build this new, digital Finland. We have made a video about the digital transformation of society, which presents some examples of the digital revolution. One of these examples is the Government's key project aimed at digitalizing public services.

To understand what the enterprises and organizations see as the most import¬ant goals, we look at their approaches through the four lenses of digital transformation: engaging customers, transforming products and services, optimizing opera¬tions, and empowering employees. Actually they have a framework that gives a coherent, industry-independent view of how the organizations prioritize their actions.

- Attract customers
- The empowerment of employees
- Transforming products and services
- Optimization of operations

60% of businesses rate increasing customer engagement as the number one priority in their digital transformation journey.

1 Finland as a global leader of digitalisation. URL: https://toolbox.finland.fi/business-innovation/finland-as-a-global-leader-of-digitalisation/

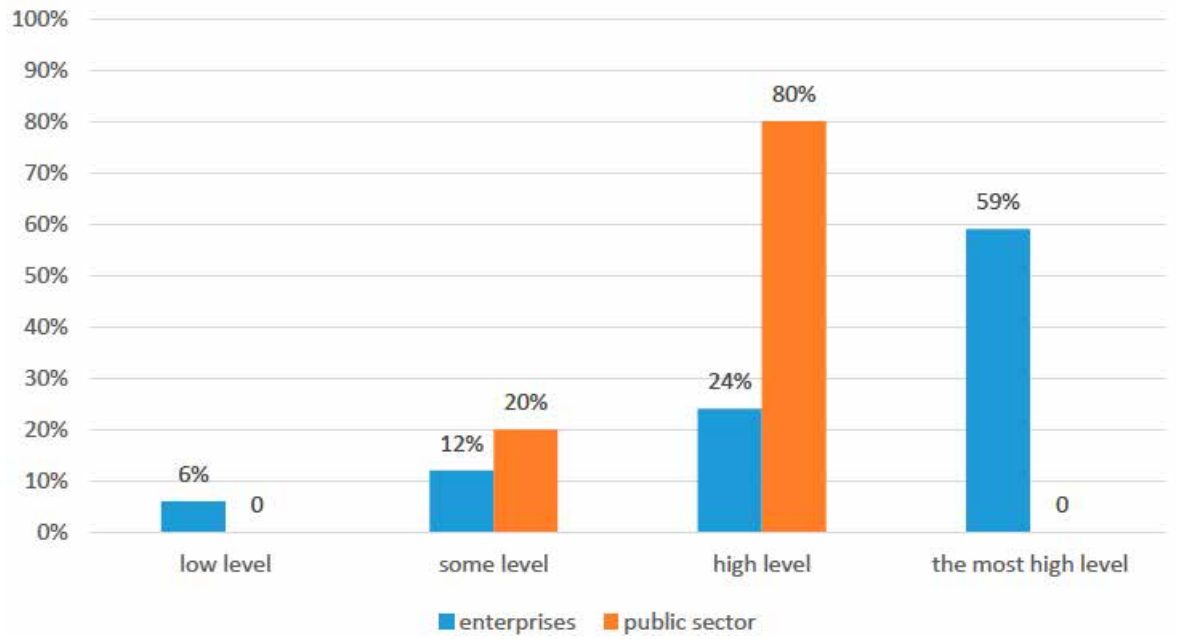

Fig. 10. Attract customers
Source: [How Finland... 2017]

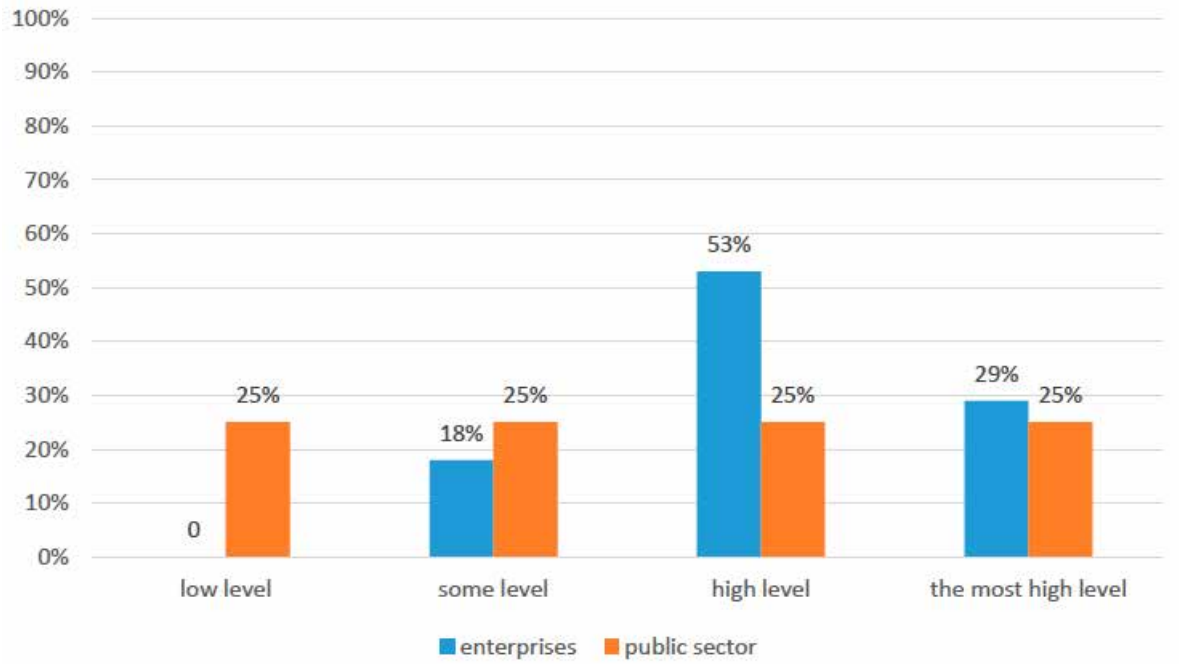

Fig. 11. Transforming products and services
Source: [How Finland... 2017]

For 30% of organizations, transforming their products and services to meet the needs of the digital world is the highest priority on the digitization agenda. For the public sector, increasing operational efficiency through digitalization is a key factor in their transformation programs. 40% of organizations emphasize employee empowerment as a top priority, making the benefits of digitalization accessible [How Finland... 2017].

Increasing productivity, improving customer experience, increasing turnover and adapting to the new market are among the advantages of digitization. In Finland, opinions diverge somewhat between the pro-poor and public sectors. The graph focuses on optimizing operations which is another advantage of digitization.

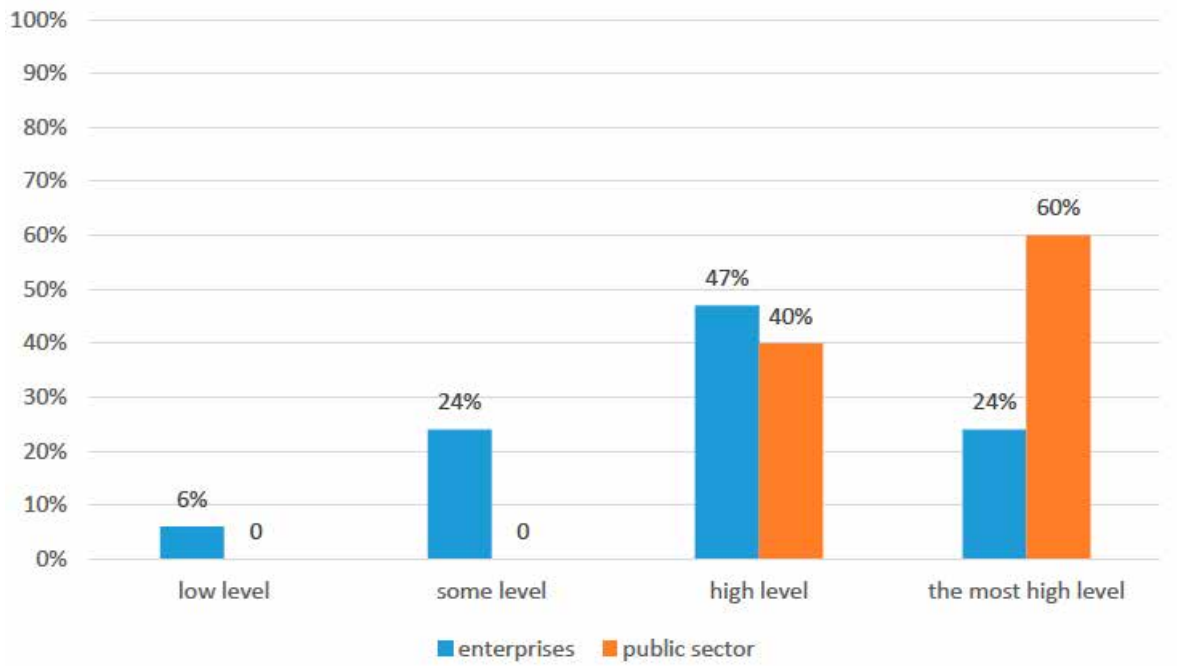

Fig. 12. Optimization of operations
Source: [How Finland... 2017]

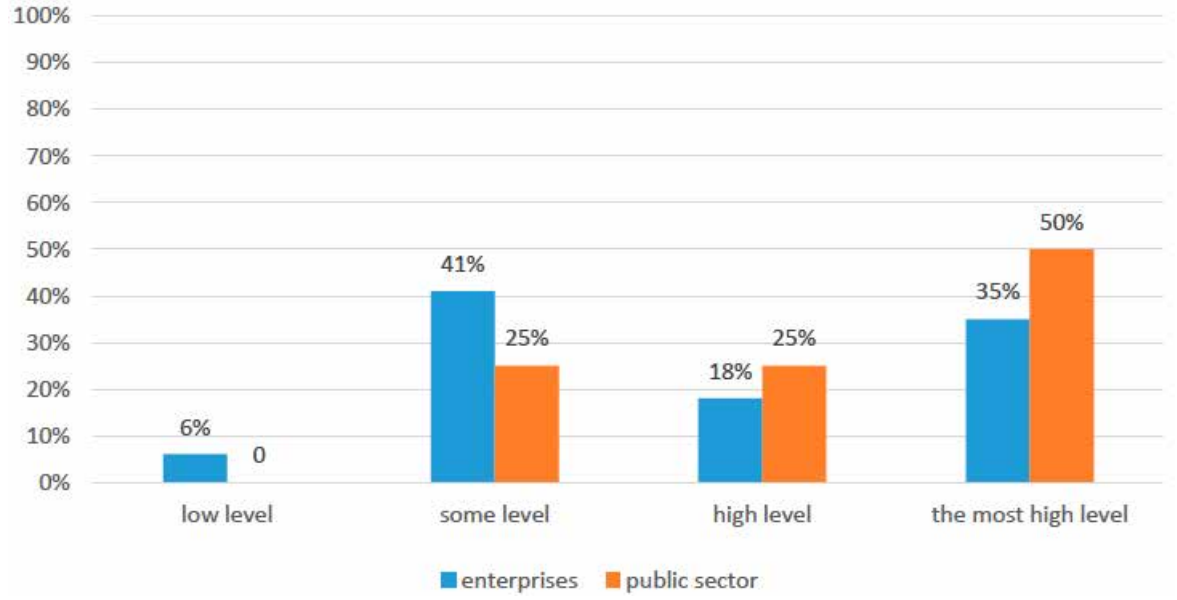

Fig. 13. The empowerment of employees
Source: [How Finland... 2017]

77% of companies agree that two- speed it is critical to success in the digital age.

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100% of public sector organizations hire partners as the main means for digital development.

Finland is experiencing an acute shortage of digital talent. Everything seems to have room for the intensification of joint creativity of clients. Finnish leaders share a global vision that AI is the most disruptive technology over the next 5 years. Only 12% of businesses use their customer data to a high degree. Most of the current new technologies have yet to prove their true business value [How Finland... 2017].

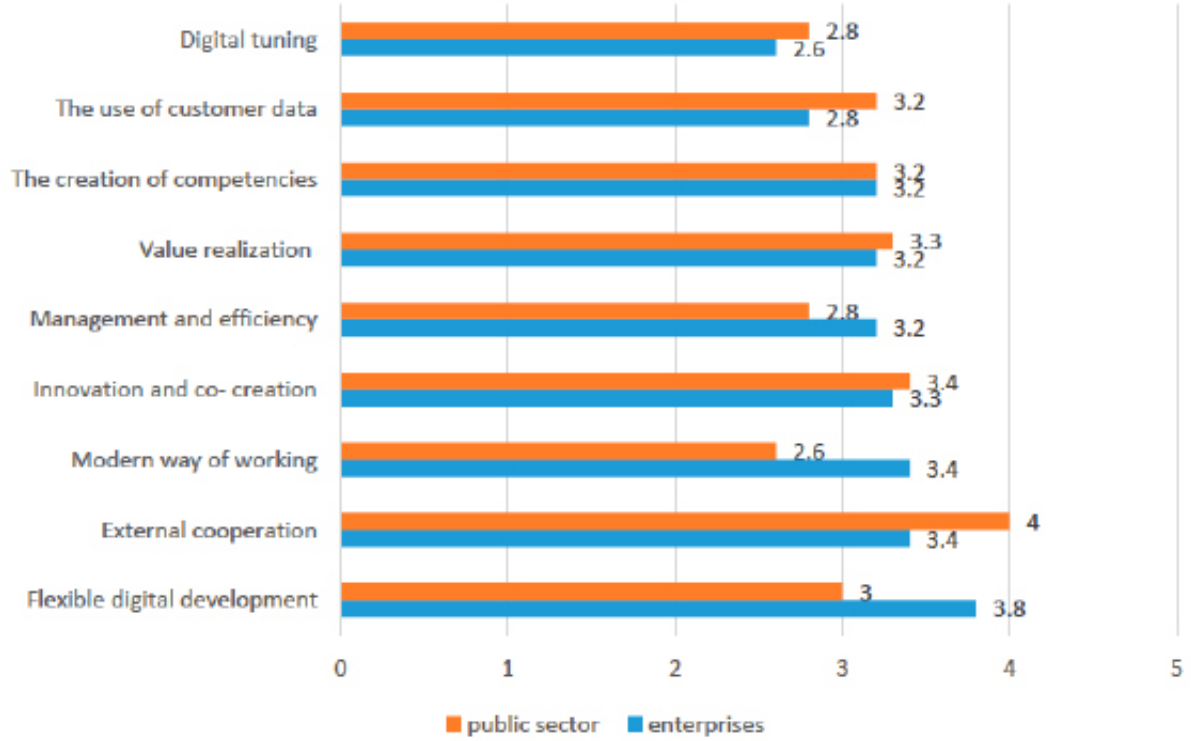

Fig. 14. Ranking key features
Source: [How Finland... 2017]

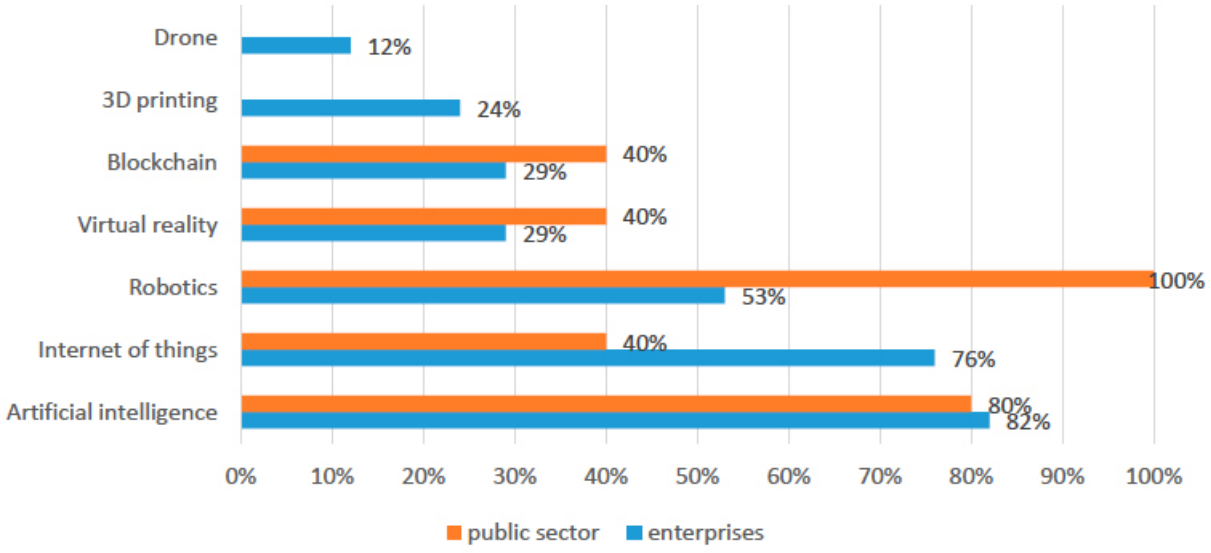

Fig. 15. Technology respondents consider the most influential in the coming future
Source: [How Finland... 2017]m

Influences of digitalization in economy and innovation

From digitalization emerging New Space Economy creates an unique opportunity to benefit from strong Finnish innovation, technology and business ecosystems.

- World leading wireless technology ecosystem
- Extensive R&D know-how and capabilities
- Existing high-value, high-quality and high-reliability manufacturing capabilities
- Radiation testing capabilities for electronics
- Strong cyber security cluster
- World leading know-how in hyper spectral imaging, pattern recognition and image analytics
- World leading know-how in surveying natural resources and environment
- High-speed and capacity data infrastructure and connections abroad, excellent location for data centers, low electricity price

- Strong IPR-protection, stable legislation and regulation
- Funding for ecosystems and networks
- Attractive NSE-related development in Finland: Smart mobility, Mobility as a Service, Smart Logistics, autonomous vehicles and vessels[1].

Radiotechnology Know-How

Finland is one of the leading countries in radio technologies: from HF to mm-waves

Vibrant ecosystem with both small and big companies

R&D competences and system research to components, signal processing and protocol SW and full product development

Examples of world leading products: 5G base stations, mobile cellular devices, satellite phones, GPS watches and navigational devices, cognitive HF-radio network and terminals, weather radars etc.[2]

Geophysical and bio economy Know-How to enable new services

- High-level research and know how in geosciences
- Atmospheric aerosol know-how and research
- Inversion modelling and imaging
- Hyperspectral imaging and image analysis
- Ionosphere and plasma physics research, space weather
- Forest research and inventory
- Environmental research
- Arctic research snow and ice

This know-how combined with NSE satellite data acquisition can create new innovative services. E.g. exploring and monitoring natural resources[3].

Business

The Business Finland Digitalization theme services include innovation funding, internationalization services and programs on the edge of the latest global digital trends. We offer companies strong expertise and the best tools for international business[4].

Finland has one the most advanced financial technology, Fintech, sectors in the world, with up to 93% of the Finnish population using online banking services. Finns are also ahead of the curve on mobile wallet and extended mobile banking services. The driving force behind this success is the innovative collaboration between telecom operators, banks, accounting and finance companies, and ambitious start-ups. Today the key battleground in the fight for banking customers is customer experience design and management. For developers and banks, the challenge is to deliver round-the-clock connectivity and military-grade security in an incredibly intuitive service package. Money never rests, and neither can Fintech solutions. Fortunately, Finnish Fintech companies run on coffee and innovation, which explains their bankable track record in developing solutions for personal finance & banking, payment technologies, blockchain and cryptocurrency, authentication and security, and digital integrated financial management solutions. From user interface to bank vault, investing in Finnish Fintech is money well spent[5].

Retail

Finnish retail tech companies are leading the field in this transformation, offering a great variety of innovative solutions to improve retail performance in key areas such as sales, marketing, shopping experience, consumer insights and competitor intelligence. Finnish solutions also enable personalized marketing actions, promotions and automated processes.

Finland is a country abundantly blessed with mobile technology, and the Finns consume more mobile data per capita than any other nation. Consequently, Finnish consumers are very mobile reliant and the number of mobile shoppers only continues to grow in Finland[6].

Digital Government

In Europe, Finland is leading the way in digital government (e-Government). It is also a global front-runner in this field[7].

Conclusion

The last 20 years have seen unprecedented changes in technology and the next 20 are looking equally dynamic. While mobile and cloud computing and the Internet of Things mature and become ubiquitous, there is a new wave of transformation emerging from artificial intelligence, virtual reality and robotics bringing hitherto futuristic concepts

1 New Space Economy. *Businessfinland*. URL: https://www.businessfinland.fi/en/do-business-with-finland/explore-finland/ict-digitalization/space/

2 Ibid.

3 Ibid.

4 Digitalization. *Businessfinland*. URL: https://www.businessfinland.fi/en/for-finnish-customers/strategy/digi/

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7 Finland as a global leader of digitalisation. URL: https://toolbox.finland.fi/business-innovation/finland-as-a-global-leader-of-digitalisation/

into our day-to-day lives both at work and at home. At the same time, technology has become a vital component of every industry, bringing unprecedented opportunities for growth along with challenges and competition from traditional and new arenas [20th CEO Survey 2017].

Finland has a long history of information technology. The global success of Nokia spurred the development of the software and electronics cluster in Finland. Currently half of the world's population uses mobile technologies developed in Finland. Today, the vibrant startup scene and a highly competitive business culture boost innovation.

Most modern new technologies have not yet proven their real value for business. The lack of digital talent makes it difficult to use new technologies.

Activities you can do to succeed in digital transformation

1. Create a clear strategic statement for the whole of your organization's digital approach and to clearly communicate at all levels.

2. Develop a culture that encourages innovative initiatives, especially in environments with ever-increasing speed and complexity.

3. Use all available data resources to effectively provide information and add value to your business.

4. Adapt a goal-oriented approach to attracting digital talent and external insights that discover, create, and capture the value of digital opportunities.

5. Try to strictly define and deploy key performance indicators that ensure the impact of your digital investments and efforts.

The key word that defines the digital transformation process in Finland: IT Infrastructure.

Also the research shows that Finns have made it far in digital financial services while the Swedes are way ahead in retail.

Analysis on the advertisement clicks in Google search showed that foreign online retailers were actively luring in Finnish customers, but the Finns themselves were rather passive on international online retail.

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ВЛИЯНИЕ ЦИФРОВИЗАЦИИ В ЭКОНОМИКЕ ЕВРОПЫ: ФИНЛЯНДИЯ

Аннотация. В данной статье рассматриваются факторы, влияющие на процесс цифровизации государственных и частных предприятий. С помощью статистического анализа на его уровне в одной из самых развитых стран Европы, Финляндии, как предприниматели в частном и государственном секторах сталкиваются с этим процессом. Данная статья является главным субстратом этого исследования, которое направлено на определение этих факторов, в обществе в целом и в человеческом капитале. Процесс цифровизации происходит по-разному в зависимости от культуры, уровня образования, научно-технического развития, экономического уровня, безопасности цифровых услуг и т. д. Потребности заинтересованных сторон государственного и частного секторов являются факторами, влияющими на уровень усвоения технологических изменений в сторону цифровой эпохи. Весь этот процесс перемен и то, как человечество сталкивается с ним, составляют цифровую культуру.

Ключевые слова: цифровизация, цифровая культура, инновации, коммерция, интернет, цифровая экономика, технологии.

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