TALLINN UNIVERSITY OF TECHNOLOGY
School of Business and Governance
Department of Business Administration

Margarita Orobetc

DIGITAINABILITY OF THE BANKING SECTOR IN ESTONIA

Bachelor's thesis

Programme International Business Administration, specialisation Finance

Supervisor: Pavlo Illiashenko

Tallinn 2022

I hereby declare that I have compiled the thesis independently
and all works, important standpoints and data by other authors
have been properly referenced and the same paper
has not been previously presented for grading.
The document length is 9350 words from the introduction to the end of conclusion.

Margarita Orobetc……

(signature, date)

Student code: 194474TVTB

Student e-mail address: maorob@ttu.ee

Supervisor: Pavlo Illiashenko:

The paper conforms to requirements in force

……

(signature, date)

Chairman of the Defence Committee:

Permitted to the defence

……

(name, signature, date)

TABLE OF CONTENTS

ABSTRACT

Over the next years, the importance of digitalization and sustainability will continue to grow accelerated by COVID-19. Beyond the individual significance of the two megatrends, their interaction will likely gain further importance. Digitainability in the financial industry can contribute to cost optimisation, efficiency, and subsequently to better performance. The aim of the research is to explore the cross-section of digitalization and sustainability in the Estonian banking sector.

The study evaluates the digitalization level on the base of the offer of digital banking products. The sustainability performance, namely the adoption of corporate social responsibility (CSR) principles, is measured by using developed framework. The examination of the digitainability of banks is determined on the basis of crossing the data related to the digital product offer and sustainability data.

The results of the research show that the banking offer of digital distribution channels' products in Estonia follows world trends and it can be considered developed. Additionally, key traditional banks such as Swedbank, LHV Pank, SEB Pank and Luminor work closely with financial and non-financial services providers proving their strong position in digitalization by expansion to open banking. In terms of digitainability, 6 out of 13 Estonian banks have a high level of digitalization and sustainability, where 5 of them hold approximately 90% of total assets of the banking sector. Thus, the Estonian banking sector has a digitainability characteristic. The remaining share of banks should embrace new digitainability opportunities, which may provide the basis for developing new core competencies, beyond improved efficiency and financial performance.

Keywords: Digitainability, banks, CSR, digital transformation

INTRODUCTION

Digitalization and sustainability are two megatrends playing a key role in shaping economies and business activities in future-oriented Europe (Lichtenthaler 2021, 64). The COVID-19 pandemic has highlighted the strategic significance of digitalization and sustainability in many industries, including financial. Banks have accelerated the developments of digital solutions, the majority of banks seek to become digitally mature and are driven mostly by innovation (Miklaszewska *et al.* 2021). Digitalization also increases operational flexibility and generates greater customer satisfaction (Boot *et al.* 2020). At the same time, financial institutions fostered the adoption of sustainability and environmental, social and governance (ESG)-related principles to align with the United Nations Sustainable Development Goals. Banks opting for sustainable finance services will strengthen public trust, outrun regulatory expectations and gain growth opportunities. "Given that financial institutions have a cross-industry role, and that sustainability is relevant across all industries, banks have a pivotal role in integrating ESG values in the business ecosystem." (Accenture … 2021)

However, the aforementioned actions are usually focused on one of the megatrends. The combination of digitalization and sustainability (digitainability) is not proficiently addressed by the banking industry. In academic literature, the links between sustainability and banking as well as digitalization and banking are well-researched. However, very few studies are dedicated to cross-section and they focus primarily on Western countries. They suggest that the combination of digitalization and CS strategies yields better returns than when applied separately, improving banks' market performance and efficiency (Forcadell *et al.* 2020a). The recent study investigating digitainability of the Serbian banking sector revealed that combination of digitalization and sustainability positively affects the financial performance of banks (Stefanovic *et al.* 2021).

Overall, it appears that the association between digitalization and sustainability in banking is unexplored, especially not during the COVID-19 pandemic, which accelerated the pace of digitalization (Zuo *et al.* 2021). Bearing in mind the significant gap in findings from the already very limited literature, this research focused on the cross-section of digitalization and sustainability

of banks in Estonia, Central and East Europe (CEE) country, by capturing the COVID-19 pandemic. Specifically, the study aims to assess the level of digitalization, sustainability and determine the digitainability characteristics of the Estonian banking industry. Moreover, the present study seeks to provide deeper context to digitainability and its benefits for banks in the Baltic Region and might serve as a groundwork for future research exploring the nexus between digitainability and financial performance. The additional goal of the study is to propose new strategies for banks stakeholders to be considered in post-covid time. COVID-19 has been described as the new black swan in the international economy and it has had a substantial impact on the improvement of the following (Stefanovic *et al.* 2021, 2): 1) risk management strategies undertaken by banks to obtain and maintain the stability, which means the application of an overall risk management approach (especially with respect to the security); 2) sustainable financing, compliance and fraud detection (especially with respect to anti-money laundering and terrorist financing); 3) internal audit and control; 4) corporate governance. Considering the subject and aims of the research, the following hypotheses were identified and verified:

Hypothesis 1 (H1): the banking offer of digital distribution channels products in Estonia can be considered as developed.
Hypothesis 2 (H2): The Estonian banking sector exhibits characteristics of digitainability.

In the empirical section, the study assessed the digitalization level on the basis of the offer of electronic banking products, then the sustainability, namely the adoption of corporate social responsibility (CSR) principles, was measured. The sample consists of 13 out of 14 commercial banks operating in Estonia as of March 2022 (Banks and creditors … 2022). The data has been collected from the publicly disclosed reports and websites of the commercial banks and Eesti Pank. The examination of digitainability of banks is determined on the basis of crossing the data related to the digital product offer and sustainability data. Consequently, monitored banks were distinguished according to the level of digitalization and sustainability within the framework developed by Lichtenthaler (2021). The strategies to attain the digitainability were proposed.

The structure of the thesis is as follows. After providing the introduction, the first chapter discusses the topic of digitalization and sustainability in the banking industry, followed by a look of a new concept of digitainability and Estonian banking sector. The related theoretical and empirical studies dedicated to the impact of digitalization and sustainability, in isolation and combining them, on banks' performance are reviewed. The second chapter presents the data as well as

research methodologies. The empirical analysis and results alongside with discussion of major findings are provided in the third chapter. The thesis conclusions and the direction for future research are found in the final chapter.

1. THEORETICAL BACKGROUND

1.1. Digitalization in banking

Digital transformation of business is an organizational change and improvement of the business process of the company due to appliance of digital technologies and tools (Barjaktarović, Stefanovic 2019, 62). Artificial intelligence, big data, robotization, cloud computing, and blockchain technology are the main examples of technological advances that can restructure the firm and bring additional value. Digitalization is highly relevant to the financial services sector, banks especially, as they are considered technology intensive (Kriebel, Debener 2020) and the process is continuous and unstoppable (Kitsios *et al.* 2021, 1). The COVID-19 pandemic has further accelerated the technology-based restructuring and changes in business models in the global banking sector (Miklaszewska *et al.* 2021, 7) because of the high demand for "contactless" services from customers and emergence of new competitors such as FinTech firms and BigTech players -in particular in the area of payments (Carletti *et al.* 2020, 15). The functionality of digital transformation is twofold: it enables banking organizations to offer new service channels through new electronic platforms (e-banking, m-banking, wearable banking) and service points (e-branch stores, POS, ATM) as well as to safeguard operational resilience, e.g. reducing operational costs by limiting the number of physical stores and staff that they use (Veenman *et al.* 2020; Kitsios *et al.* 2021). This is the reason why, according to Veenman *et al.* (2020), more than half of financial service providers are reporting a year-on-year increase in IT budget, and IT investments will continue to rise.

As digitalization is rather broad term and covers various banks' dimensions, the tools should be scoped and narrowed down as well as the stages of applying FinTech solutions should be highlighted. According to Yip, Bocken (2018), the digital transformation includes the digitization of documents, an electronic signature for transactions, e-statements and m-payments, teleconference, online trading platforms, digital stores, and e-learning. As to the development of FinTech impact on commercial banks, Zuo *et al.* (2021) suggest that it can be split into three stages. The first stage embraces the introduction of IT. Banks achieve automation of business

operation and office management and improve efficiency by implementing IT hardware and software. The second stage is the introduction of internet finance. Banking organizations build online business platforms, attract customers and information through the Internet or mobile terminal channels, and consequently accomplish the interconnection of transaction, payment, and capital flow. The last stage applies fintech development. Banks start to adopt new IT for financial information gathering, risk pricing models, investment decision-making processes, and credit intermediaries.

Digitalization is driven primarily by customer needs and their high expectations (Mbama, Ezepue 2018). Internet, telephones, mobile, and even wearables are available alternative channels delivering services to today's bank clients. The variety of possibilities, ease of use, offer of innovative products, not to mention time saving and cost reduction are among the main benefits of digital banking making it extremely appealing for all types of customers (Kitsios *et al.* 2021; Upadhyaya *et al*. 2020). In the post-COVID era commercial banks should reflect on how to adapt to the new technological environment, change the interaction with customers, management of their middle and back-office operations (Kitsios *et al.* 2021, 1) and exploit the digital economy's revolution by integrating innovative solutions and models (Zuo *et al.* 2021).

In the financial literature the topic of digitalization has been well researched. Gupta *et al.* (2020) report that digitalization can increase productivity and decrease costs, thus enhancing better performance. According to the biggest global digital banking study performed by Deloitte, long-established banks, that set key digital trends and have leading market practices, outperform banks' competitors in their country on average both C/I and ROE (Deloitte…2020). Barjaktarović, Stefanovic (2019) argue that the positive changes, namely more efficient business models, the seizure of new segments of clients and penetration into new markets, where new services create new sources of revenue, are observed due to digital transformation. The study focusing on single country, such as Nigeria, shows that there is a mild significant and positive relationship between the digitalization process and commercial bank performance (Agboola *et al.* 2019). Another empirical study from China reveals that the science and technology investment of commercial banks affects the comprehensive efficiency and consequently affects the income of banks (Zuo *et al.* 2021). Barjaktarović, Stefanovic (2019), analysing the Serbian banking sector, claim that level of investment in digital transformation has a strong relationship with the net result.

However, the technology-driven transformation poses threats to banks and their clients in several areas, including security primarily due to cyber attacks (Ivanova *et al.* 2020). Moreover, digitalization entails operational risks (Zabala Aguayo, Ślusarczyk 2020), an increase in unemployment rate in the banking sector and exclusivity of people not existing in the digital space.

1.2. Sustainability in banking

Sustainability is defined by United Nations as a movement for safeguarding better well-being for all humans, including future generations. The organization highlights the importance of the concept setting it within The Sustainable Development Goals as a key trend for individuals, policymakers and companies. (United-Nations…2015) Sustainability has a vast literature, which conceptualizes the movement beyond conserving the environment and also involves social and economic factors, leading to the bottom line of financial, environmental, and social outcomes (Lichtenthaler 2021; Elkington 2018). This apprehension is in line with the Sustainable Development Goals (United-Nations…2015) and with the concept of creating shared value, which describes firms' activities of achieving financial and strategic goals while positively contributing to the environment as well as society (Pfitzer *et al.* 2013; Porter, Kramer 2011, 76).

Commercial banks play an essential role in allocating financial resources for social and economic activity to prosper. Though the direct environmental impact of banking operations is limited (Sempere-Ripoll *et al.* 2020), the indirect effects are vast in dimensions of governance, environment and societal terms. (Yip, Bocken 2018). For instance, Birindelli *et al.* (2013) report that CSR can alter the economic policy of the bank in the field of loans and asset management, thus risk management can indirectly affect the environment and society. New possibilities of sustainable banking include "maximizing material and energy efficiency, substituting with digital processes, promoting sensible borrowing, supporting social enterprises, re-employing retired staff on a contract basis, employing physically disabled persons and encouraging staff to do volunteer work by giving paid leave, reducing fees for nongovernmental organizations (NGOs), promoting green bonds or just promoting social innovation" (Sempere-Ripoll *et al.* 2020, 2). Yeung (2011) underscores the main elements of corporate social responsibility (CSR) in the banking sector: comprehension of the complexity of financial services, risk management, strengthening ethical principals, the adoption of strategies for the financial crisis and protection of the rights of customers. According to Graafland, Van de Ven (2011), the emphasis on the social responsibility

of banks requires higher professionalism of financial sector workers, a stronger emphasis on the observance of ethics, verifying workers' abilities and other approaches, the orientation of the interests of stakeholders, cooperation with the societal institutions. Overall, banks as financial organizations hold a unique intermediary role between depositors and borrowers in providing sustainable development (Yip, Bocken 2018).

Applying sustainable principles within the CSR concept, banks significantly enhance the relations with stakeholders such as clients, government, local communities and employees and, thus, improve their performance and reputation (Birindelli *et al.* 2013). However, there is a skeptical opinion that banks, as strongly profit-oriented organizations responsible for innate maximizing of profits, (Watkins 2011; Chatterjee, Lefcovitch 2009) are implementing CSR concept solely for short-term benefits (Pérez, Del Bosque 2012).

There is an extensive body of evidence examining sustainability in financial industry, especially that linking corporate social responsibility (CSR) and financial performance. Loureiro *et al.* (2012) claim that the concept of CSR contributes to better financial performance by reducing costs directly and indirectly, by raising productivity and customer satisfaction. Chaterjee, Lefcovitch (2009) conclude that as a result of the latest rise in socially responsible trends, the social performance becomes almost as important as financial performance. Cornett *et al.* (2016) examine banks' sustainability in the US during global financial crisis and establish they got rewarded for socially responsible behavior.

Several authors dedicated their studies to the relationship between CSR and financial performance of commercial banks. The predominant conclusion is that sustainability results in financial outperformance (Scholtens, Klooster 2019, 3). Scholtens (2009) confirms the hypothesis about the positive impact of CSR on the financial performance of the banks in his study as well as Weber (2017) shows in the research that corporate sustainability and financial performance correlate to each other positively, whereas Jan *et al.* (2019) report that in Islamic banking the improvements in sustainability practices add financial value to various stakeholders. On the other hand, few studies revealed that the application of CSR does not significantly relate to financial performance (e.g. Paulík *et al.* 2015) or that high financial performance affects social responsibility (Gonenc, Scholtens 2019). The results from cross-region studies generally point in the same direction as those on individual countries (Scholtens, Klooster 2019, 3). Ciciretti *et al.* (2014) suggest banks with higher sustainability scores have lower cost of debt and equity. Jo *et al.* (2015) state that

banks' environmental performance improves their operational efficiency and as such results in better financial performance. Wu *et al.* (2017) argue that the more banks engage with sustainability, the better their financial performance, namely bank efficiency and performance ratios. The cross-regional study of banks from 48 countries shows that sustainable banking practices increase profitability (Olmo *et al.* 2021). In addition, Buallay (2019), examining 235 European banks from 2007 to 2016, holds that there is a positive impact of environmental, social, and governance (ESG) issues on performance. The recent research focusing on 472 global banks by considering the period from 2015 to 2019 shows that ESG initiatives are regarded as strong value-adding mechanisms (Bhaskaran *et al.* 2021).

Even though the link between sustainability and performance has been identified, the data on the effects of sustainability on financial performance is limited, especially in developing markets (Stefanovic *et al.* 2021, 2). It is observed that most of the literature is oriented to Western countries, being almost absent in Central and East Europe Countries (Fijałkowska *et al.* 2018) and, thus, research is needed in this field. According to Furrer *et al.* (2010), sustainability significantly differs between Western and CEE countries. So-called technology followers present different contextual specificities, e.g industrial norms, institutional policies, that influence how their firms understand sustainability features (Sempere-Ripoll *et al.* 2020, 4). As stated by Fijałkowska *et al.* (2018), CEE countries' interest in sustainability is relented by their different institutions, dynamic environment with systematic changes from rapid economic growth, a preference for materialism and maximization of economic and financial goals, and less stress on social issues. The study also outscores that sustainability engagement is not rewarded in these countries because their markets are incapable to perceive social-environmental performance as a competitive advantage but rather as additional costs lowering profitability in the financial industry. This conclusion matches that of Furrer *et al.* (2010) who found that attitudes toward social, economic and environmental corporate responsibility among managers and students in CEE countries are less important than in the West.

1.3. Digitainability

In spite of the variety of innovation activities having at least some sustainability focus in many firms, they are generally unrelated to digitalization initiatives that the same firms have set in recent years (Maier *et al*. 2020). In addition, the implementation of particular initiatives and measures happens in relative isolation without considering the potential positive and negative

interdependencies of sustainability and digitalization (George *et al.* 2020). This independence is surprising since both megatrends invoke substantial transformation and change in many companies (Lichtenthaler 2021, 67). The significant opportunities might stem from combining sustainability with digitalization according to the notion of digitainability (Gupta *et al.* 2020). The term was recently introduced and it refers to " the cross-fertilization between the processes of digitalization and sustainable development" (*Ibid*., 3). Companies should consider these new opportunities, which may provide the basis for designing new core competencies for an ever-more digital and sustainability-driven competitive environment in the future (Lichtenthaler 2021). At the same time, there may also be negative interdependencies between digitalization and sustainability. Digitalization may have a negative environmental impact and may strengthen social divides, even if simultaneously it positively contributes to a firm's financial goals (Gupta *et al*. 2020; Lichtenthaler 2021). For instance, merely focusing on analog efficiency will be insufficient and companies may also need to address digital one (Lichtenthaler 2021).

Competitive, social and institutional pressures on corporate sustainability and digitalization have been forcing banks to improve their impact on society and the environment and to engage in digital transformation. For example, pressure groups, e.g. BankTrack, intensively question international banks' lending practices on critical aspects such as climate change (i.e. funding to fossil fuels) or socially excluded groups. Additionally, governments are increasingly introducing different mandatory ESG-related reporting requirements for financial institutions. To illustrate, European Bank Authority (EBA) recently suggested that credit institutions and investment firms should disclose Green Asset Ratio alongside with other key performance indicators. Moreover, there is a growing demand from clients for sustainability-related products, delivered through digital channels. The 2008 financial crisis was an example of the financial industry's importance for economic development. (Forcadell *et al.* 2020a) However, the financial support by the public sector and the subsequent macroeconomic shocks (Hallerberg, Markgraf 2018) prompted social revulsion toward banks and strongly damaged their reputations (Ruiz *et al.* 2014). Since then, many banks have adopted CS initiatives to restore reputations (Forcadell, Aracil 2017).

Forcadell *et al.* (2020a) argue that reduction of information asymmetries both on the side of the banks – via digitalization, and on the side of the customers – via corporate responsibility, improves banks' economic and market performance and efficiency. The information asymmetries are noteworthy in the banking industry since borrower quality is not easily detectable and can change the risk profile of banks (Levine 2004). Data and firm capabilities for analyzing and predicting

customer behavior reduce asymmetric information significantly, being a source of competitive advantage (Davenport, Dyché 2013). Further, providing financial services in a branch-less scenario enables banks to reduce transaction costs and grasp a larger number of clients (Kitsios *et al.* 2021). Therefore, digitalization can enhance banks' performance and efficiency, by minimizing costs and maximizing revenues. However, digital pathways are not free of risks. Data collection and privacy concerns have become major issues for banks. The increased availability of data from clients creates fears of opportunistic threat and may tarnish the reputation due to job displacements. Standing for corporate sustainability may ease these asymmetries, boosting customers' trust and confidence and minimizing the threat associated with digitalization. (Forcadell *et al.* 2020a, 19)

There is another perspective on how digitainability can be beneficial for the financial industry. Forcadell *et al.* (2020b) claim that reputation generated by corporate sustainability (CS) may offset digitalization drawbacks, specifically CS helps to overcome digitalization challenges that influence banks' boundaries and scope. These risks are the liability of newness, the threat of opportunism generated by information asymmetries, a reduction in switching costs, and the replacement of human labor with technology (*Ibid.*). Sustainable banking has promoted a more inclusive approach by diversifying products and markets to foster financial inclusion (Demirguç-Kunt *et al.* 2018) and environmental care (Scholtens 2017), offering green products such as green and blue bonds, impact investing. Consequently, it may help banks to grow in scope by increasing their digital offerings. The digitalization process contributes to financial inclusion because the unbanked population has a possibility to access banking services in rural areas simply using the mobile phone. (Forcadell *et al.* 2020b, 2184)

Stefanovic *et al.* (2021) assert that digitainability in banking is a substantial factor in uncertain times and should be fostered and included in bank strategies in the post-pandemic world.

1.4. Overview of Estonian banking

The Estonian banking sector is highly concentrated, with a small number of large, primarily foreign, banks. These foreign-owned banks hold 85% of banking sector assets. The market is chiefly divided between Swedbank, SEB Bank, LHV Bank and recent entrant Luminor Bank. 14 banks are serving two million private and 0.3 million corporate customers through 77 bank branches (Estonia's banking … 2021). The high level of banking sector concentration is a result

of privatisation and mergers following the banking crises in Estonia (1992–1994). During this period, some banks were liquidated or recapitalised, and the government encouraged bank mergers and foreign takeovers (especially of Nordic countries) afraid of bank runs and credit contraction. (Cuestas *et al.* 2020, 217)

According to studies devoted to banking sectors in Central and Eastern European (CEE) countries, during the financial crisis of 2008 the region proved to be very resilient, comparable to Western European banking sectors, due to the sound capitalization, strict regulation, and high profitability achieved before the crisis (Horobet *et al.* 2021; Miklaszewska *et al.* 2021). Nevertheless, the crisis has altered the attitude towards bank assessment, by underscoring the importance of bank stability and risk control (Allen *et al.* 2009) and proper capitalization (Demirgüç-Kunt, Huizinga 2010). Thus, on the supply-side, banks in CEE entered the 2020 global economic crisis with strong and stable performance.

Financial stability review made by Estonian Bank in 2021 is consistent with the aforementioned findings. The aggregate capitalization of operating banks remains strong despite the pandemic. The ratio of own funds of the banks to risk-weighted assets was above 27% at the end of the second quarter of 2021. The leverage ratio, which is not adjusted for risk, stays high for the banking sector at 11%. All the banks have been able to meet the capital and buffer requirements throughout the pandemic, most of them with a large margin. Similarly, the pandemic has not harmed the banks' profitability. The net profit as a ratio to assets remained at the level of 1.3-1.4% that was seen in earlier years. (Eesti Pank… 2/2021, 8) Noteworthy, the banking sector in Estonia is among the top three in the euro area for profitability. One explanation for this is that the interest rates on loans issued are higher than those in other countries. Good profitability means that the sector is more resilient to possible loan losses. Overall, the strong financial position means that the banks operating in Estonia are most probably to be able to handle possible loan losses and other developments during difficult times. (Eesti Pank…1/2021, 20)

Meanwhile, several challenges for the banking sector remain. First, there is doubt in the sustainability of the SME sector, especially related to companies in tourism, passenger transport and catering once subsidies are removed. Secondly, low interest rate environment with the dominance of the traditional bank business model may impact adversely on net earnings. Intensified competition from FinTech firms and challenger banks puts additional pressure. According to FinTech Report (2021), 215 FinTechs were operating in Estonia by the end of 2020 and 57 % of them were engaged in digital asset exchange, digital lending and digital payments.

A large amount of surveys and reports show that customers are open to switching to high-tech-based financial firms because of their easy service, more innovative products, attractive rates, and better quality of service (Miklaszewska *et al.* 2021). Further, regardless of the cybersecurity threat, the younger generation of clients indicates a high degree of trust in FinTech firms, products, and solutions (BIS…2019).

Finally, Baltic States' banking sector is exposed to high reputational risks because of the recent money-laundering scandals in the region. They have led to a blow to the Baltic states' reputation as dynamic and safe markets. In Estonia, due to the largest money laundering scandal, the branch of Danske Bank and other Nordic credit institution Versobank AS were ordered to close by Finantsinspektsioon, the supervisory authority. In addition, the licenses of several payment institutions were withdrawn after repeated violations of anti-money laundering requirements. Estonia has been under pressure to strengthen its anti-money laundering system since then. (European Commission … 2020)

2. METHODOLOGY

2.1. Objectives and Data

There are 14 banks of which nine are licensed credit institutions in Estonia and five are operating as branches of foreign credit institutions as of March 2022 (Banks and creditors … 2022). The study consists of 13 commercial banks operating in Estonia since Scania Finans offers only financial leasing. A secondary research method was used by collecting data from existing sources, namely the publicly disclosed reports and websites of the commercial banks, Eesti Pank.

The following banks were the subjects of the analysis (listed with corporate names): Swedbank AS, AS SEB Pank, Luminor Bank AS, AS LHV Pank, Coop Pank AS, Holm Bank AS, Bigbank AS, AS TBB pank, AS Inbank, AS Citadele banka Eesti filiaal, OP Corporate Bank plc Eesti filiaal, TF Bank AB Eesti filiaal, Nordiska Financial Partner Norway AS Eesti filiaal.

Swedbank, SEB and Luminor are the largest commercial banks comprising together about 75% of consolidated banking assets, each of the banks has market share of more than 15% of total banking assets. LHV is another major bank with 14 % of market share and the only big bank founded on Estonian capital. Coop Pank is a smaller Estonian bank with 2.5 % volume of assets, owned by consumer cooperatives. TBB Pank is one of the oldest commercial banks in Estonia which has had a significant drop in net income since 2019. There are several small niche banks. Holm Bank AS is a family-owned bank focused on providing consumer credit solutions to private individuals. Bigbank specialises in providing term deposits and consumer loans to Estonian residents. Inbank is based on the Estonian fintech company Cofi and offers deposit, consumer financing products to retail customers. The latter two banks have 2.5 % volume of assets each. The rest of monitored banks are branches of foreign credit institutions: Citadele banka, OP Corporate Bank, TF Bank which offers personal loans to individuals and Nordiska Financial Partner Norway which provides non-secured small loans and credit cards. They comprise together approximately 2% of market share.

Total assets of the domestic banks account for 22 % of consolidated banking assets. The majority of foreign-controlled banks are owned by Nordic banking groups, which makes the Estonian banking sector dependent on the banking sectors of the Nordic countries−Finland, Norway and to a greater extent Sweden.

Considering the main objective of the paper, namely to identify whether Estonian banks have characteristics of digitainability, the following research elements were designed: 1) the assessment of digitalization of banks is determined on the basis of the banks' offer of digital distribution channels products; 2) the assessment of sustainability is done by evaluation of the application of CSR principles applying CSR measurement framework; 3) to examine the digitainability of the banking sector, the crossing of data connected to digital product offer and sustainability data is performed. Additionally, the study aims to propose new strategies for Estonian banks in post-pandemic times for improving stability and risk management, ESG compliance and sustainable banking.

2.2. Methods

The first step of the research was to assess the level of digitalization of credit institutions. Since the customers are the key driver for banks' digital transformation (Mbama, Ezepue 2018) and maintaining customer relevance, especially during crises, is vital for bank high performance (KMPG … 2019), the offer of self-services channels products has been chosen for assessing the digitalization. Attracting new clients and retaining them demands, inter alia, faster responses to customer service inquiries, more rapid onboarding of loans, fewer system errors, what can be achieved by digitalizing banking processes.

For many researchers, the term digital transformation is employed in new digital channels such as e-banking, mobile banking and e-branch (Kitsios *et al.* 2021). Zuo *et al.* (2021) considered the number of digital channels offered by Chinese banks to evaluate their digital maturity and digital transformation experience. Another recent country study investigating digitainability of the Serbian banking sector used the same approach for assessing the development of digitalization (Stefanovic *et al.* 2021). This study was a continuation of research performed in 2018/2019 focused on the digital transformation of the Serbian banks and investment in digitalization, reflected as the intangible investments affecting the net profit of the banking sector (Barjaktarović,

Stefanovic 2019). Authors there outlined two groups of alternative distribution channels for retail and corporate customers: 1. Electronic banking (e-banking, m-banking, online banking, home banking, e-commerce, 24/7 payment zones); 2. Payment cards (types: debit and credit - DINA, VISA, Masters, American; POS, ATM, payment method). Since Estonia is highly ranked for use of cards and other non-cash payments (e.g. 47 % of all payments were done by card in Estonia while the average in the EU was 24% in 2019 according to a survey conducted by European Central Bank), it is not reasonable to include the payment card group of channels in the assessment.

Meanwhile, partnership with non-banks is another gaining popularity way to expand services to clients, e.g. spending analytics or insurance, mortgages, investment. (Deloitte … 2019; Atherton 2017). Banks being active in the fintech space either by launching stand-alone digital banks or through partnerships, keep abreast of the digital race. Taking into account, that Estonian banks have been actively advancing digital payment solutions and building up high expectations among service users for some years, introduced online and mobile banking long ago and now it is possible to open a bank account online using an e-ID or e-Residency card (Country profile … 2020; E-banking … 2022), the partnership with non-banks is next action for them to broaden digital engagement to counter the threat of the innovative newcomers and, in turn, an indicator of digital maturity. Therefore, the digitalization will be assessed by analyzing if banks 1) developed digital banking channels such as online banking, mobile banking, open banking, wearable banking, chatbot banking, e-commerce (Deloitte … 2020); 2) expanded offer of services due to cooperation with non-banks (KMPG … 2019).

The second step was to evaluate the sustainability of Estonian banks, namely the adoption of CSR principles. In general either exact or index and benchmarking approaches can be used for the CSR evaluation. Exact methods are developed by the specialized companies and initiatives, such as Global Reporting Initiative, G4 Guidelines initiative, SA 8000 (Social Accountability), OECD Guidelines for Multinational Enterprises, and London Benchmarking Group (LBG). (Paulík *et al.* 2015, 68) Soana (2011) presents the methods that can quantify social performance: 1) content analysis of documents with information about CSR activities; 2) survey study for the management; 3) measuring of reputation designed by specialized agencies; (4) measurement of individual indicators focused on specific CSR activity; 5) ethical ratings, including comprehensive measurement of CSR indicators. To measure CSR by using index and benchmarking methods the analysis of the annual reports can be applied. Scholtens (2009) developed a clear framework for banks around the world to measure the degree of social responsibility. He considers the aspects of

social conduct that have voluntary character, particularly social and environmental. The evaluation of socially responsible behavior is made on the basis of four factors: 1) codes of ethics and sustainability reporting; 2) environmental management; 3) responsible financial products; 4) social conduct. However, the study neglects the financial-economical aspect of CSR which calls into question the usefulness of model because banks are especially interested in the economic pillar of CSR. Paulík *et al.* (2015) provide a thorough measuring model of CSR application in commercial banking, using index and benchmarking concept of the measurement of CSR activities. The model takes into account all 3 pillars (Economy, Environment and Social Responsibility), which are divided into seven areas with a total of 18 criteria. Eventually, the authors perform the quantitative evaluation of the application of CSR principles and the assignment of the CSR Index to monitored banks.

In this study the CSR assessment has been made on the basis of the economic, social and environmental criterias (divided into 11 indicators, namely Socially responsible products, Documents and records on CSR, Ethics Code, Equal opportunities and Human rights, Anti-corruption policies and Procedures, Training and Education, Environmental Policy, Financing of environmentally oriented projects, applying two abovementioned models (see Table 1).

Table 1. Framework to assess bank performance on corporate social responsibility (CSR)

Number	Indicator
Economic pillar	
1	investment in public welfare and sponsorship
2	socially responsible products
3	documents and records on CSR
Social pillar	
4	ethics code
5	equal opportunities and human rights
6	anti-corruption policies and procedures
7	customer insight
8	training and education
Environmental pillar	
9	environmental policy
10	financing of environmentally oriented projects
11	green lending

Source: composed by the author based on Scholtens (2009, 164), Paulik *et al.* (2015, 71-76)

"Digital" scoring (1 or 0) is applied. In order to assess individual bank performance, the relative number of indicators, on which bank scores positive, was calculated within each criterion. To

illustrate, if bank scores positive on 1 indicator out of 5 for social pillar, it gets 20% within criteria. Then the average was calculated. The limitation of such assessment is that some information may suffer from self-reporting bias as it has been taken from banks' websites and reports.

Lastly, the examination of digitainability was performed through crossing the data related to the digital product offer and sustainability data. Further, monitored banks were distinguished according to the level of digitalization and sustainability, applying the conceptual framework developed by Lichtenthaler (2021). The author suggests that there are four situations in how core business processes of companies address two megatrends (see Figure 2). Firstly, the *established business activities* can be described by limited levels of digitalization and sustainability, companies implementing them pursue primarily only financial goals. Secondly, companies may have *typical sustainability activities*, meaning that most sustainability initiatives explicitly have a non-digital focus. Thirdly, businesses may establish *typical digitalization initiatives*, which have strong stress on digitalization, while sustainability does not play a significant part.

Finally, strategic emphasis on the high level of both digitalization and sustainability provides *new digitainability opportunities* resulting in enhanced efficiency or wider scope. Some companies advanced in combining a high level of digitalization and sustainability (Gupta *et al.* 2020) and key trends (indicated by arrows in Figure 1) can be highlighted: exploring digital sustainability, enabling sustainable digitalization and empowering balanced digitainability (Lichtenthaler 2021, 70-71).

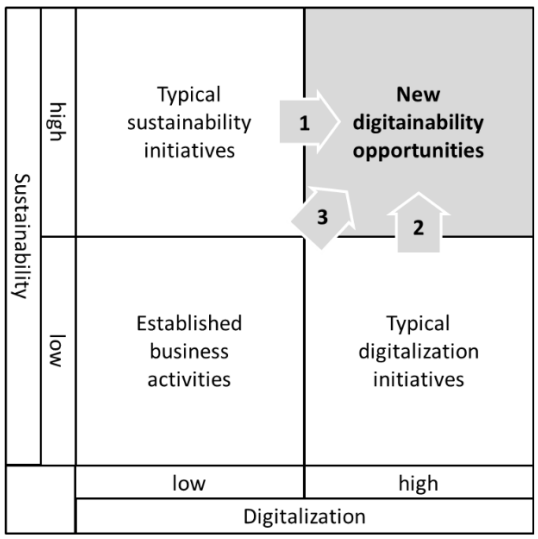

Figure 1. The conceptual framework to distinguish a different strategic emphasis of companies
Source: Lichtenthaler (2021, 69)

3. ANALYSIS AND DISCUSSION

3.1. Data analysis and results

The analysis of banks' websites revealed that every bank in Estonia has implemented some form of digitalization. However, the offer of digital services varies significantly in quantity (see Figure 2). Two key Estonian banks Swedbank and LHV Pank have the broadest offer of digital products for private and corporate clients. SEB Pank and Luminor Bank, as two other major credit institutions, have not developed wearable banking strategy so far as well as chatbot solution (Luminor). Coop Pank similarly to Luminor has not introduced banking for wearables and virtual assistant. Overall, major incumbents – banks with the long-established position on the market (Deloitte…2020) – implemented fully digital processes for account opening, customer onboarding and day-to-day banking largely due to COVID-19 (according to banks' annual reports) and can be considered as digital champions in the amount of channels and functionalities offered and setting key trends.

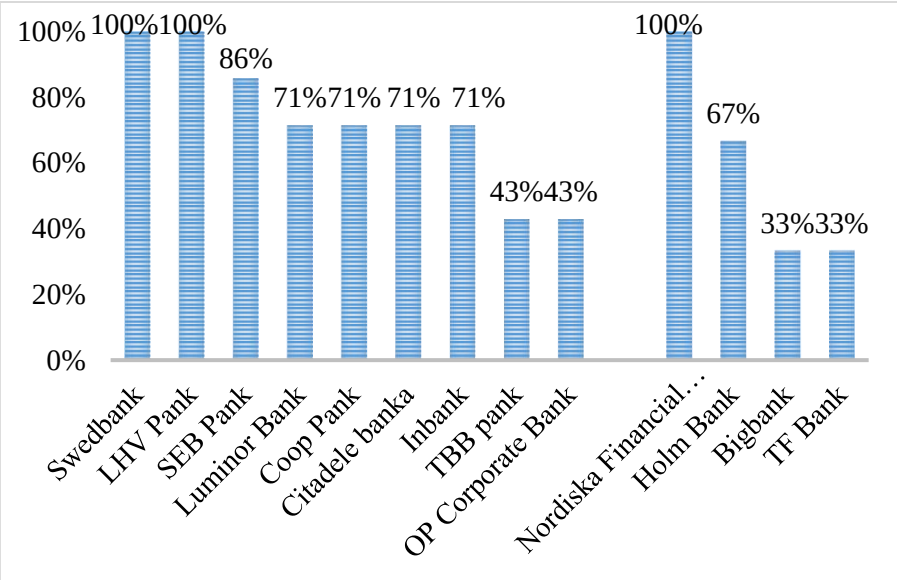

Figure 2. Digital functionality covered
Source: Author's calculations based on data from Appendix 1

The following banks have a slightly less extensive offer of digital distribution channels products: Citadele banka, Inbank. Noteworthy, Citadele banka (branch of Latvian bank) offers wearables such as ring, wristband and sticker for contactless payments that can be received in any branch. Inbank (based on Estonian fintech company Cofi) focuses on deposit and consumer financing products and offers innovative sales finance solutions for merchants. On top of that, it developed In Pay card and app for everyday purchases, being the first bank in Estonia that gives back some of the revenue from card payments. Inbank is the only "challenger" - relatively small bank competing with large long-established banks (Deloitte … 2020) - in the market. A limited range of digital products is offered by OP Corporate bank and TBB pank, which is one of the oldest commercial banks operating in Estonia. It can be explained by the bank's strategic focus on small and middle-sized enterprises.

The rest of monitored banks are niche banks that provide either consumer loans and term deposits to private individuals such as Holm bank, Bigbank or solely loans such as TF Bank. Considering its specialization, they were assessed on the basis of the offer of three products: online banking, mobile banking and chatbot. Nordiska Financial Partner Norway makes available for the customers all possible digital products, followed by Holm Bank with online and m-banking offered. Bigbank and TF Bank have the smallest range of functionalities relevant to customers.

It is worth mentioning that the majority of banks in their annual reports highlighted the increasing importance of digitalization of the core business processes and its relevance for customer satisfaction. The digital product offerings resulted in a rising number of customers choosing to use digital banking products as well as in the continuous improvement of digital services and in the introduction of new ones to meet customer needs and enhance the security of their data and transactions.

In regard to cooperation, banks can be divided in accordance to the digitalization approach they adopted (Deloitte … 2018):

1) Transformation of traditional banking products and services from brick-and-mortar into internet and mobile. Coop Pank, OP Corporate Bank, TBB Pank are the banks with limited presence of strategic partnerships with external companies.

2) Platform-based business approach where data, processes, and business functionalities are made available within an ecosystem of customers, third-party developers, FinTech startups, or partners.

The services provided are financial and may come from banks as well as from third parties. Following banks have adopted the open banking approach: Swedbank, SEB Pank, Luminor Bank, LHV Pank, Inbank, Citadele banka. Three groups of partners can be distinguished (see Appendix 2). The first group is online payment systems and digital wallets Apple Pay, Google Pay. The second group is third party developers such as e-shop integration platforms WooCommerce, OpenCart, Magento2, PrestaShop; webpage and e-mail hosting provider Veebimajutus; account information analytics solution provider Nordigen; e-accounting and e-invoicing providers as ERPLY, Briox, Fitek. The last group is Fintechs such as PayPal, payment gateway platform EveryPay and wearable payment service Fidesmo Pay.

Comparing the banking offer of digital distribution channels products in Estonia with other countries of the world (Deloitte … 2020), it can be concluded that the Estonian banking sector is in accordance with it. Thus, hypothesis 1 (H1) is proved. Additionally, key traditional banks work closely with financial and non-financial services providers proving their strong position in digitalization by expanding to open banking.

In the next step, the assessment of the sustainability of monitored banks was done. Appendix 3 contains the results of it and total performance of every bank. The following figure shows the individual performance within Economic, Social and Environmental criteria (see Figure 3).

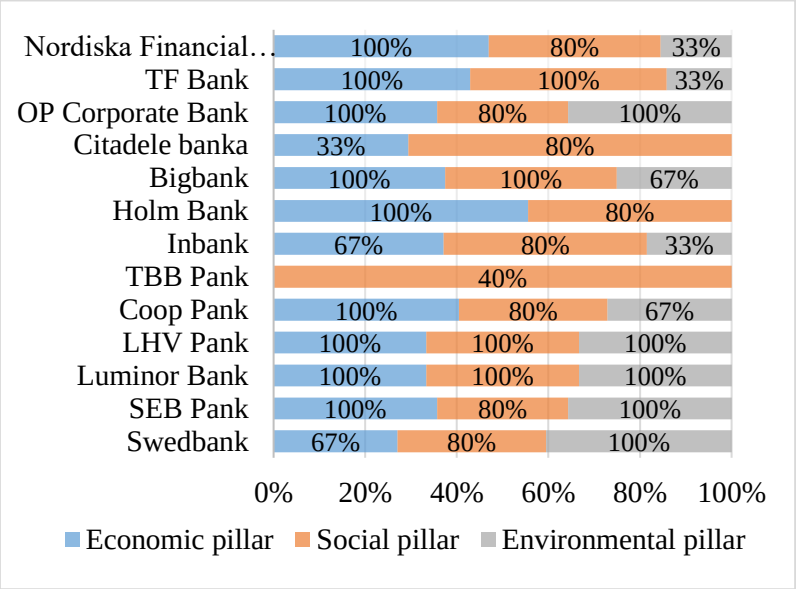

Figure 3. Banks' performance within pillars
Source: Author's calculations based on data from Appendix 1

The first pillar focuses on the economic impacts of the company activities on its surroundings as well as on the communication of sustainable strategy. Within the first indicator, the majority of banks (85%) except Citadele and TBB are financially involved in some way and contribute to the public welfare through their social responsibility programs, sponsorship projects. For example, LHV pank supports The Estonian Football Association, Rally Estonia and Estonian Entrepreneur of the Year competition aiming to contribute to the development of Estonian society (Sponsorship 2022). The provision of socially responsible products is the second indicator. This field is strongly represented in the Estonian banking sector. 92% of banks are integrating sustainable principles into investing and lending process. Additionally, they have determined criteria for deciding what kind of companies are not financed. Noteworthy, Swedbank AB (publ) is included in well-known Dow Jones Sustainability Europe Index, which indicates high results in terms of the volume of provided socially responsible products and an outcome of investing in socially responsible companies. The last indicator is CSR reporting. Overall, CSR reporting is substantially widespread (77%) among Estonian banks. However, some of the banks such as Swedbank, SEB, LHV, Bigbank provide more thorough sustainability and ESG-compliance reports. To illustrate, SEB reports according to the Swedish Annual Accounts Act (based on the EU Non-Financial Reporting Directive) and international frameworks such as Global Reporting Initiative (GRI), the Task Force on Climate-related Financial Disclosures (TCFD) and Principles for Responsible Banking.

The second pillar is focused on Social Responsibility and contains 5 indicators. Ethics code, equal opportunities and human rights, anti-corruption policies and procedures refer to social policy, which is accompanied by voluntary commitment. The ethics code is applied by all of the monitored banks, except TBB Pank which does not disclose its internal ethics code. Similarly, all banks address the issue of equal opportunities and corruption and money laundering. In TF bank's sustainability report 2021 the main aspects of gender equality work are highlighted, namely promotion of opportunities to reconcile work and parenthood, prevention of discrimination, facilitation of even gender distribution within operations and provision to all employees equal pay and conditions for equal work. In regard to anti-corruption policies, banks commit to the subject by providing documents with detailed basic principles and rules for fighting corruption. The next indicator is customer insight which can be considered the most important aspect of the social pillar of CSR due to its impact on the financial performance. The banks argue that they regularly measure customer satisfaction and analyze feedback, complaints, but only a third of monitored banks announce the results. For instance, Bigbank, within its customer experience strategy 2017-2021, increased customer satisfaction with both the functionality of the environment and the overall

experience based on feedback obtained (Bigbank 2021). The last indicator is dedicated to the Employee. 92 % of banks provide training and development programs within employee care.

The last pillar of the CSR concentrates on the environmental field of business. The third of banks do not have an explicit environmental policy (commitment to environmental policy is aimed directly at the activities of the banks and may, for example, evaluate the consumption of paper or water, or in connection with renewable energy sources to assess the share of consumption of so-called green energy). Coop Pank, for instance, moved the head office to the new and more economical Skyon building in order to reduce the carbon footprint of the bank's operations. This office building is built and maintained according to the requirements of the LEED Gold certificate. (Coop Pank 2021) TF Bank reduces its climate impact by using a cloud-based server solution that is considered to be more secure and energy efficient. The office is powered by 100% green electricity and well-functioning recycling procedures have been established. (TF Bank 2021) The second indicator is aimed at the indirect influence on the environment through the offering green products. Only half of the banks committed to the promotion and funding of the environmental projects, e.g. green home loans, green investment loans for companies. Luminor, for example, offers leasing for low emission cars and extends the green product portfolio to support the transition to low carbon economy. It also performs an environmental and social impact assessment on the total consequences of large scale high environmental impact projects and customers. (Corporate Social … 2022) The last indicator is green lending. This type of funding is intended for low carbon and environmentally sustainable investments. SEB is a pioneer and has been a leader in green bonds for close to 15 years. Swedbank has been offering ESG-related bonds and green loans for capital market customers for more than ten years to finance specific green and social projects, investments (Swedbank 2021).

The banks' total scores as percentages can be found in the following figure (see Figure 4). Luminor and LHV banks reached the highest value of the CSR performance with 100%; the lowest result was presented by TBB pank with a value of 13 %. SEB, Swedbank and OP Corporate bank lagged behind the leader banks by only 7 %, followed by Coop Pank with 82 %. Based on the results it can be concluded that commercial banks in Estonia apply the socially responsible principles on an average level of 70 %.

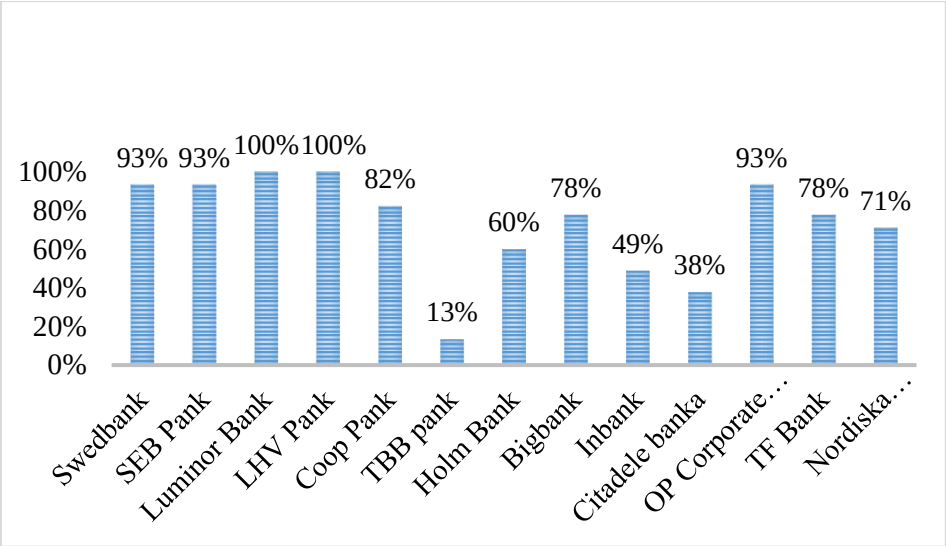

Figure 4. Banks' total score on corporate social responsibility
Source: Author's calculations based on data from Appendix 3

Lastly, the digitainability of monitored banks was determined on the basis of crossing data from figure 3 and figure 4. Banks that have more than average (68%) of digital functionality covered are to be considered highly digital, while high sustainability implies that CSR performance is larger than average equal to 73%. Based on the Lichtenthaler (2021) framework, the distinction of monitored banks according to the level of sustainability and digitalization is provided (see Figure 5).

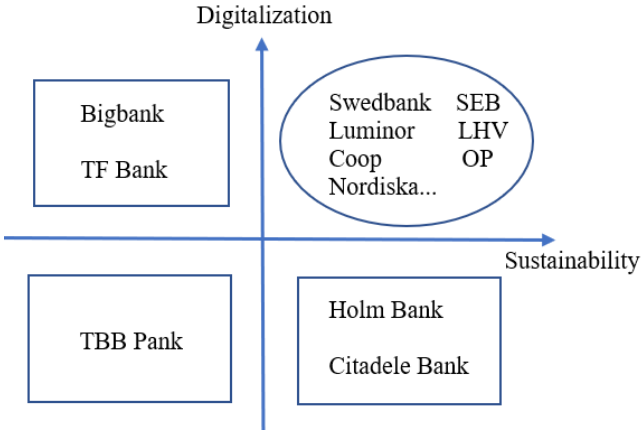

Figure 5. Distinction of Estonian banks by their level of digitalization and sustainability
Source: Author's calculations based on data from Appendix 1 and Appendix 3

Only one credit institution, TBB pank, characterizes for the low level of both sustainability and digitalization, meaning that its core business processes did not specifically address the topics, even though the bank acknowledges the relevance of sustainability or digital tools. Holm Bank, Inbank, Citadele banka have established typical digitalization initiatives, contributed to cost reductions as well as the growth of revenues from innovative products. However, the balancing financial, environmental, and social aspects has not played a significant role for them. On the contrary, Bigbank and TF Bank pay particular attention to the sustainability of their core business, but without enhancing it with many digital solutions. Banks that are combining the high level of digitalization with the high level of sustainability within their strategic focus are the following: Swedbank, SEB Pank, Luminor Bank, LHV Pank, Coop Pank and Nordiska Financial Partner Norway.

Furthermore, they report what kind of digitainable initiatives and operational measures they have adopted. Swedbank focuses on developing digital services as they contribute to minimizing their ecological footprint. Specifically the adoption of digital tools helps to reduce paper costs and save time, as well as to create remote service solutions that can be used without having to visit bank branches. (Swedbank 2021) Coop Pank has introduced the paper-free management of documents in everyday work: they enter into agreements with clients and partners electronically and allow clients to join the bank via simple web solution (Coop Pank 2021). Luminor offers their partners in the e-commerce business an AI tool to reduce their return rates, which in turn contributes to reduced transports (Corporate Social … 2022).

Overall, 6 out of 13 Estonian banks (46%) can be called digitainable, where 5 of them hold approximately 90% of the total assets of the banking sector. The obtained results show that the Estonian banking sector has a digitainability characteristic and, in this way, hypothesis 2 (H2) has been proven.

Table 2 shows the correlation between the CSR performance and digitalization level of the sample of 13 banks and some key bank specific characteristics. This paper analyzes the scale indicators of commercial banks (including total assets and the number of employees); financial performance indicators (including return on average assets, return on average equity, and cost to income ratio); net interest margin; bank liquidity ratio (net loans-to-total assets); bank capital ratio (equity-to-total assets). The financial parameters for the end of the 2021 year were taken from BankFocus, the database of banks' financial statements and ratings. For measuring the dependence of each

variable in the analysis Pearson's correlation coefficient was used, which ranges from -1 (perfect negative correlation) to 1 (perfect positive correlation) and determines the linear dependence of two variables.

Table 2. The correlation coefficients of banks' sustainability, digitalization levels and key financial characteristics

	CSR performance	Digitalization
CSR performance	1	
Digitalization	0.47	1
Total Assets	0.36	0.14
N of employees	0.40	0.35
ROAA	0.04	0.46
ROAE	0.18	0.23
Cost to income	-0.67	-0.21
Net interest margin	-0.03	0.23
Liquidity ratio	0.20	-0.09
Capital ratio	-0.15	0.22

Source: author's calculations based on data from BankFocus (2022)

A moderately strong correlation between CSR performance and digitalization indexes was established. There is a mildly strong relationship between bank size and digitainability, as reflected by the moderate correlation between the number of employees and the two indexes of sustainability and digitalization. The implementation of the CSR strategy has a statistically significant negative impact on the cost to income ratio of the bank, given the correlation coefficient of -0.67. Conversely, a significant positive relation between digitalization and financial performance (ROAA) was found. Other monitored variables have weak, not statistically significant dependences on sustainability and digitalization.

3.2. Discussion

Based on the obtained results within digital transformation, banks such as TBB, Holm bank, Bigbank, TF Bank, and OP corporate bank should deploy more digital products and increase their technology spending on channel improvements if they intend not to lag behind in the digital race and satisfy the consumers' constantly evolving demand, thereby enhancing the better performance and net results (Gupta *et al.* 2020; Barjaktarović, Stefanovic 2019). Meanwhile, Coop Pank and

OP corporate bank are suggested to be more active in FinTech space through partnerships with non-banks as it enables them to sell more products to existing customers, attract and retain clients and generate additional profits.

In terms of sustainability, TBB pank, Inbank, Citedele banka, Holm Bank and Nordiska Financial Partner Norway should address vigorously the initiatives stimulating the transition to a more sustainable future. In other words, they have to integrate sustainability into their core businesses by including ESG considerations into risk management processes, product design, position statements and long-term strategies. Eventually, it will lead to better financial performance through reduced costs, raised productivity and customer satisfaction (Loureiro *et al.* 2012).

Regarding the combination of sustainability and digitalization, many banks in Estonia have started to exploit its potential and provided new digitainability opportunities due to the strategic focus. The rest of the sector can advance towards achieving at least some of the benefits of digitainability in different ways. Bigbank and TF bank could explore digital sustainability, enhancing the impact and strength of their sustainability initiatives beyond the non-digital context by complementing them with specific digital tools and solutions (Lichtenthaler 2021, 70). Holm bank, Inbank and Citadele banka could enable sustainable digitalization, adapting programs to increase the sustainability of their business activities, enriched in this way by additional benefits. TBB pank, being focused neither on digitalization nor on sustainability has a chance to pursue new strategic initiatives that are directed at combining digitalization and sustainability from the beginning (Gupta *et al.* 2020).

In the end, banks that seize the opportunities of digitainability can improve their economic and market performance and efficiency (Forcadell *et al.* 2020a). They can mitigate digitalization risks (e.g. data privacy) by reputation generated by corporate sustainability and tackle the digitalization challenges (e.g. increasing carbon footprint and energy consumption) through implementing sustainability efforts. Successful co-existence of financial and sustainability goals in an increasingly digital business environment should be enabled in bank strategies in the post-COVID 19 world.

CONCLUSION

The study aimed to determine the presence of digitainability in the Estonian banking sector. All commercial banks (n=13), except Scania Finans which provides solely leasing, were examined primarily for the level of digitalization and sustainability. The results showed that every bank in Estonia has implemented some form of digitalization taking into account the needs of customers. More than half of banks (61%) has an extensive offer of digital distribution channel products and was assessed as highly digital. Swedbank, LHV Pank, SEB Pank and Nordiska Financial Partner Norway are more advanced technologically than others and, according to Deloitte digital banking maturity 2020, can be called digital champions, that set trends and provide a reference for other banks to promote their digital transformation and efficiency improvement. In addition, 6 banks (46%) are cooperating with other non-banking partners to expand banking offers and increase their attractiveness for customers and stakeholders of interconnected businesses. Thus, hypothesis 1 was proved.

Existing banks with the low level of digitalization such as TF Bank and Bigbank should promote their digital transformation to meet growing customer expectations prompted particularly by the COVID-19 pandemic. The recent entry of Google and Apple into the payment services market in Estonia, the introduction of the Payment Services Directive PSD2, open banking and the continuous growth of the FinTech industry are driving forces for banks to strengthen the integration of operations with innovations. Additionally, the acceleration of digitalization will help them to safeguard operational resilience, namely to stand the shocks, continue to deliver core business, protect balance sheets, and support customers.

In terms of sustainability, 8 credit institutions (61%) actively apply sustainable principles within the corporate social responsibility concept, choosing to lead on ESG issues and trying to stay ahead of competitors and regulators. The rest of the banks with the low level of sustainability such as TBB Pank and Citadele banka miss the opportunity to build customer relationships based on trust and transparency, not taking a position on the ESG values that clients want to see reflected in the brands they choose. The pressure from stakeholders due to the pandemic is increasing, the

regulatory and policy measures are growing, therefore it is critical for above mentioned banks to link sustainability initiatives to corporate purpose statements and develop a coherent long-term strategy.

The research results show that 46% of the Estonian banking sector has digitainability characteristics. Considering that the five banks included in this share are the largest credit institutions in Estonia, hypothesis 2 has been also confirmed. The correlation analysis results reveal that there is a strong positive relationship between bank size and digitainability. Furthermore, the implementation of CSR strategy and digitalization has a moderately strong impact on the financial performance of the bank (cost-to-income ratio and ROAA).

The main limitation of the study lies in the approach for analysis of digitalization and sustainability. For example, the 'digital' scoring (it is either 0 or 1) within CSR measurement results in loss of nuances as a bank is said to comply or not or to perform or not, whereas the degree or intensity by which the bank does so is not taken into consideration. Moreover, the most important source of information is the banks themselves and the information may suffer from the self-reporting bias.

Evidently, digitalization and sustainability have started to penetrate into banks' business processes and entire value chain. All of this dynamism will provide new opportunities, from the inception of new competencies in emerging technologies that can support banks in achieving their sustainable development goals to build totally new customer relationships firmly anchored by trust and transparency (Lichtenthaler 2021). Capturing the cross-fertilization potential of digitalization and sustainability initiatives will lead to optimization and cost savings. Banks should actively embrace these new opportunities, which may additionally provide the basis for developing new core competencies for an increasingly digital and sustainability-driven competitive environment in the future.

Obtained results contribute to the literature dedicated to digitalization and sustainability in the financial industry by extending knowledge on the country from CEE, where research is scant. In addition, results add more evidence to the current research landscape on the cross-section of digitalization and sustainable development.

A similar approach examining digitainability can be applied to other banks in the Baltic States, and future research studies can be compared with the trends in the EU. Moreover, research related to digitainability and profitability in the banking sector can be conducted. More in-depth conducted future studies may allow the understanding and implementation of strategies to improve digitainability for financial institutions in the post-COVID-19 world. Lastly, managerial implications can be extended to other sectors as the digitalization-sustainability framework is a common issue across industries.

LIST OF REFERENCES

Accenture banking blog. Macchi, M. (2021, June 9). Banks stand to benefit as sustainability co-stars alongside digital. [Blog post]. Retrieved from https://bankingblog.accenture.com/banks-stand-to-benefit-sustainability-co-stars-alongside-digital, 05 March 2022.

Agboola, M.G., Awobajo, K.A., Oluwatobi, S.O., Akinbode, M.O., Fagbohun, M.O., Esse, U.C., Segun-Adeniran, C.D., Asaolu, A.O., Betek, C.M. (2019). Effect of digitalization on the performance of commercial banks in Nigeria. *IOP Conference Series: Earth and Environmental Science*, International Conference on Energy and Sustainable Environment 18–20 June 2019, Covenant University, Nigeria.

Allen, F., Babus, A., Carletti, E. (2009). Financial Crises: Theory and Evidence. *Annual Review of Financial Economics*, 1 (1), 97-116.

Atherthon, M. (2018). *Special Feature - Measuring up: Five key metrics to help Banks measure their "Digital Maturity".* Retrieved from https://www.rfigroup.com/rfi-group/news/special-feature-measuring-five-key-metrics-help-banks-measure-their-digital-maturity, 10 March 2022.

BankFocus (2022). Companies. BankFocus (E-database). Retrieved from https://bankfocus.bvdinfo.com/version-202253/bankfocus/1/Companies/dashboard/Index?refreshTopPos=0&format=_standard&BookSection=PROFILE&uniqueId=True , 1 May 2022.

Banks and creditors. Finantsinspektsioon. Retrieved from https://fi.ee/en/banking-and-credit/credit-institutions, 10 March 2022.

Barjaktarović, L., Stefanovic, N. (2019). What is the effect of intangible assets on earnings of the Serbian banking sector? *Industrija*, 47, 61–75.

Bhaskaran, R.K., Sujit, K.S., Mongia, S. (2022). Linkage between performance and sustainability initiatives in banking sector–An empirical examination. *International Journal of Productivity and Performance Management*, ahead-of-print.

Bigbank Annual Report 2021.

Birindelli, G., Ferretti, P., Intonti, M., Iannuzzi, A. P. (2013). On the drivers of corporate social responsibility in banks: evidence from an ethical rating model. *Journal of Management & Governance*, 3, 39-54.

BIS. BigTech in Finance: Opportunities and Risks. Annual Economic Report 2019.

Boot, A., Hoffmann, P., Laeven, L., Ratnovski, L. (2020). Financial intermediation and technology: What's old, what's new? *ECB Discussion Paper*, No 2438.

Buallay, A. (2019). Is sustainability reporting (ESG) associated with performance? Evidence from the European banking sector. *Management for Environmental Quality*, 3, 98–115.

Carletti, E., Claessens, S., Fatas, A., Vives, X. (2020). *Barcelona Report 2 - The Bank Business Model in the Post-Covid-19 World*. London, UK: Centre for Economic Policy Research.

Chatterjee, Ch., Lefcovitch, A. (2009). Corporate social responsibility and banks. *Amicus Curiae*, 78, 24-28.

Ciciretti, R., Kobeissi, N., Zhu, Y. (2014). Corporate social responsibility and financial performance: an analysis of bank community responsibility. *International Journal of Banking Accounting and Finance*, 5, 342–373.

Coop Pank Annual Report 2021.

Cornett, M. M., Erhemjamts, O., Tehranian, H. (2016). Greed or Good Deeds: An Examination of the Relation between Corporate Social Responsibility and the Financial Performance of U.S. Commercial Banks around the Financial Crisis. *Journal of Banking and Finance*, 70.

Corporate Social Responsibility. Luminor. Retrieved from https://luminor.ee/corporate-social-responsibility-luminor#environment, 10 April 2022.

Country profile: digital and instant payments are the norm in Estonia. (2019). European Payment Council. Retrieved from https://www.europeanpaymentscouncil.eu/news-insights/insight/country-profile-digital-and-instant-payments-are-norm-estonia, 11 March 2022.

Cuestas, J.C., Lucotte, Y., Reigl, N. (2020). Banking sector concentration, competition and financial stability: the case of the Baltic countries. *Post-Communist Economies*, 32, 215–249.

Davenport, T. H., Dyché, J. (2013). Big Data in big companies. SAS International Institute for Analytics Report.

Demirgüç-Kunt, A., Huizinga, H. (2010). Bank activity and funding strategies: The impact on risk and returns. *Journal of Financial Economics*, 98, 626–650.

Deloitte Digital Banking Maturity 2020.

Deloitte EMEA Digital Banking Maturity 2018.

E-banking. E-Estonia. Retrieved from https://e-estonia.com/solutions/ease_of_doing_business/e-banking/, 10 March 2022.

Eesti Pank Financial Stability Review 1/2021.

Eesti Pank Financial Stability Review 2/2021.

Elkington, J. (2018). 25 Years Ago I Coined the Phrase "Triple Bottom Line." Here's Why It's Time to Rethink It. *Harvard Business Review.* Retrieved from https://hbr.org/2018/06/25-years-ago-i-coined-the-phrase-triple-bottom-line-heres-why-im-giving-up-on-it, 10 March 2022.

Estonia's banking sector: Facts and Figures (2021). European Banking Federation. Retrieved from https://www.ebf.eu/estonia/#:~:text=The%20Estonian%20banking%20sector%20is,customers%20through%2077%20bank%20branches, 15 March 2022.

European Commission. Country Report Estonia 2020.

Fijałkowska, J., Zyznarska-Dworczak, B., Garsztka, P. (2018). Corporate Social-Environmental Performance versus Financial Performance of Banks in Central and Eastern European Countries. *Sustainability*, 10, 772.

FinTech Report Estonia 2021.

Forcadell, F. J., Aracil, E. (2017). European Banks' Reputation for Corporate social Responsibility. *Corporate Social Responsibility and Environmental Management*, 24 (1), 1– 14.

Forcadell, F.J., Aracil, E., Úbeda, F. (2020a). The Impact of Corporate Sustainability and Digitalization on International Banks' Performance. *Global Policy*, 11, 18–27.

Forcadell, F.J., Aracil, E., Ubeda, F. (2020b). Using reputation for corporate sustainability to tackle banks digitalization challenges. *Business Strategy and the Environment*, 29, 2181–2193.

Franklin, A., Babus, A., Carletti, E. (2009). Financial Crises: Theory and Evidence. *Annual Review of Financial Economics*, 1, 97-116.

Furrer, O., Egri, C.P., Ralston, D.A., Danis, W.M., Reynaud, E., Naoumova, I., Molteni, M., Starkus, A., Darder, F.L., Dabic, M., Furrer-Perrinjaquet, A. (2010). Attitudes toward corporate responsibilities in Western Europe and in Central and East Europe. *Management International Review*, 50 (3), 379–398.

George, G., Merrill, R. K., Schillebeeckx, S.J.D. (2020). Digital Sustainability and Entrepreneurship: How Digital Innovations Are Helping Tackle Climate Change and Sustainable Development. *Entrepreneurship Theory and Practice*, 45 (5), 999-1027.

Gonenc, H., Scholtens, B. (2019). Responsibility and Performance Relationship in the Banking Industry. *Sustainability*, 11 (12), 3329.

Graafland, J. J., Van de Ven, B. W. (2011). The Credit Crisis and the Moral Responsibility of Professionals in Finance, Journal of Business Ethics. *Springer*, 103, 605-619.

Gupta, S., Motlagh, M., Rhyner, J. (2020). The Digitalization Sustainability Matrix: A Participatory Research Tool for Investigating Digitainability. *Sustainability*, 12, 9283.

Hallerberg, M., Markgraf, J. (2018). The Corporate Governance of Public Banks before and after the Global Financial Crisis. *Global Policy*, 9 (1), 43– 53.

Horobet, A., Radulescu, M., Belascu, L., Dita, S.M. (2021). Determinants of Bank Profitability in CEE Countries: Evidence from GMM Panel Data Estimates. *Journal of Risk and Financial Management*, 14, 307.

Ivanova, O.V., Korobeinikova, L.S., Risin, I.E., Sysoeva, E.F. (2020). The Main Directions and Tools of Banking Digitalization. In: E.G. Popkova, B.S. Sergi (Eds.), *Digital Economy: Complexity and Variety vs. Rationality* (510–516). Springer International Publishing, Cham.

Jan, A., Marimuthu, M., Pisol, M. (2019). The nexus of sustainability practices and financial performance: From the perspective of Islamic banking. *Journal of Cleaner Production*, 228, 703–717.

Jo, H., Kim, H., Park, K. (2015). Corporate environmental responsibility and firm performance in the financial services sector. *Journal of Business Ethics*, 131, 257–284.

Kitsios, F., Giatsidis, I., Kamariotou, M. (2021). Digital Transformation and Strategy in the Banking Sector: Evaluating the Acceptance Rate of E-Services. *Journal of Open Innovation: Technology, Market, and Complexity*, 7, 204.

KMPG Digitalization in banking beyond COVID-2019.

Kriebel, J., Debener, J. (2020). Measuring the Effect of Digitalization Efforts on Bank Performance. In: (Ed.), *Academy of Management Annual Meeting Proceedings* (1-43). New York, NY, USA: Academy of Management.

Levine, R. (2004). The Corporate Governance of Banks: A Concise Discussion of Concepts and Evidence. *World Bank Working Paper*, No. 3404.

Lichtenthaler, U. (2021). Digitainability: The Combined Effects of the Megatrends Digitalization and Sustainability. *Journal of Innovation Management*, 9, 64–80.

Loureiro, S., Sardinha, I. M. D., Reijnders, L. (2012). The effect of corporate social responsibility on consumer satisfaction and perceived value: the case of the automobile industry sector in Portugal. *Journal of cleaner production*, 9(2), 59-74.

Maier, D., Maier, A., Aschilean, I., Anastasiu, L., Gavris, O. (2020). The Relationship between Innovation and Sustainability: A Bibliometric Review of the Literature. *Sustainability*, 12, 1–20.

Mbama, C.I., Ezepue, P.O. (2018). Digital banking, customer experience and bank financial performance: UK customers' perceptions. *International Journal of Bank Marketing*, 36, 230–255.

Miklaszewska, E., Kil, K., Idzik, M. (2021). How the COVID-19 Pandemic Affects Bank Risks and Returns: Evidence from EU Members in Central, Eastern, and Northern Europe. *Risks*, 9, 180.

Olmo, B.T., Saiz, M.C., Azofra, S.S. (2021). Sustainable Banking, Market Power, and Efficiency: Effects on Banks' Profitability and Risk. *Sustainability*, 13, 1298.

Paulík, J., Majková, M., Tykva, T., Cervinka, M. (2015). Application of the CSR Measuring Model in Commercial Bank in Relation to their Financial Performance. *Economics & Sociology*, 8, 65–81.

Pérez, A., Del Bosque, I. R. (2012). The Role of CSR in the Corporate Identity of Banking Service Providers. *Journal of Business Ethics*, 108 (2), 145-166.

Pfitzer, M., Bockstette, V., Stamp, M. (2013). Innovating for Shared Value. *Harvard Business Review*, 91, 100–107.

Porter, M. E., Kramer, M. R. (2011). Creating shared value: How to reinvent capitalism and unleash a wave of innovation and growth. *Harvard Business Review*, 89, 62–77.

Roy, M.K., Salam Sarker, M., Parvez, S. (2015). Sustainability in Banking Industry: Which way to move? *ASA University Review*, 9(2).

Ruiz, B., Esteban, A., Gutierrez, S. (2014). Determinants of reputation of leading Spanish financial institutions among their customers in a context of economic crisis. *Business Research Quarterly*, 17 (4), 259– 278.

Scholtens, B. (2009). Corporate Social Responsibility in the International Banking Industry. *Journal of Business Ethics*, 86 (2), 159-175.

Scholtens, B., Klooster, S. (2019). Sustainability and bank risk. *Palgrave Communications*, 5, 1–8.

Sempere-Ripoll, F., Estelles-Miguel, S., Rojas-Alvarado, R., Hervas-Oliver, J. L. (2020). Does Technological Innovation Drive Corporate Sustainability? Empirical Evidence for the European Financial Industry in Catching-Up and Central and Eastern Europe Countries. *Sustainability*, 12, 2261.

Soana, M. G. (2011). The Relationship Between Corporate Social Performance and Corporate Financial Performance in the Banking Sector. *Journal of Business Ethics*, 104 (1), 133-148.

Sponsorship. LHV. Retrieved from https://www.lhv.ee/en/sponsorship, 10 April 2022.

Stefanovic, N., Barjaktarovic, L., Bataev, A. (2021). Digitainability and Financial Performance: Evidence from the Serbian Banking Sector. *Sustainability*, 13, 13461.

Swedbank Sustainability Report 2021.

TF Bank Sustainability Report 2021.

United-Nations. (2015). Transforming our world: The 2030 agenda for sustainable development. New York: General Assembly.

Upadhyaya, A., Devesh, S., Lawati, A. (2020). What factors drive the adoption of digital banking? An empirical study from the perspective of Omani retail banking. *Journal of Financial Services Marketing*, 25, 14–24.

Watkins, J. P. (2011). Banking Ethics and the Goldman Rule. *Journal of Economic Issues*, 45 (2), 101-119.

Weber, O. (2017). Corporate sustainability and financial performance of Chinese banks. *Sustainability Accounting, Management and Policy Journal*, 8, 358–385.

Wu, MW., Shen, CH., Chen, TH. (2017). Application of multi-level matching between financial performance and corporate social responsibility in the banking industry. *Review of Quantitative Finance and Accounting, Springer*, 49 (1), 29–63.

Yeung, S. (2011). The role of banks in corporate social responsibility. *Journal of Applied Economics and Business Research*, 1 (2), 103-115.

Yip, A.W.H., Bocken, N.M.P. (2018). Sustainable business model archetypes for the banking industry. *Journal of Cleaner Production*, 174, 150–169.

Zabala Aguayo, F., Ślusarczyk, B. (2020). Risks of Banking Services' Digitalization: The Practice of Diversification and Sustainable Development Goals. *Sustainability*, 12, 4040.

Zuo, Lihua, Strauss, J., Zuo, L. (2021). The Digitalization Transformation of Commercial Banks and Its Impact on Sustainable Efficiency Improvements through Investment in Science and Technology. *Sustainability*, 13, 11028.

APPENDICES

Appendix 1. Overview of the offer of digital banking products in Estonia

	Digital products						
Bank	online banking	mobile banking	chatbot banking	wearable banking	open banking	e-commerce	cash e-management
Swedbank	yes	yes	yes	yes	yes	yes	yes
SEB Pank	yes	yes	yes	no	yes	yes	yes
Luminor Bank	yes	yes	no	no	yes	yes	yes
LHV Pank	yes	yes	yes	yes	yes	yes	yes
Coop Pank	yes	yes	no	no	yes	yes	yes
TBB Pank	yes	no	no	no	yes	yes	no
Inbank	yes	yes	no	no	yes	yes	yes
Holm Bank	yes	yes	no	n/a	n/a	n/a	n/a
Bigbank	yes	no	no	n/a	n/a	n/a	n/a
Citadele banka	yes	yes	no	yes	no	yes	yes
OP Corporate Bank	yes	yes	no	no	no	no	yes
TF Bank	yes	no	no	n/a	n/a	n/a	n/a
Nordiska Financial Partner Norway	yes	yes	yes	n/a	n/a	n/a	n/a

Source: Prepared by the author on the basis of the data available on the websites of the analyzed banks on 20 March 2022

Note: n/a stands for not applicable to a particular case

Appendix 2. Overview of Estonian banks' partnerships

Bank	In cooperation with non-banks
Swedbank	Google Pay, Apple Pay (mobile payment services and digital wallets); Garmin, Fitbit, XiaomiPAY (smartwatches payments); Fidesmo, Manage-Mii (wearable payments); ERPLY Books (e-accounting); Avokaado (digital environment for contract management); Veebimajutus.ee (webhosting for homepage, e-shop); EveryPay (payment gateway platform)
SEB Pank	Briox (e-accounting) and Fitek (e-invoicing); WooCommerce, OpenCart, Magento2, PrestaShop (e-shop integration platforms); PayPal (e-commerce); Voog, ShopRoller, WebShopper (e-commerce cloud platforms); EveryPay (payment gateway platform)
Luminor Bank	Nordigen (automated bank account statement analysis); WooCommerce, Shopify, Magento, Opencart, PrestaShop (e-shop integration platforms); Voog (e-commerce cloud platform)
LHV Pank	Google Pay, Apple Pay (mobile payment services and digital wallets); Fitbit Pay, Garmin Pay (smartwatches payments); WooCommerce, OpenCart, Magento2, PrestaShop (e-shop integration platforms); mTasku, Ektaco, Astro (retail cash register and wallet systems); Voog, ShopRoller (e-commerce cloud platform); EveryPay (payment gateway platform)
Coop Pank	e-residency marketplace
TBB Pank	Google Pay (mobile payment service and digital wallet)
Inbank	Google Pay, Apple Pay (mobile payment services and digital wallets); Woocommerce, Magento, PretaShop (e-shop integration platforms)
Holm Bank	none
Bigbank	none
Citadele banka	Google Pay, Apple Pay (mobile payment services and digital wallets)
OP Corporate Bank	none
TF Bank	none
Nordiska Financial Partner Norway	none

Source: Prepared by the author on the basis of the data available on the websites of the analyzed banks on 20 March 2022

Appendix 3. Estonian banks' performance on corporate social responsibility

	Corporate social responsibility											
Bank	1	2	3	4	5	6	7	8	9	10	11	total score (percentage)
Swedbank	1	0	1	1	1	1	0	1	1	1	1	93
SEB Pank	1	1	1	1	1	1	0	1	1	1	1	93
Luminor Bank	1	1	1	1	1	1	1	1	1	1	1	100
LHV Pank	1	1	1	1	1	1	1	1	1	1	1	100
Coop Pank	1	1	1	1	1	1	0	1	1	1	0	82
TBB Pank	0	0	0	0	1	1	0	0	0	0	0	13
Inbank	1	1	0	1	1	1	0	1	0	0	1	49
Holm Bank	1	1	1	1	1	1	0	1	0	0	0	60
Bigbank	1	1	1	1	1	1	1	1	1	0	1	78
Citadele banka	0	1	0	1	1	1	0	1	0	0	0	38
OP Corporate Bank	1	1	1	1	1	1	0	1	1	1	1	93
TF Bank	1	1	1	1	1	1	1	1	1	0	0	78
Nordiska Financial Partner Norway	1	1	1	1	1	1	0	1	1	0	0	71

Source: Prepared by the author on the basis of the data available on the websites of the analyzed banks on 20 March 2022

Note: Column number relates to indicator defined in Table 1. "1" means that bank is active with respect to indicator.

Appendix 4. Non-exclusive licence

A non-exclusive licence for reproduction and publication of a graduation thesis[11]

I Margarita Orobetc

1. Grant Tallinn University of Technology free licence (non-exclusive licence) for my thesis Digitainability of the banking sector in Estonia,

supervised by Pavlo Illiashenko,

1.1 to be reproduced for the purposes of preservation and electronic publication of the graduation thesis, incl. to be entered in the digital collection of the library of Tallinn University of Technology until expiry of the term of copyright;

1.2 to be published via the web of Tallinn University of Technology, incl. to be entered in the digital collection of the library of Tallinn University of Technology until expiry of the term of copyright.

2. I am aware that the author also retains the rights specified in clause 1 of the non-exclusive licence.

3. I confirm that granting the non-exclusive licence does not infringe other persons' intellectual property rights, the rights arising from the Personal Data Protection Act or rights arising from other legislation.

11.05.2022

[1] *The non-exclusive licence is not valid during the validity of access restriction indicated in the student's application for restriction on access to the graduation thesis that has been signed by the school's dean, except in case of the university's right to reproduce the thesis for preservation purposes only. If a graduation thesis is based on the joint creative activity of two or more persons and the co-author(s) has/have not granted, by the set deadline, the student defending his/her graduation thesis consent to reproduce and publish the graduation thesis in compliance with clauses 1.1 and 1.2 of the non-exclusive licence, the non-exclusive license shall not be valid for the period.*