

Assessing the Digital Transformation in Two Banks: Case Study in Hungary

Lam Quynh Trang Tran¹, Dai Thich Phan², Miklos Herdon¹, Levente Kovacs²

¹ Faculty of Economics and Management, University of Debrecen, Hungary

² Institute of Finance and Accounting, University of Miskolc, Hungary

Abstract

The influence of Industry 4.0 and the trend of economic globalization has led to growing competition among enterprises in all business sectors, then compelled them to seek new ways to create competitive advantages and sustainable development. Presently, digital transformation plays a critical role across many countries and in all sectors including the agriculture and the rural development. New players have been increasing in the banking sector in which incumbent banks are competing with other traditional banks, fintech, and big tech. Nevertheless, not all banks are successful in digital transformation. By analyzing the practices of two banks in Hungary, this study aims to highlight the digital transformation process which happens at the leading banks and compare and contrast in all dimensions at these transformations. The study results confirm that digitalization in incumbent banks is still at a low and medium level. Moreover, the study outcomes suggest that strategic planning and human resource play key roles in implementing Digital transformation. In addition, digital transformation at traditional banks is not only related to internal; external stakeholders can be drivers or barriers to this process. Government policy and support are important factors to improve the digitalization process in Hungary related to financial services for the agriculture. Based on the results obtained, the authors aim to supplement the lack of research on digital transformation in Hungary.

Keywords

Digital transformation, bank, Hungary, case study.

Tran, L. Q. T., Phan, D. T., Herdon, M. and Kovacs, L. (2022) "Assessing the Digital Transformation in Two Banks: Case Study in Hungary", *AGRIS on-line Papers in Economics and Informatics*, Vol. 14, No. 2, pp. 121-134. ISSN 1804-1930. DOI 10.7160/aol.2022.140210.

Introduction

With the convergence of digital-physical-biological technologies, the fourth industrial revolution completely changed how people live, work, and run society. This revolution greatly impacts the competitive advantages of countries. Currently, digital transformation and the digital economy are becoming a remarkable feature and an inevitable trend in the world; many governments, organizations, industrial, agricultural and rural development associations have worked on strategic-foresight studies to ground their associated long-term policies (Ebert and Duarte, 2018). Digital financial services (DFS) can give a direct link to increasing farmer income and decreasing malnutrition. The great benefits of digital transformation spread across various aspects of the business (Phornlaphatrachakorn and Kalasindhu, 2021). The value of DFS is apparent in 1. Reducing loss; 2. Increasing social protection and 3. Extending saving, insurance, and credit

services and creating new market opportunities (for new business models, products, and services in every sector). One of many credit vehicles used to finance agricultural transactions, including loans, notes, drafts, and bankers' acceptances. These types of grants are tailored to the specific financial needs of farmers, as determined by planting, harvesting, and marketing cycles (USAID, 2018). Digital transformation is a continuous process with no end, so learning from practical success always brings valuable lessons to all enterprises (Chanias et al., 2019). Significantly under the consequence of the Covid-19 pandemic, the digital transformation would be not only an approach but a mandatory requirement for each country and enterprise. However, despite its importance, it remains an open question of implementing a successful digital transformation. According to a global survey from McKinsey (2018), only 16% of managers confirmed that their companies could perform better after implementing their digital transformation.

Going digital inevitably brings benefits and challenges to all enterprises, and the banking industry is not out of this trend. Digital transformation requires incumbent banks to understand and accept the increasing challenges to survive (Vasiljeva and Lukanova, 2016) and offers new opportunities for the development process (Omarini, 2017). In light of industrialization 4.0, the banking industry has witnessed fundamental changes. On the demand side, the global transition to digital technology, which has changed the customers' behaviors, requires banks to find new technologies to develop their digital services and competencies (Cuesta et al., 2015). On the supply side, financial services would no longer be the game among traditional banks but witness the entry of big-tech (such as Apple, Amazon, Alibaba, Google) and full digital banks (such as N26, Revolut), making this marketplace more competitive (Cuesta et al., 2015; Phan, 2020). The challenges in the digital age force traditional banks to look for new business models that are not relying heavily on transaction costs (Breidbach et al., 2020). The noticeable approach in the business model of traditional banks is to use digital technologies such as open APIs (Application Programming Interfaces), Big Data, and AI (Artificial Intelligence) to create its ecosystem with highly customer personalization, combining non-financial services and financial services, and using a solely digital platform (Pantielieieva et al., 2019). In addition to that, the business environment is becoming more volatile and disruptive. More than ten years since the effects of the 2007-2008 financial crisis, the world economy has gone into a new state of uncertainty due to the Covid-19 pandemic, which has caused some unprecedented business operations in the banking sector. The challenges faced by incumbent banks come from outside factors and the bank's operations. For instance, the changing role of brick-and-mortar bank branches, managing non-branch channels more secure, and the lack of transparency associated with executing regulations issued by banks (Feher and Varga, 2019). Faced with such challenges in the highly dynamic environment, it is clear that a digital transformation is an approach with many potential benefits, frankly speaking, digital transformation in the banking sector would be an irreversible trend. Financial institutions in developed and developing countries have rapidly caught up and embraced this trend. However, it may be that incumbent banks with large assets are more reluctant to adopt digital technologies (Zhou et al., 2021). In many countries, the level of digitization of the banking sector is still not high compared

to the comparative advantage they have. For example, the level of digitalization of Hungarian domestic incumbent banks is low and medium (Magyar Nemzeti Bank, 2019, 2021). It means that there is much space for banks to accelerate their digital transformation process during the next few years. Therefore, it is important to deeply understand digital transformation in the banking sector. Despite the importance of digital transformation, there remains a paucity of evidence on the Hungarian banking sector. In order to fulfill this shortage, the current study aims to bring the best practices from analyzing case studies and give a more holistic view of the digital transformation taking place in banking sectors in Hungary.

By comparing the latest implementation of digitalization between two leading banks, the study would highlight the best practice and differences and analyze how these banks develop their digital capabilities in improving their performance. The current study is composed of five parts. The first part will be the introduction; the second part will briefly present the literature review. The third part will present the methodology used for this study. Part four analyses the digital transformation of two banks. The remaining part of this paper is the discussion and conclusion part.

Theoretical aspect

Digital transformation is a holistic approach to renovate strategy and business model through digital technology (Besson and Rowe, 2012). Some associated terms such as digitization and digitalization should not be misunderstood and often have many different understandings among academicians. Therefore, it is necessary to clarify what these words mean. The term 'digitization' has been used to define the transformation from analog to digital (Bloomberg, 2018). More broadly, digitization is considered the process of changing analog information into digitized information and is associated with the ultimate goal of creating new value for the stakeholders (Schallmo and Williams, 2018). While digitization is related to changing at the information level, the term digitalization has been used to describe the transformation happening at the business process level (Schallmo and Williams, 2018). Meanwhile, digital transformation occurs at the strategic level, emphasizing the changes to the new/ innovative business model toward customers based on digital technology (Bloomberg, 2018; Schallmo and Williams, 2018). Nonetheless, widely varying definitions of digital transformation

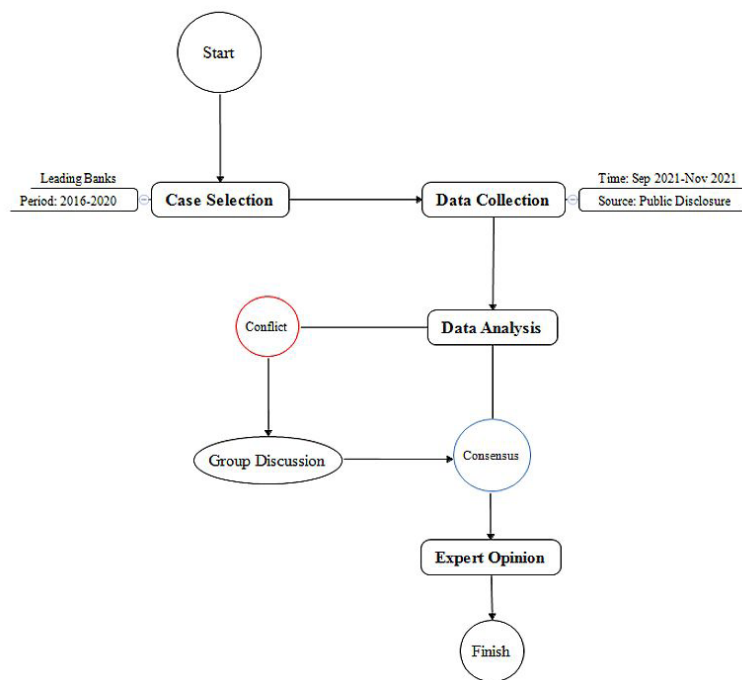
have emerged. For Nwankpa and Roumani (2016), digital transformation means changes based on a foundation of digital technologies. Meanwhile, Libert et al. (2016) and Stief et al. (2016) argue that digital transformation is based on the implementation and application of digital technology, ICTs in order to transform the existing business operation into a new process, products/service, or new business model, sometimes new digital products. In a broader definition, Janssens (2019) defines that digital transformation as the shifting to a new management model and a different philosophy which encourages innovation and new business models and uplifts the use of digital technologies to enhance the experience of internal and external customers. As Kane et al. (2015) mention, digital transformation does not lie in digital technology but in how enterprises organize and implement the transform. In endeavors to provide an overview of digital transformation at the enterprise level, digital maturity models and digital frameworks have been proposed by many researchers (Table 1). For instance, Cuesta et al. (2015) reveal that the digital transformation in the banking sector is divided into three stages. At the first stage, as a response to the change in the competitive circumstances, banks create new channels which focus on mobile devices and new digital products, which predominantly happen in retail payment activities. The second stage strongly emphasizes innovative technological adaptation to transform banks' technology platforms, upgrade the current IT infrastructure. The last stage is the organization-wide transformation from large digital technology investments to organizational culture. Meanwhile, Backbase (2020) introduces the digital-first

framework, which explains how incumbent banks compete successfully with digital newcomers. The framework includes four pillars: omnichannel banking, smart banking, modular banking, and open banking. Matt et al. (2015) propose a digital transformation framework that combines four primary dimensions: Use of technologies, changes in value creation, structural changes, and financial aspects. Accordingly, the use of technologies is considered a strategic priority in digital transformation, thereby helping banks add new products and services to their current offerings or introducing new business models and opportunities. Not only that, the emergence of new technologies and new value chains requires changes in structural operations to ensure effective digital transformation. Matt et al. (2015) argue that financial aspects are the foundation for implementing the remaining three dimensions. Erjavec et al. (2018) show that innovation is mainly derived from the business. While current information technology architectures are dropping behind, somewhat hindering digital transformation, organizational factors such as culture shift or change management contribute greatly to digital transformation success. In Hungary, Kő et al. (2019), through a survey on digital transformation with 167 organizations, shows that enhancing operating efficiency and improving client experiences are the most popular digital transformation goals. However, many companies have paid too little attention to preconditions for successful transformation. Similarly, Endrődi-Kovács and Stukovszky (2022) conclude that the level of digitalization in Hungary is far below the average level in Europe.

Authors	Journal/ Source	Proposed framework	Main idea
Backbase (2020)	Backbase	Four pillar framework	It is suggested that banks should build four pillars: omnichannel banking, open banking, modular banking, and smart banking.
Cuesta et al. (2015)	BBVA research	The three successive stages	The study identifies three important stages to going digital for traditional banks: developing new channels and products, adapting the technological infrastructure, positioning in the digital environment.
Sia et al. (2021)	California Management Review	Design a future-ready framework	The study presents a framework based on the digital transformation journey of DBS Bank.
Krasnikolakis et al. (2020)	Journal of General Management	Multiple polar frameworks	The study proposes multiple polar frameworks that present the five most important factors: customer value, system and process; culture; business model, and institutional context.

Source: Authors' elaboration

Table 1: Some digital transformation frameworks in the banking sector.



Source: Authors' elaboration

Figure 2: Workflow for analyzing the case studies.

and reduce observer bias. Moreover, selecting two cases allows researchers to compare and contrast cases (Meyer, 2001). Due to mergers and acquisitions, the number of banks varies yearly. Until the end of 2020, there were 21 commercial banks and 3 three specialized banks in Hungary, some of which provided financial services to the agricultural sector (EBF, 2021). Our research selected two banks with a wide range of customers and activities and have already achieved some results in the development of digitization in the bank's operations and services. Then, we defined the period for assessing the digital transformation implementation at these two banks from 2016 to 2020. The period from 2016 to 2020 was chosen because of some reasons. Firstly, a period of 5 years is enough to analyze the change in digital transformation at the bank and evaluate its results. Secondly, the period from 2016 onwards is considered a period of stability and development in Hungary's banking system after the financial crisis (Kovács, 2019). Finally, we conducted this research in 2021; therefore, most bank reports could have been completed about 2020.

- The second step in our research was to collect data. Table 2 describes the various sources utilized in this study. This study highlighted the context of the Covid-19 pandemic. For research on the new topic as such digitalization, utilizing reliable sources such as public disclosure from banks, the Central Bank, and the Banking Association is considered an effective method that can be applied (Zhou et al., 2021). Finally, 26 documents with a length of 3034 pages were collected.
- The third step of the research was to analyze data. The two authors searched separately for digitalization keywords (described in the following paragraphs). Then, the sentences in the vicinity of the keyword will be coded manually in Excel files. This process is quite time-consuming but ensures high accuracy. After that, these two authors grouped these codes into each theme: strategy and vision, people, and culture; process and governance; technology and capabilities; and external dimensions. These two authors are then compared against each other based on the encrypted file. If items can be linked to two themes, the four authors will discuss choosing an appropriate theme.

Sources	The type of documents	The number of documents	The number of pages
Two cases	Annual reports & sustainability reports	21	2785
The Hungarian Banking Association	Reports	3	145
The Central Bank of Hungary	Fintech and digitalization reports	2	104
Total		26	3034

Source: Authors' elaboration

Table 2: Sources for data collection.

- The fourth step was used to check for better accuracy and reliability of data analyses. When all information received the authors' consent, it was sent to a professional expert with a great understanding of the digital transformation process in the Hungarian banking sector. As a result, one item was suggested to be re-checked, then all authors would work on this item before finding the agreement. The analyzed dimensions were:
 - Strategy and vision
 - People and culture
 - Process and governance
 - Technology and capabilities
 - External dimension

Furthermore, this study adopts a method to measure digitalization from Martín-Peña et al. (2020) and Zhou et al. (2021), who assessed the level of digitalization as the combination of digital technologies. In this study, the level of digitalization of two case studies was examined in the following step. We first listed the six following digital technologies suggested by OECD (2017) and Zhou et al. (2021): multi-channel banking (mobile banking; online banking; internet banking); data management (big data analysis); platforms (crowdlending); artificial intelligence (Robo financial advisors), blockchain (cryptocurrencies), and other digital infrastructures (5G; machine learning; cloud computing). By scanning the sustainability reports and annual reports from these banks during the studied period, if one item was mentioned, then indicated as 1, if not indicated as 0. Then total numbers were used to indicate the level of digitalization. It means six indicated the highest level of digitalization, 0 indicated the lowest level.

Results and discussion

Case study 1: Bank A

Bank A is among the leading financial service provider groups in Hungary. Currently, this bank has more than 200 bank branches in Hungary with around 10000 employees. The agriculture sector and SMEs customers are its priority. The bank provides many financial services to agricultural farms. Some important ones: AgroDevelopment, Restart Investment, Crisis Loan; Agricultural Direct Payments Pre-Financing; Agricultural Investment Loan with interest rate subsidy; Agro-Entrepreneur Overdraft Facility. In addition to these services, professional online help is Land subsidy calculator, Management calculator, Agricultural machinery financing calculator, Farmland calculator.

1. Strategy and vision

The digital transformation strategy was implemented from 2016-2018, emphasizing four goals: (1) Develop online product application processes; (2) Renew digital platforms and improve customer experiences; (3) Go beyond banking services through the internet and mobile apps; (4) Switching paper-based to electronic processes. Digital transformation strategy is considered a priority strategy of the group; Bank's digital transformation object is to improve the customer experience and enhance our banking operations. Until 2018, this bank has completed 25 digital projects. This bank positions customers as the focus of the development process. In addition to shifting the provision of service to the internet and mobile channels to meet new demand, the bank continues to innovate the in-branch financial services to meet traditional customers who prefer to conduct banking transactions in the traditional ways. Consequently, the Bank determines the parallel transformation to serve all customers better.

2. People and culture

Along with digital transformation, Bank also innovates its corporate culture. During the digital transformation period, the bank's CEO has expressed the need to enhance the organizational culture to implement successful digital transformation. This bank has implemented many projects towards developing organizational culture and innovative skills during digital transformation. For example, in 2017, this bank established an innovation center to encourage an innovative culture and enhance the bank's competitiveness. This center becomes a place to gather innovative ideas with high applicability, supported by Bank for testing and wide application. These innovative ideas contribute to changing the mindset of employees, raising awareness of innovation in the bank. One of the ideas that have been successfully launched is the redesign of the bank's branches. Along with promoting the transformation of staff and managers thinking about digital transformation, Bank also adopts digital technology in training staff and managers. The whole training process was moved to digital environments in 2020 because of the Covid-19 pandemic. At the group level, to enhance digital skills in a new digital working environment, this bank provides a course in leadership skills in cyberspace for manager-levels. At the same time, in 2020, Bank has released internal standards for the communication process in the whole corporation. Accordingly, all information sources from this group, such as website, email, message system will be required to follow this legal document using plain language.

3. Process and governance

As for organizational changes, Bank implemented a change management program starting in 2018, first with the retail and IT department. This program aims towards internal workflow changes, in which teams are formed with ten members whose covering multiple functions work in a single space allowing for faster decision making, accelerating the product development process to market. The result of this program is shortening the time to launch new products/services and increasing customer satisfaction. This program's results initially show success when teams working under this new model can reduce a loan product delivery time by 30-90% and launch one new mobile payment service. The digital transformation process requires close support and supervision from top managers; for example, customer complaints will regularly be reported to top managers in Bank.

4. Technology and capabilities

New technologies such as big data analytics, artificial intelligent allow banks to create new business models and automate and robotize working processes in the banking sector (Werth et al., 2020). In 2014, Bank started to adopt the business intelligence system at customer service and call centers. The automated process reduced the waiting time from customer requests, so more quick answers and immediate resolution could be provided. Furthermore, this bank established a robot-process-automation competence center that could process high-volume workflow without staff present physically. This robotic process is applied to some loan packages. Robots could take over more and more internal processes in the future. This bank has also actively upgraded existing services, such as creating a new website to provide more useful agricultural market information and building a chatbot function on the bank's website. In addition, Bank has installed security software protecting ATMs against software attacks on all ATMs and established a cybersecurity center to ensure information security.

5. External dimension

For mobile services, to meet the increased demand for transactions via the internet and mobile, this bank promotes the shift of online banking services. Furthermore, there is Going beyond conventional banking services: Bank's Mobile application (in 2016, further shopping options were added: booking cinema, theater & concert ticket, paying for parking, motorway tolls, or calling a taxi). In 2016, services such as opening accounts and personal loan applications were carried out on the internet without physically visiting the bank, and this bank also opened a new service such as "meeting online with experts". By 2017, the service "meeting online with experts" was be deployed on more than 130 branches. By 2020, this service would be expanded to include experts in loan assessments and approvals. Being consulted by high-quality and highly experienced experts brings many benefits to customers, especially for services related to high-value investments.

For customer services in branches, in 2016, this bank focused on a customer-friendly approach, the continuous expansion of an available function, expanding our clients, financial knowledge. Therefore, Bank provided easy-to-understand information to customers, such as direct kiosks (2016) or Online video (2017). In 2017, the "Tudasbank" (knowledge banks) service

launched many videos on the website and YouTube channel to explain the most important information regarding the building society saving products. A notable feature is the introduction of cashless branches, where smart ATMs carry out cash transactions; the main purpose of branches is to advise customers on complex products.

To grasp the advantages of financial technology and start-up companies, Bank decided to cooperate with them to add more features for customers. For example, customers can use consumer loans on some partner websites.

Bank's digital transformation implementation brings benefits to the community. The visible benefit of digital transformation the Bank is reducing paperwork and paper consumption. Meanwhile, the video conference model also helps reduce business travel and emissions. Moreover, some benefits from digitalization that Bank contributes to society can be mentioned, such as an online donation channel (in 2018) or using YouTube videos and digital training courses to improve financial literacy.

Case study 2: Bank B

Bank B is a member of Europe's leading banking and insurance business institution, headquartered in a Western European Country. According to an independent rating agency, the level of digitalization at the parent bank is in second place, only behind a fully digital bank in the Belgian market. That is a prove of the success that this Bank has achieved for its digital transformation. Hungary is one of six core markets alongside the other five markets.

1. Strategy and vision

Digital transformation in this Bank is closely related to the digital transformation from the parent Bank. In 2017, the parent bank decided to invest 1.5 billion EUR for its 3-year innovation and digital transformation strategy from 2017-2020. Bank's digital strategy uses an omnichannel approach which aims to optimize customer experiences and create more integrated and more seamless interactions between channels. From 2020, realizing the importance and necessity of digital technologies and innovations solutions in the coming up years, this Bank added these terms to its strategic objective.

2. People and culture

Organizational culture contributes significantly to the success of the parent bank which is implemented to the whole group. The Group's well-

known acronym (implemented since 2012) has created a long-admired internal culture, working as a fundamental of successful implementation of the digital transformation strategy. From 2020, Bank added one more dimension to its organizational culture. This dimension expresses more cooperation, more supports to develop innovative ideas and solutions at the group-wide level. Furthermore, to build a strong culture, the parent bank creates a bank slogan used for all branches and their banks in 6 markets. This attempt aims to promote pride and solidarity within the group, regardless of which market country they serve.

3. Process and governance

In 2016, to execute the digital transformation plan in the entire group, the parent group appointed a Chief Innovation Manager and created an innovation board. Digital strategy implementation plans, and initiatives would be discussed at the Innovation Board of CIM and the CEOs at six core markets. The group understands that the digital transformation trend will expand and affect many areas, departments, and markets. Therefore, the parent group focuses on developing team building to promote learning and sharing new ideas and experiences. Team building groups would include members from many fields and markets to create diversity and group-wide commonality. In addition, under the impact of the Covid 19-pandemic, the Bank has invested more in equipment and IT infrastructure for work from home in the new condition. At the same time, training activities are also invested millions of forints for digital training.

4. Technology and capabilities

In digital transformation, Bank understands that it is necessary to respond quickly to requests to serve customers better, and simplifying all processes becomes the most important issue. Through the help of Artificial Intelligence and data analysis, the whole internal process is done faster. As a result, the decision-making is faster and more accurate based on data. The parent group had plans to launch many full digital assistants in each core market, and this mobilization service is the main trend to provide banking services in the future; many functions are expanded, aiming to synchronize all services. For example, customers can track their savings and investment portfolio with one click. At the same time, the infrastructure of this bank has also been upgraded to a new banking platform. Such as, this bank is implementing a new and modern open-core banking platform which would help

Bank be able to respond quickly to the dynamic Hungarian market.

5. External dimensions

For customers, Bank's digital transformation strategy defines digital-first channel development to meet customers' preferences and demands. For the digital-first channel, the bank will develop digital assistants through mobile apps. All services provided by the bank will be available in a digital manner. At the same time, combining the use of digital technology, the Bank focuses on human-human advice services, and expands cooperation with fintech companies to launch new services such as artificial intelligent-operated cash loan services. The Bank also cooperated with some Vloggers in providing finance and banking knowledge in an easy-to-understand form. It is among the first banks in Hungary to comply with the Payment Service Directive 2 (PSD2), which allows third parties access to the bank account for information and payment purposes. Before the Covid-19 pandemic, the Bank had built legal and infrastructure frameworks that allow its employees to work from home safely. That explains why this bank responded quickly to the Government requirements related to the covid-19 pandemic.

Discussion

After analyzing 2 case studies, the article has synthesized features in the digital transformation process according to the schedule from 2016 to 2020 (Figure 3). Therefore, the research shows

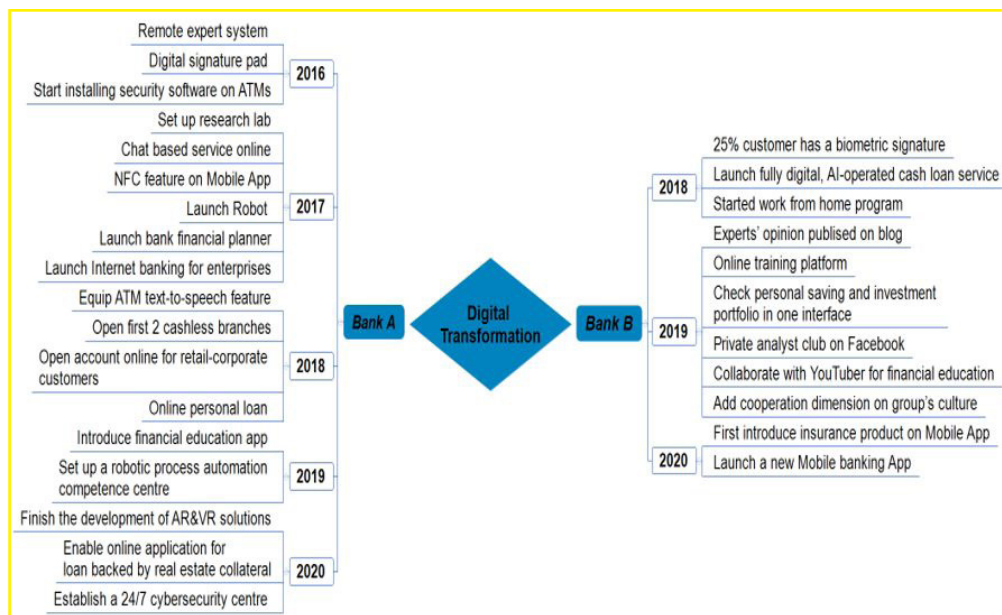
the improvement of technology application and the speediness of digital transformation of each case study.

1. Strategy and vision

Firstly, digital transformation plays an important role in the strategy of banks. In which digital transformation at banks is understood as a higher-level transformation than digitalization, positioned strategically in the long-term, not merely in internal process simplification, instead of towards creating new business model, new services, and products. It seems obvious that banking operations are highly secure, promoting safety and stability, which implies that banks must carefully test new changes and new technologies. The digital transformation in incumbent banks is happening in a parallel process in the new business and traditional models. This result is consistent with the conclusion from Sebastian et al. (2020). Second, the focus of the digital transformation strategy is to serve customers better. The benefits that digital transformation brings to banks are quite large, including new experiences to customers and allowing banks to provide more new types of services, expanding their customer base beyond traditional markets.

2. People and culture

Practices from two case studies show that digital transformation does not just change in technology, processes, or product services. More importantly, it must change the mindset of thinking, corporate



Source: Authors' elaboration

Figure 3: Some features in the digital transformation process from two case studies.

culture, and awareness of each employee in banks. For a successful digital transformation, the role of people and culture is crucial. Therefore, along with digital transformation activities in the operation process and the deployment of new technology, training activities for current and potential employees are necessary. At the same time, education activities occur not only for existing employees but also for bank customers. New training and retraining are necessary to employees due to the digital transformation.

3. Process and governance

Implementing digital transformation requires strong support and monitoring from top managers. In addition, digital transformation projects need to be practical, targeted towards solving specific problems, and done step by step before rolling out in all branches.

4. Technology and capabilities

The application of digital technology in the banking industry is inevitable. Banks set up digital transformation projects for each specific goal, according to which the effectiveness of each item can be assessed. It can be seen from the two banks that digital transformation projects are carried out in many stages carefully, evaluating effectiveness before being applied to the whole system. Currently, the trend of digital service, synchronization in connecting services, robotization of some internal processes is the mainstream trend to be seen. According to the digitalization measurement suggested by Martín-Peña et al. (2020) and Zhou et al. (2021), we found both two banks are still in a low and medium level of digitalization. It can be seen that the application of digital technologies in these banks is still limited and mainly focus on online channels such as mobile banking applications, internet platforms. The expansion has recently applied AI and robotics to a few new products. However, new technologies such as blockchain, cloud computing, crowdlending, or machine learning have not been mentioned. This result is in line with the recent findings from the Fintech report from the central bank of Hungary. This result is also consistent with the results from Zhou et al. (2021), who conclude that incumbent banks reluctantly adopt digital technologies and wait for the mature phase of digital technologies.

5. External dimensions

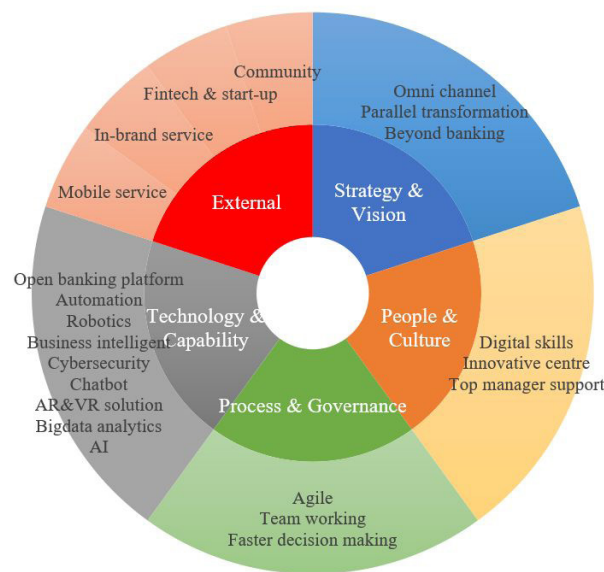
Banks promote digital transformation on online and offline channels regarding distributing products and services (Figure 3). Digital transformation

strategy takes place in four identifiable directions. First, they are launching new mobile applications and internet solutions in providing and expanding their services beyond banking. Second, incumbent banks applied the latest digital technology for in-branch services to develop more financial consulting services at their branches. Third, cooperating with fintech and start-ups mainly focuses on financial information and stimulating innovative ideas. Fourth, for contributing to society, realizing the importance of financial inclusion in this digital era, banks organized many interactive channels to improve financial knowledge for young, elderly, and rural customers. Moreover, using digital technologies to support sustainable development is another identifiable trend from our case studies.

Conclusions

The current research was designed to access a holistic approach to the digital transformation in the two Hungarian banks. The findings from this study make some contributions to the current literature and shed new light on the digital transformation implementation. The present study has been one of the first attempts to thoroughly examine the digital transformation in Hungarian banks. Theoretically, the digital transformation process is happening in five dimensions: strategy and vision, people and culture, technology, governance, and external dimension (Figure 4). By highlighting and providing a new understanding of digital transformation in two leading banks in Hungary, this research may assist banks and bank managers. Our study confirms that incumbent banks in Hungary are still in the early adoption of digital technologies. Some important points could be highlighted in the digital transformation of our case studies.

- Strategic planning is an important factor in implementing Digital Transformation. Banks should prioritize the content of Digital Transformation's orientation in their development plan. This research suggests that banks should carefully implement and evaluate their digital projects before launching in the whole group.
- Human resource plays a key role in successfully implementing Digital Transformation. The human resource is shown in two aspects: managers' support and vision and staff skills. The leaders' strategic vision and close supervision



Source: Authors' elaboration

Figure 4: Digital transformation framework.

from the top management support will help the digitalization projects go on the right track. For example, Bank A requires a direct report on customer complaints to the board of directors. Bank B appointed a Chief of Data Officer position of the whole group, responsible for discussing directly with a Chief Executive Officer at each national market and bringing cohesion, sharing information and experience for innovative ideas and projects.

- Our study highlights that digital transformation at traditional banks is not only related to inside stakeholders; among them, customers is the center of digitalization process. From the perspective of agricultural customers, the study found that digital transformation toward this group of customers is relatively limited. For example, although the agricultural sector is Bank A's main customer, digitization mainly focuses on improving internal processes through faster lending methods or providing market information via the websites. Meanwhile, Bank B supports innovation development in the agricultural sector by providing grants for R&D activities.
- In terms of Governmental policy, a key policy priority should be to plan for the long-term care of digital skills for financial inclusions, such as small

and medium enterprises, young people, older people, and rural residents in remote areas. Governments should also provide more support to develop innovative centers that could bridge banks and scientific research institutions to join and cooperate in researching and applying new innovative ideas.

Limitation and further research

The most important limitations lie that this study was carried out on two banks and based on reports and archives. Therefore, this weakness will limit the generalizability of these results. Furthermore, digital transformation is a continuous process. It is associated with the evolution of digital technologies and changes in customer needs, so more studies are needed to clarify how leading banks can maintain their sustainable digital transformation. Understanding the importance of digital technology is the center of digital transformation; meanwhile, each technology requests a different type of skills and supports. Therefore, we hope that future studies would extend our knowledge to answer how to diffuse the innovative technologies in the banking industry effectively and efficiently.

Corresponding authors:

Dai Thich Phan

Institute of Finance and Accounting, University of Miskolc, Miskolc, Egyetem ut 1, 3515, Hungary

E-mail: sttpd@uni-miskolc.hu

References

- [1] Abdulquadri, A., Mogaji, E., Kieu, T. A. and Nguyen, N. P. (2021) "Digital transformation in financial services provision: a Nigerian perspective to the adoption of chatbot", *Journal of Enterprising Communities*, Vol. 15, No. 2, pp. 258-281. ISSN 1750-6204. DOI 10.1108/JEC-06-2020-0126.
- [2] Backbase (2020) "Banking 2025. Four Pillars of the Digital-First Bank". [Online]. Available: <https://www.backbase.com/resources/banking-2025-whitepaper/>. [Accessed: 10 Feb. 2022].
- [3] Bernini, F., Ferretti, P. and Angelini, A. (2021) "The digitalization-reputation link: a multiple case-study on Italian banking groups", *Meditari Accountancy Research*, Vol. ahead-of-print, No. ahead-of-print. ISSN 2049-372X. DOI 10.1108/MEDAR-02-2021-1201.
- [4] Besson, P. and Rowe, F. (2012) "Strategizing information systems-enabled organizational transformation: A transdisciplinary review and new directions", *The Journal of Strategic Information Systems*, Vol. 21, No. 2, pp. 103-124. ISSN 0963-8687. DOI 10.1016/j.jsis.2012.05.001.
- [5] Bloomberg, J. (2018) "Digitization, Digitalization, And Digital Transformation: Confuse Them At Your Peril", *Forbes*. [Online]. Available: <https://www.forbes.com/sites/jasonbloomberg/2018/04/29/digitization-digitalization-and-digital-transformation-confuse-them-at-your-peril/#78e677fd2f2c>. [Accessed: 10 Feb. 2022].
- [6] Breidbach, C. F., Keating, B. W. and Lim, C. (2020) "Fintech: research directions to explore the digital transformation of financial service systems", *Journal of Service Theory and Practice*, Vol. 30, No. 1, pp. 79-102. ISSN 2055-6225. DOI 10.1108/JSTP-08-2018-0185.
- [7] Chanas, S., Myers, M. D. and Hess, T. (2019) "Digital transformation strategy making in pre-digital organizations: The case of a financial services provider", *The Journal of Strategic Information Systems*, Vol. 28, No. 1, pp. 17-33. ISSN 0963-8687. DOI 10.1016/j.jsis.2018.11.003.
- [8] Cuesta, C., Ruesta, M., Tuesta, D. and Urbiola, P. (2015) "The digital transformation of the banking industry", *BBVA Research*, pp. 1-10. [Online]. Available: https://www.bbva.com/wp-content/uploads/2015/08/EN_Observatorio_Banca_Digital_vf3.pdf [Accessed: 10 Feb. 2022].
- [9] Ebert, C. and Duarte, C. H. C. (2018) "Digital Transformation", *IEEE Software*, Vol. 35, No. 4, pp. 16-21. ISSN 0740-7459. DOI 10.1109/MS.2018.2801537.
- [10] Endrődi-Kovács, V. and Stukovszky, T. (2022) "The adoption of industry 4.0 and digitalisation of Hungarian SMEs", *Society and Economy*, Vol. 44, No 1, pp. 138-158. ISSN 1588-9726. DOI 10.1556/204.2021.00024.
- [11] Erjavec, J., Manfreda, A., Jaklič, J., Fehér, P., Indihar Štemberger, M., Szabó, Z. and Kő, A. (2018) "Case Studies of Successful Digital Transformation in Slovenia And Hungary", in Matej, C., Darija, A., Jure, K., Darja, P., Rudi, R. and Alesa, S. S. (Eds.), *5th International Conference on Management and Organization, Brdo pri Kranju, Szlovénia*: Slovenian Academy of Management, pp. 219-233.
- [12] EBF (European Banking Federation) (2021) "Banking in Europe: Facts and Figures 2021". [Online]. Available: <https://www.ebf.eu/facts-and-figures-2021/>. [Accessed: 16 Jan. 2022].
- [13] Evans, N. D. (2017) "Managing Innovation & Disruptive Technology", [Online]. Available: <https://www.cio.com/managing-innovation-and-disruptive-technology> [Accessed: 16 Jan. 2022].
- [14] Fehér, P. and Varga, K. (2019) "Digital transformation in the Hungarian banking industry – Experiences with Design Thinking", *Society and Economy*, Vol. 41, No. 3, pp. 293-310. ISSN 1588-9726. DOI 10.1556/204.2019.41.3.2.
- [15] Filotto, U., Caratelli, M. and Fornezza, F. (2021) "Shaping the digital transformation of the retail banking industry. Empirical evidence from Italy", *European Management Journal*, Vol. 39, No. 3, pp. 366-375. ISSN 0263-2373. DOI 10.1016/j.emj.2020.08.004.

- [16] Hess, T., Benlian, A., Matt, C., Wiesböck, F., Benlian, A. and Wiesböck, F. (2016) "Options for formulating a digital transformation strategy", *MIS Quarterly Executive*, Vol. 15, No. 2, pp. 123-139. ISSN 1540-1960. DOI 10.4324/9780429286797-7.
- [17] IFC (2017) "*Handbook: Digital Financial Service for Agriculture*", World Bank Group. ISBN 978-0-620-81328-0. [Online]. Available: https://www.ifc.org/wps/wcm/connect/region_ext_content/ifc_external_corporate_site/sub-saharan+afrika/resources/dfs-agriculture [Accessed: 10 Jan. 2022].
- [18] Janssens, J. (2019) "Digital Transformation Journeys in a Digitized Reality", *Advanced Methodologies and Technologies in Business Operations and Management*, IGI Global, pp. 282-294. DOI 10.4018/978-1-5225-7362-3.ch021.
- [19] Kane, G. C., Palmer, D., Philips Nguyen, A., Kiron, D. and Buckley, N. (2015) "Strategy, Not Technology, Drives Digital Transformation", *MIT Sloan Management Review & Deloitte*, No. 57181, p. 27. [Online]. Available: <https://sloanreview.mit.edu/projects/strategy-drives-digital-transformation/> [Accessed: 15 Dec. 2022].
- [20] Kanungo, R. P. and Gupta, S. (2021) "Financial inclusion through digitalisation of services for well-being", *Technological Forecasting and Social Change*, Vol. 167, 120721. ISSN 0040-1625. DOI 10.1016/j.techfore.2021.120721.
- [21] Kő, A., Fehér, P. and Szabó, Z. (2019) "Digital Transformation – A Hungarian Overview", *Economic and Business Review*, Vol. 21, No. 3, pp. 371-392. ISSN 2335-4216. DOI 10.15458/eb.91.
- [22] Kovács, L. (2019) "The First Three Decades of the Hungarian Banking Association", *Economy & Finance*, Vol. 6, No. 1, pp. 2-16. ISSN 2415-9379. DOI 10.33908/EF.2019.1.1.
- [23] Krasnikolakis, I., Tsaropoulos, M. and Eng, T.-Y. (2020) "Are incumbent banks bygone in the face of digital transformation?", *Journal of General Management*, Vol. 46, No. 1, pp. 60-69. ISSN 0306-3070. DOI 10.1177/0306307020937883.
- [24] Libert, B., Beck, M. and Wind, Y. (2016) "7 Questions to Ask Before Your Next Digital Transformation", *Harvard Business Review*, Vol. 60, No. 12, pp. 11-13. ISSN 0017-8012.
- [25] Magyar Nemzeti Bank (2019) "FinTech Strategy of the Magyar Nemzeti Bank", Magyar Nemzeti Bank, Vol. 1.
- [26] Magyar Nemzeti Bank (2021) "Fintech and Digitalisation Report 2021". [Online]. Available: <https://www.mnb.hu/en/publications/reports/fintech-and-digitalisation-report> [Accessed: 15 Jan. 2022].
- [27] Martín-Peña, M.-L., Sánchez-López, J.-M. and Díaz-Garrido, E. (2019) "Servitization and digitalization in manufacturing: the influence on firm performance", *Journal of Business and Industrial Marketing*, Vol. 35, No. 3, pp. 564-574. ISSN 0885-8624. DOI 10.1108/JBIM-12-2018-0400.
- [28] Matt, C., Hess, T. and Benlian, A. (2015) "Digital Transformation Strategies", *Business & Information Systems Engineering*, Vol. 57, No. 5, pp. 339-343. ISSN 2363-7005. DOI 10.1007/s12599-015-0401-5.
- [29] McKinsey. (2018) "*Unlocking success in digital transformations*". [Online]. Available: <https://axiomgroupe.com/images/whitepaper/2019/Unlocking-success-in-digital-transformations.pdf> [Accessed: 10 Jan. 2022].
- [30] Meyer, C. B. (2001) "A Case in Case Study Methodology", *Field Methods*, Vol. 13, No. 4, pp. 329-352. ISSN 1525-822X. DOI 10.1177/1525822X0101300402.
- [31] Nwankpa, J. K. and Roumani, Y. (2016) "IT Capability and Digital Transformation: A Firm Performance Perspective", *International Conference of Information Systems*, Dublin, Ireland.
- [32] OECD (2017) "*Digital Economy Outlook*", OECD Publishing, Paris. ISBN 9789264276284. DOI 10.1787/9789264276284-en.

- [33] Omarini, A. (2017) "The Digital Transformation in Banking and The Role of FinTechs in the New Financial Intermediation Scenario", *International Journal of Finance, Economics and Trade*, Vol. 1, No. 1, pp. 1-6. ISSN 2643-038X. DOI 10.19070/2643-038X-170001.
- [34] Pantieličieva, N., Zaporozhets, S., Nagaichuk, N. and Bartosh, O. (2019) "Transformation of Financial Intermediation in the context of spread of digital trends", *Bulletin of the National Academy of Sciences of the Republic of Kazakhstan*, Vol. 3, No. 379, pp. 144-152. E-ISSN 2518-1467, ISSN 1991-3494. DOI 10.32014/2019.2518-1467.80.
- [35] Phan, D. T. (2020) "I have seen the future, and it rings-What we know about mobile banking research", *Theory, Methodology, Practice*, Vol. 16, No. 2, pp. 69-79. ISSN 1589-3413. DOI 10.18096/TMP.2020.02.07.
- [36] Phornlaphatrachakorn, K. and Kalasindhu, K. N. (2021) "Digital Accounting, Financial Reporting Quality and Digital Transformation: Evidence from Thai Listed Firms", *Journal of Asian Finance*, Vol. 8, No. 8, pp. 409-0419. ISSN 2288-4645. DOI 10.13106/jafeb.2021.vol8.no8.0409.
- [37] Schallmo, D. R. A. and Williams, C. A. (2018) "History of Digital Transformation", *Digital Transformation Now!*, Springer, Cham, pp. 3-8. E-ISSN 2191-5490, ISSN 2191-5482. DOI 10.1007/978-3-319-72844-5_2.
- [38] Sebastian, I. M., Ross, J. W., Beath, C., Mocker, M., Moloney, K. G. and Fonstad, N. O. (2020) "How Big Old Companies Navigate Digital Transformation", *Strategic Information Management*, 5th ed., Routledge, pp. 133-150.
- [39] Selimović, J., Pilav-Velić, A. and Krndžija, L. (2021) "Digital workplace transformation in the financial service sector: Investigating the relationship between employees' expectations and intentions", *Technology in Society*, Vol. 66, 101640. ISSN 0160-791X. DOI 10.1016/j.techsoc.2021.101640.
- [40] Sia, S. K., Weill, P. and Zhang, N. (2021) "Designing a Future-Ready Enterprise: The Digital Transformation of DBS Bank", *California Management Review*, Vol. 63, No. 3, pp. 35-57. ISSN 0008-1256. DOI 10.1177/0008125621992583.
- [41] Stief, S. E., Eidhoff, A. T. and Voeth, M. (2016) "Transform to Succeed: An Empirical Analysis of Digital Transformation in Firms", World Academy of Science, Engineering and Technology, *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, Vol. 10 No. 6, pp. 1550-1559. DOI 10.5281/zenodo.1124445.
- [42] USAID (2018) "Digital financial services for agriculture guide". [Online]. Available: <https://www.usaid.gov/digitalag/documents/digital-financial-services-agriculture-guide> [Accessed: 15 Jan. 2022].
- [43] Vasiljeva, T. and Lukanova, K. (2016) "Commercial banks and FINTECH companies in the digital transformation: Challenges for the future", *Journal of Business Management*, No. 11, pp. 25-33. ISSN 1691-5348.
- [44] Werth, O., Schwarzbach, C., Rodríguez Cardona, D., Breitner, M. H. and Graf von der Schulenburg, J.-M. (2020) "Influencing factors for the digital transformation in the financial services sector", *Zeitschrift Für Die Gesamte Versicherungswissenschaft*, Vol. 109, No. 2-4, pp. 155-179. ISSN 0044-2585. DOI 10.1007/s12297-020-00486-6.
- [45] Yin, R. K. (1994) "Case Study Research: Design and Methods", 2nd ed., Thousand Oaks, CA: Sage. ISBN 9780803956636.
- [46] Zhou, D., Kautonen, M., Dai, W. and Zhang, H. (2021) "Exploring how digitalization influences incumbents in financial services: The role of entrepreneurial orientation, firm assets, and organizational legitimacy", *Technological Forecasting and Social Change*, Vol. 173, 121120. ISSN 0040-1625. DOI 10.1016/j.techfore.2021.121120.