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DIGITAL TRANSFORMATION IN BANKING INDUSTRY: A 3-LEVEL APPROACH

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Abstract

Purpose: The purpose of this survey is twofold. It explores the changes in banking services provided to bank customers and in the relationship between employees and customers due to the digital transformation, which affects all the procedures. The second is the digital disruption caused to the banking profession due to this digital transformation in banks by the reduced staff working in traditional banks and the need for specialized staff with knowledge of the digital bank and its functions.

Methodology: Two primary analyses, one by collecting qualitative data through interviews with bank executives and another by collecting quantitative data through structured questionnaires from bank customers. A primary survey was conducted on 237 banking customers from Greece, Latvia, and the USA. Customers were selected randomly, and information was collected through an interview survey using a structured questionnaire. Principal component analysis (PCA) was conducted to identify the main factors affecting customers' attitudes toward using digital services and applications in the banking sector. Cluster analysis was performed to classify them into groups with similar behavior, whilst discriminant analysis was conducted to check cluster predictability.

Findings: The results indicate that customer relationships have become less personalized and more automated. The majority of the sample considers digital banking services to be accessible while being more convenient and reliable than traditional banking. Most of the sample consider digital banking services to be easy to access and use, while at the same time, they are considered more convenient and reliable than traditional banking. The public shows confidence in digital banking and does not consider it particularly expensive compared to traditional banking services.

Research limitations/implications: The sample size is relatively small and may not be adequate to represent the whole population as the sample may simply differ from the population. This preliminary research could not be considered indicative of the generalization of results. The sample of respondents is only from three countries. Enlargement and reopening of the investigation in future years will record executives' views more accurately to provide safer conclusions. An understanding of the service dimensions and relative importance of the service attributes of digital banking services is of critical importance to banks.

Practical implications: The banking institutions should consider the study's conclusions. Emphasis should be placed on customers' importance to the security and quality of digital transactions. Important advantages of digital banking services are 24-hour support, better time usage, and simplified procedures. However, most respondents consider their personal contact with banking staff necessary, useful, and efficient. The above conclusions should be studied by policymakers in banking institutions in the sense that customers' concerns and expectations should be taken seriously in relation to digital banking services.

Social implications: Identifying key customer segments enables banks to enhance customer experiences. The fact that many respondents consider the interpersonal relationship with bank employees something generally useful should be a starting point for those in charge of seeking a golden intersection between digital and traditional banking to prevent a breach between the new banking reality and the real needs of their customers. Moreover, this should be an important reminder for the banking industry's designers of the different approaches for different customer communities.

Originality: The originality of the paper derives from the three-level approach as it explores how digital transformation affects banks (new business models), customers (preferred services), and employees (forms of employment). The other dimension of the originality is that it identifies the factors that affect customers' attitudes towards digital banking

and classifies the customers into groups according to their similar behavior patterns, demographic characteristics, and other factors with a sample from three countries: Greece, Latvia, and the USA.

Keywords: Digitalization; Banks; Customers; Employees; Statistical analysis

JEL index*:* L86; G21

Introduction

Banks are facing enormous challenges globally due to the trend toward the loss of specific monopolies that used to have comparative advantages in the past and supported their dominant position in the financial system (World Bank, 2012; Zhaojin, 2016; Bollard et al., 2017; D' Espallier et al., 2017). During the past decade, the banking industry developed new business models, concepts, and improvements such as digital banking, telephone banking, and electronic retailing (Yousafzai and Yani-de-Soriano, 2012). This evolution has increased customers' expectations, the availability of customer service, and competitive pricing (Hough and Chan, 2018).

Each day, new technologies and devices are providing various customer touch points (Shivakumar and Sethii, 2019). Access to computer screens is a common habit every day, and nowadays, smartphones give numerous abilities to users through applications. Each bank has its own app, which provides a wide variety of services, and what is more, the level of security it provides is very high (Khan et al., 2016). All these technological developments have changed the traditional banking industry, which is being replaced by new models and practices that have changed the customers' experience (Evdokimova et al., 2019). This is a challenge that all banks should consider because the customers' experience is valuable (The Financial Brand, 2018). The purpose of this survey is twofold; it explores how customers perceive bank digital services and the disruption caused to the banking profession. Firstly, it deals with the changes in banking services and how digitalization has affected the relationship between banks and customers (Keskar et al., 2018; Rieker, 2018). Secondly, it explores how these digital advances have affected employees. There is a big reduction of staff working in traditional banks, and moreover, the need for specialized staff with knowledge of digital banks and their functions is more than essential (Evdokimova et al., 2019). The purpose of this survey is twofold; it explores how customers perceive bank digital services and the disruption caused to the banking profession. Firstly, it deals with the changes that have occurred in banking services and how digitalization has affected the relationship between banks and customers (Keskar et al., 2018; Rieker, 2018). Secondly, it explores how these digital advances affected the employees. There is a big reduction of staff working in traditional banks, and moreover, the need for specialized staff with knowledge of digital banks and their functions is more than essential (Evdokimova et al., 2019).

Quantitative data was collected through structured questionnaires from bank customers in three countries, while qualitative data was collected through specific interviews with bank executives and structured questionnaires from bank customers.

Large-scale demographic data were gathered to describe these respondents and identify key customer groups. Awareness of key customer segment factors can be a useful tool for banks to improve their customer experience in the current highly competitive financial services market. This offers important information banks could use to enhance digital banking services and advance new products and programs. In this respect, comprehending the dimensions of the service and the respective importance of the digital banking service features is crucial for banks. The research work was carried out in three countries, namely Greece, Latvia, and the USA, so that we could provide an international perspective.

Literature review

Many surveys have focused on digitizing the banking industry and its impact on customers and employees. More specifically, for customers, Ramaswami et al. (2000) suggest that for offline and online transactions, two factors influence the purchase of online financial products. These are previous indications that the customer is 'gaining' on the offline channel and using the online channel for information search. This means that customer online behavior is often determined by previous indications on the offline channel, which corresponds to the mental model on the online one. Thus, if the customers are satisfied with an offline product, they are likely to favor it on the online channels. The research by Ramaswami et al. (2000) shows that if there is trust in the offline vendor from the customer, then there will be a positive customer attitude towards online products; Gefen et al. (2003) shows that trust in an e-commerce vendor leads to the customer's intention to purchase from that vendor. Therefore, the research by Lee et al. (2007) investigating the research of Ramaswami et al. (2000) and Gefen et al. (2003) showed that, similarly, trust in the offline bank should positively influence the extent of the intended use of the bank's online system.

However, Aboobucker and Bao (2018), as well as Boateng et al. (2016) intended to investigate hypotheses about the impact of social features of websites, such as trust and compatibility on customer lifestyles. The results of Boateng et al.'s (2016) research showed that trust is closely related to customers' intentions to adopt digital banking, and therefore, it plays an important role in its use. It is one of the central elements of the social environment, as evidenced by the research of Aboobucker and Bao (2018) and Boateng et al. (2016). This reduces the lack of certainty among individuals in their respective social environments and encourages customers to use online banking rather than offline. Jarvenpaa et al. (2000) proved that customer trust leads to purchase intentions, while the research of Liu et al. (2011) found that what Jarvenpaa et al. (2000) showed corresponds to digital banking as well.

Normalini and Ramayah (2012) argue that information security is of great concern to

computer users, as it relates to human factors. The research by Normalini and Ramayah (2012) refers to digital banking and the lack of security in applications. They explored ways to improve the security system of digital banking transactions, such as using biometric authentication systems. Their purpose was to delete passwords and, for example, replace them with fingerprints. Thus, Normalini and Ramayah (2012) argue that a way to be more secure in e-banking technologies is to add the biometric identities of customers to banking systems. AbuShanab and Pearson (2007) used three variables in their research: Performance expectancy, effort expectancy, and social influence. These variables showed that customers with high-performance expectancy were more likely to use digital banking. However, this variable was influenced by age, an important factor in this relation because younger customers could accept technology more easily than older people. This was also the conclusion of Serener's survey (2016), which, in addition to age, used other variables such as income and education, and they found that people with higher income or higher education are more likely to adopt digital banking services. AbuShanab and Pearson (2007), using expectation effort, demonstrated that the relation with gender, age, and experience was not important because the convenience of a system weakens with experience, while customers are more concerned about safety and utility. Finally, consumers with high social influence were intent on using digital banking services.

On the other hand, Julien and Tsoni (2013) conducted comparative quantitative research on banking services, where the bank's financial advisers and consumers were asked to answer a few of the same questions about customer perceptions of quality bank services. The results showed significant discrepancies of perception between bank customers and frontline employees (financial advisors). Julien and Tsoni's (2013) findings show that employees struggle to put themselves in the customer's shoes and understand the customer experience. The key features of service quality are less strict because frontline employees do not blame themselves for any poor performance. The development of multi-channel distribution strategies has negatively affected the time allocation of frontline employees. Bank customers increasingly contact financial advisers through various communication channels (e.g., email, Internet, mobile, face-to-face), expecting they will be more readily available.

According to Ege Oruc and Tatar (2017), in Turkey, in addition to customer results, there were also ways to manage digital transformation services (Digital banking). Therefore, banks should focus on providing guidelines for these services and on planning different campaigns to minimize the customers' perceived risks to digital banking services and increase their confidence in their system for any third-party violations by disclosing the benefits of this service in contrast to other traditional channels. Another study was conducted by Yoon and Barker Steege (2013) on the acceptance factors of digital banking customers. They came to a positive conclusion that the research model can help bank managers and, generally, the banking system to discover motivating factors and prospective barriers to using digital banking services so that they can improve their banking systems for the purpose of attracting customers.

Takieddine and Sun (2015) also investigated in 33 European countries (Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Luxembourg, The Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, and Turkey) to answer the research question why different countries exhibit different levels of digital banking adoption. They proposed a digital banking diffusion model that examined the impact of economic, technological, and cultural factors on digital banking diffusion. Surveys conducted by Koufaris and Hampton-Sosa (2004), Hampton-Sosa and Koufaris (2005), Casalo et al. (2007) and Vatanasombut et al. (2008), have categorized four factors in the banking sector concerning digital banking services: perceived security, perceived usefulness, perceived privacy, and perceived ease of use. The authors of the aforementioned studies point out that these factors influence trust in digital banking services. Yap et al. (2009) argue that traditional service quality enhances customer trust in the digital banking service. The size and reputation of the bank were found to provide structural assurance to the customer but not in the absence of traditional service quality. Website features that give customers confidence are significant situation normality cues.

Finally, the 'usability' or the effort required to use the computers of the digital banking website, as defined by Casalo et al. (2007) can directly affect customer confidence. Moreover, the same research notes that trust in digital transformation directly and positively affects the bank's potential. The better the reputation of the bank, the more reliable the reputation of its digital services will be. Thus, according to Casalo et al. (2007) and Mukherjee and Nath (2003), an important factor directly related to both online and offline banking services is the reputation of the bank's physical store. Therefore, reputation is key to customer confidence concerning digital banking services.

Digital proliferation and automation in the service sector, par excellence in the banking industry, intersects with the transformations that take place in labor relations during the post-reform era (Upchurch, 2018). Some aspects of these transformations include flexible forms of employment, new working conditions, new occupational hazards, transformations of social security systems, and new forms of organizing trade union action (International Labour Office, 2016). In the context of new industrial relations, the widening digitization of employment shapes a new landscape in the world of work whose characteristics have not yet been sufficiently explored (World Economic Forum, 2018).

With this new data, important questions arise for banking industry employees about the evolution and prospects of their work (Sullivan et al., 2014). For most of the employees in the banking sector, digitalization has brought major changes in terms and conditions of work, rights, education, management of job insecurity, and policies. Generally, new conditions are established in the banking industry (Noe et al., 2017). Intensification and systematization of continuing education and training, certification of new skills, management of job insecurity, and standardization of innovative active employment policies are necessary interventions for a smooth transition to the new conditions (Chadha and Parimoo, 2017; Sommer, 2023)

Approach

The study involves a three-level analysis considering three entities: banks, customers, and employees (Figure 1).

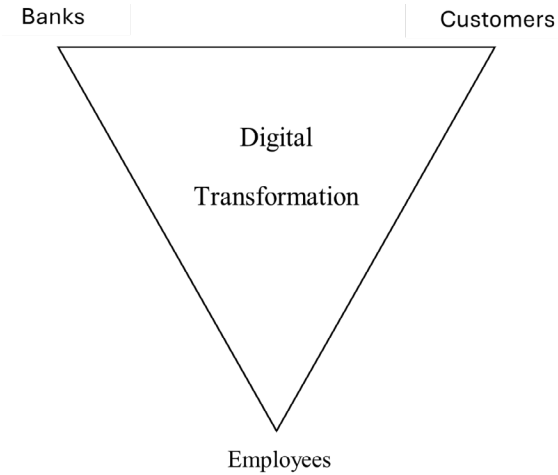

Figure 1: Schema among banks, customers, and employees
Authors' adaptation

A secondary analysis was performed by gathering quantitative data from other research concerning the impact of automation and digitization on the banking industry. Two primary analyses were conducted, one by collecting quantitative data through structured questionnaires from bank customers and the other by collecting qualitative data through interviews with bank executives. The overall evaluation disclosed findings for bank business models, customer habits and preferences, and labor relations of employees in the three countries.

It was determined that both quantitative and qualitative research were required for this project. Qualitative research is a scientific method of observation that gathers non-numerical data (Babbie, 2013). Quantitative research is defined as "explaining phenomena by collecting numerical data that are analysed using mathematically based methods (in particular statistics)" (Aliaga and Gunderson, 2000). Survey research was selected as the methodology was deemed the best fit based on the study objectives. Survey research is "collecting information from a sample of individuals through their responses to questions" (Check and Schutt, 2012). To distribute the same survey in multiple countries, an online survey became increasingly attractive to reach our target audiences. The techniques used in the survey were also created to generate the information needed. The survey techniques used to conduct our research were designed to generate the necessary data. Close-ended questions were used, so that the data could be quantifiable. Open-ended questions were

also used to gain clarification and probe deeper into customer behavior.

This study builds on research by Dhurup et al. (2014) and Yousafzai and Yani-de-Soriano (2012). After testing 38 statements and using a factor analysis procedure, Dhurup et al. (2014) identified seven factors influencing customer perception of digital banking service quality: assurance, responsiveness, ease of use, accessibility, fulfillment, speed and accuracy, and contact. Yousafzai and Yani-de-Soriano (2012) developed a construct of technology readiness using the technology acceptance model (TAM) (Davis et al., 1992) and testing 46 statements. For this research, a 20-item scale was developed using those statements that display the highest factor loading (>.90) across both studies.

Valsamidis et al. (2020) presented a preliminary version of the survey in a different dataset regarding bank customers. That survey concerned only Greek customers of digital services offered by banks, and bank executives were not interviewed. The approach is depicted in Figure 2.

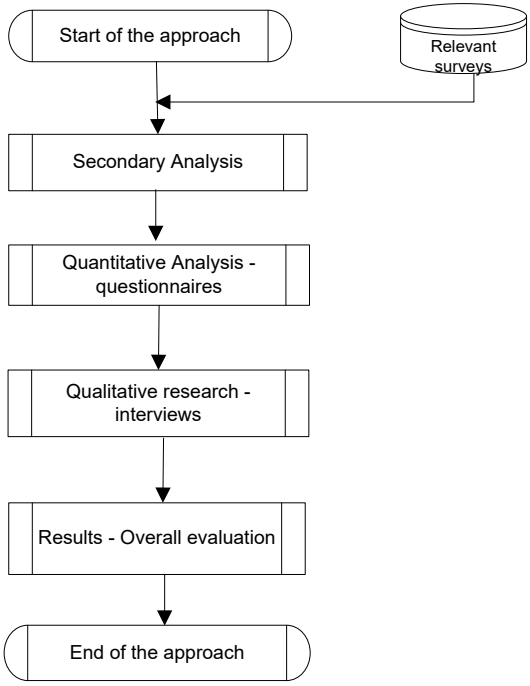

Figure 2: The 4 steps approach

Results

Factors that influence bank customers on bank digital services.

4.1.1 Factors that influence bank customers on bank digital services in Greece.

Tables 1 and 2 show the variables and the five main key factors that influence bank customers in Greece on digital banking, as well as their eigenvalues and the percentage of variance results from PCA.

Table 1. Variables influencing Greek banking customers' attitude to bank digital services.

Component	Eigenvalues	% of Variance	Cumulative Variance
1	**9.676**	**48.381**	**48.381**
2	**1.826**	**9.128**	**57.509**
3	**1.347**	**6.736**	**64.245**
4	**1.143**	**5.713**	**69.958**
5	**1.050**	**5.249**	**75.207**
6	0.813	4.066	79.274
7	0.680	3.401	82.674
8	0.576	2.878	85.552
9	0.452	2.259	87.811
10	0.431	2.153	89.964
11	0.367	1.833	91.797
12	0.313	1.563	93.360
13	0.295	1.477	94.838
14	0.236	1.178	96.016
15	0.212	1.058	97.074
16	0.170	0.849	97.923
17	0.155	0.775	98.697
18	0.101	0.505	99.202
19	0.084	0.420	99.622
20	0.076	0.378	100.00

Table 2. The main factors influencing Greek banking customers' attitude to bank digital services.

Main Factors	Factor Loadings
Factor 1. Digital banking issues	
My bank's website is easy to use	0.817
My bank's online functionality serves my needs	0.758
I am able to get onto the website quickly.	0.754
It is easy to find what I need on the bank's website	0.706
My bank's website loads quickly	0.625
It was easy to for me to become confident with online banking	0.588
Factor 2. Speed and security issues	
Digital banking enables me to conduct transactions more quickly	0.861
My bank's website seems security-conscious	0.696
My bank has a good reputation	0.678
My online transactions with the bank are always accurate	0.670
Technology gives me more freedom of mobility	0.635
Digital banking helps me make the best use of my time	0.564
Factor 3. Website issues	
My bank's website does not breakdown	0.806
The website does not freeze during a transaction	0.716
Technology gives me more control over my daily life	0.534
Factor4. Correspondence issues	
There is always a representative to speak if I have a problem	0.902
My bank provides prompt response to my requests	0.599
Factor 5. Human touch	
Human touch is very important when doing business with a company	0.897
I prefer to use the most advanced technology available	0.541
My bank protects my personal information	0.460

KMO MSA = 0.852 Bartlett test of Sphericity 731.008 P <0.001

Hence, PCA identified five main factors that influence Greek banking customers' attitude to digital services offered by banks: (a) digital banking issues, (b) speed and security issues, (c) website issues, (d) correspondence issues, and (e) human touch.

In the next stage, hierarchical and non-hierarchical clustering methods were used to develop a typology of banking customers' attitudes towards digital services offered by banks (Hair et al., 1998). Cluster analysis was conducted on the 52 observations, as there were no outliers.

The analysis yielded three groups of bank customers named according to their attitudes

to these applications (Table 3). These are (a) customers interested in technological issues, (b) customers interested in digital banking issues, and (c) customers interested in speed, security, and correspondence issues.

Table 3. Categorization of Greek customers regarding their attitudes towards bank digital services

Key Consumption Dimensions	Interested in technological issues	Interested in digital banking issues	Interested in speed, security, and correspondence issues	P
Digital banking issues	-0.14527	0.95551	-0.22875	0.010
Speed and security issues	0.30677	-0.54704	0.30134	0.036
Website issues	0.45479	0.43797	-1.11284	0.001
Correspondence issues	0.17552	-1.31609	0.36258	0.001
Human touch	-0.29543	-0.12698	-0.50345	0.036
Number of customers (n=52)	**29**	**8**	**15**	

In particular, customers interested in technological issues comprise 56% of the sample. They believe that digital banking enables them to conduct transactions more quickly. Moreover, their bank's website seems to be safe and conscious; they believe that their bank has a good reputation, their online transactions with the bank are always accurate, technology gives them more freedom of mobility, and digital banking helps them make the best use of their time. Besides, they believe that their bank's website does not break or freeze during transactions, while technology gives them more control over their daily lives. What is more, they consider quite important the fact that there is always a representative of the bank to speak with if they have a problem and that the bank provides prompt response to their requests. On the other hand, those interested in digital banking issues comprise 15% of the sample. These customers mainly believe that their bank's website is easy to use, their bank's online functionality serves their needs, and they can enter the website quickly. They consider very important the fact that it is easy to find what they need on the bank's website, it loads quickly, and they claim that it was easy to for them to become confident with online banking. Furthermore, most believe that their bank's website does not break or freeze during transactions, while technology gives them more control over their daily life.

The remaining percentage (29%) of the sample are those interested in speed, security, and correspondence issues. These customers believe that digital banking enables them to conduct transactions more quickly. Moreover, their bank's website seems safe and conscious; they believe that their bank has a good reputation, their online transactions are always accurate, technology gives them more freedom of mobility, and digital banking helps them make the best use of their time. Moreover, they consider the fact that there is always a

bank representative to speak with if they have a problem quite important, and that the bank provides prompt response to their requests.

Discriminant analysis was conducted to evaluate the predictors derived from the factor analysis's prediction of group membership. Table 4 depicts the cross-validation classification results following the quadratic discriminant analysis.

Table 4. Classification with Cross-validation for Greek customers

Actual Classification	Predicted Classification		
	Interested in technological issues	**Interested in digital banking issues**	**Interested in speed, security, and correspondence issues**
Interested in technological issues	28	0	0
Interested in digital banking issues	0	8	0
Interested in speed, security, and correspondence issues	1	0	14
Total N	**29**	**8**	**15**
N correct	28	8	14
Proportion	96.6%	100.0%	93.3%
N =52	**N correct=50**	**Proportion Correct**	**96.15%**

Factors that influence bank customers on bank digital services in the U.S.A.

The variables and the five key factors that influence bank customers in the USA on digital banking, along with their eigenvalues and the percentage of variance results from PCA, are portrayed in Tables 5 and 6.

Table 5. Variables affecting the USA bank-customers' attitudes towards digital services.

Component	Eigenvalues	% of Variance	Cumulative Variance
1	**8.779**	**48.770**	**48.770**
2	**1.995**	**10.859**	**59.628**
3	**1.093**	**6.074**	**65.702**
4	0.814	4.521	70.223
5	0.767	4.260	74.483
6	0.641	3.559	78.042
7	0.614	3.409	81.452

Component	Eigenvalues	% of Variance	Cumulative Variance
8	0.550	3.054	84.506
9	0.440	2.443	86.949
10	0.398	2.212	89.161
11	0.387	2.152	91.313
12	0.368	2.042	93.355
13	0.303	1.685	95.040
14	0.269	1.497	96.537
15	0.213	1.184	97.221
16	0.162	0.900	98.621
17	0.138	0.768	99.389
18	0.110	0.611	100.00

Table 6. The main factors having an effect on USA banking customers' attitude to bank digital services.

Main Factors	Factor Loadings
Factor 1. Digital banking issues	
Technology gives me more control over my daily life	0.823
Digital banking helps me make the best use of my time	0.791
Digital banking enables me to conduct transactions more quickly	0.780
It was easy to for me to become confident with online banking	0.778
My bank has a good reputation	0.752
Technology gives me more freedom of mobility	0.721
My bank's online functionality serves my needs	0.694
I prefer to use the most advanced technology available	0.693
My online transactions with the bank are always accurate	0.686
My bank protects my personal information	0.646
My bank's website is easy to use	0.628
I am able to navigate the bank's website quickly and easily	0.616
Factor 2 Website issues	
The website does not freeze during transactions	0.804
My bank's website loads quickly	0.767
My bank's website does not break down	0.752
Factor 3. Correspondence issues	
There is always a representative to speak with if I have a problem	0.837

Main Factors	Factor Loadings
My bank provides prompt response to my requests	0.797
Human interaction is very important when banking	0.644

KMO MSA = 0.864 Bartlett test of Sphericity 1040.551 P <0.001

Hence, PCA identified three main factors that influence US banking customers' attitudes to digital banking applications: (a) digital banking issues, (b) website issues, and (c) correspondence issues.

Our next step was to categorize the bank customers' stance on digital services offered, by adopting hierarchical as well as non-hierarchical clustering methods (Hair et al., 1998). We performed cluster analysis on 89 observations because no outliers existed.

The analysis yielded three groups of bank customers named according to their attitudes to these applications (Table 7). These are the (a) interested in web issues, (b) opportunists, (c) interested in digital banking, and (d) interested in the use of digital services offered by banks.

Table 7. Categorization of USA customers regarding their attitudes towards bank digital services

Key Consumption Dimensions	Interested in technological issues	Interested in digital banking issues	Interested in speed, security, and correspondence issues	P
Digital banking issues	-0.02781	-4.18440	0.29865	0.59443
Speed and security issues	0.30677	-0.54704	0.30134	0.036
Website issues	0.36133	-1.91330	0.31454	-1.51191
Correspondence issues	0.50151	-0.65747	-1.33562	0.30204
Number of customers (n=89)	**52**	**3**	**21**	**13**

In particular, customers interested in web issues comprise 58% of the sample. They believe that the bank's website does not freeze during transactions. It loads quickly and does not break down. Moreover, they believe there is always a representative of the bank to speak with if they have a problem, the bank provides prompt response to their requests, and human interaction is very important when banking. On the other hand, the opportunists comprise 3% of the sample and are not interested in any of the identified factors, whilst those interested in digital banking comprise 24% of the sample. They think technology gives them more control over their daily life, and digital banking helps them make the best use of their time and conduct transactions quickly. They become confident with online

banking, believing that their bank has a good reputation, technology gives them more freedom of mobility, the bank's online functionality serves their needs, and they prefer to use the most advanced technology. They also claim that their online transactions with the bank are always accurate, their bank protects their personal information, the bank's website is easy to use, and can navigate the bank's website quickly and easily. Furthermore, they believe that the bank's website does not freeze during transactions, it loads quickly and does not break down, and that digital banking enables them to conduct transactions more quickly. Besides, customers who are interested in the use of digital services offered by banks are also interested in digital banking issues; they appreciate the fact that there is always a representative of the bank to speak with if they have a problem; they believe that the bank provides prompt response to their requests and that human interaction is very important when banking. These customers comprise 15% of the sample.

The results of the cross-validation classification after the quadratic discriminant analysis are portrayed in Table 8.

Table 8. Classification results with Cross-validation for the USA customers

Actual Classification	Predicted Classification			
	Interested in web issues	**Opportunists**	**Interested in Internet banking**	**Interested in digital banking issues**
Interested in web issues	50	0	1	1
Opportunists	0	3	0	0
Interested in digital banking	1	0	20	0
Interested in digital banking issues	1	0	0	12
Total N	**52**	**3**	**21**	**13**
N correct	50	3	20	12
Proportion	96.1%	100.0%	95.2%	92.3%
N =89	**N correct=85**	**Proportion Correct**	**95.50%**	

Factors that influence bank customers on bank digital services in Latvia.

Tables 9 and 10 depict the variables and the three main key factors that influence bank customers on digital services offered by banks in Latvia, along with their eigenvalues and the percentage of variance results from PCA.

Table 9. Variables affecting the Latvian bank customers' attitudes to bank digital services.

Component	Eigenvalues	% of Variance	Cumulative Variance
1	5.187	51.875	51.875
2	1.307	13.072	64.946
3	1.086	10.862	78.808
4	0.639	6.387	82.195
5	0.578	5.783	87.978
6	0.466	4.655	92.634
7	0.292	2.924	95.557
8	0.225	2.251	97.808
9	0.153	1.533	99.341
10	0.066	0.659	100.00

Table 10. The main factors influencing Latvian bank customers' attitude to digital services offered by banks.

Main Factors	Factor Loadings
Factor 1. Website issues	
My online transactions with the bank are always accurate	0.825
My bank's website loads quickly	0.772
The website does not freeze during a transaction	0.729
I am able to get onto the website quickly	0.683
My bank's online functionality serves my needs	0.618
Factor 2 Digital banking issues	
My bank provides prompt response to my requests	0.837
Technology gives me more freedom of mobility	0.821
Digital banking helps me make the best use of my time	0.712
Factor 3. Correspondence issues	
My bank's website seems security -conscious	0.878
There is always a representative to speak with if I have a problem	0.715

KMO MSA = 0.708 Bartlett test of Sphericity 643.130 P <0.001

Hence, PCA identified three main factors that influence Latvian banking customers' attitudes to digital services offered by banks: (a) website issues, (b) digital banking issues, and (c) correspondence issues.

As in our survey concerning USA bank customers, our next step was to categorize the Latvian customers' stance on digital services provided by adopting hierarchical and

non-hierarchical clustering methods (Hair et al., 1998). We performed cluster analysis on 96 observations because no outliers existed. Two categories of bank customers resulted from the analysis. The groups were named based on the customers' attitudes to digital applications (Table 11). These are: (a) the interest in correspondence and security issues and (b) the interest in the use of digital services offered by banks.

Table 11. Categorization of Latvian customers regarding their attitudes towards bank digital services.

Key Consumption Dimensions	Interested in correspondence and security issues	Interested in the use of digital services offered by banks	P
Website issues	-0.17482	0.34964	0.001
Digital banking issues	-0.37923	0.75845	0.001
Correspondence issues	0.36425	-0.72850	0.001
Number of customers (n=96)	**64**	**32**	

In particular, customers interested in website issues comprise 67% of the sample. They support the idea that the bank's website seems security–conscious and that there is always a representative to speak with when they have a problem. On the other hand, those interested in using digital services offered by banks comprise 33% of the sample. They mostly believe that their online transactions with the bank are always accurate, the bank's website loads quickly, and does not freeze during transactions. They also believe they can get onto the website quickly, that their bank's online functionality serves their needs, and that their bank responds promptly to their requests. Finally, they have the opinion that technology gives them more freedom of mobility and that digital banking helps them to optimize the use of their time. The results of the cross-validation classification after the quadratic discriminant analysis are shown in Table 12.

Table 12. Summary of Classification with Cross-validation regarding Latvian customers.

Actual Classification	Predicted Classification	
	Interested in correspondence and security issues	Interested in the use of digital services offered by banks
Interested in correspondence and security issues	63	1
Interested in the use of digital services offered by banks	1	31
Total N	64	32
N correct	63	31

Actual Classification	Predicted Classification	
	Interested in correspondence and security issues	**Interested in the use of digital services offered by banks**
Proportion	98.4%	96.9%
N =96	**N correct=94**	**Proportion Correct: 97.9%**

Profiling each group of bank customers regarding their sociodemographic characteristics.

We conducted a chi-square analysis to profile each group of bank customers of the three examined countries regarding their sociodemographic characteristics. As Table 13 indicates, most of the Greek customers who are interested in technological issues are quite young (26-35 years old), single, hold a university degree, and work in the private sector. Moreover, most of those interested in digital banking issues are between 26 and 34 years old. Still, no significant association was found between the participation in this group of customers and any of the other examined demographic characteristics. On the other hand, about three-quarters of those interested in speed, security, and correspondence issues are single, and about two-thirds hold a university degree. No significant association was found between age, occupation, and this group of customers.

Table 13. Profiling of Greek bank customers according to their sociodemographic attributes.

Demographic characteristics		**Interested in technological issues**		**Interested in digital banking issues**		**Interested in speed, security, and correspondence issues**	
Age	<26 years old	x^2=28.923, P<0.001	6%	x^2=6.250, P<0.05	0%	n.s	
	26-34		**52%**		**75%**		
	35-44		33%		12.5%		
	45-54		9%		12.5%		
	>54		0%		0%		
Marital Status	Married	x^2=52.769, P<0.001	27%	n.s		x^2=11.200, P<0.05	20%
	Widowed		2%				6%
	Divorced		6%				0%
	Single		**65%**				**74%**
Education	College	x^2=56.462, P<0.001	2%	n.s		x^2=14.600, P<0.05	6.5%
	High School		14%				20.0%
	University		**69%**				**67.0%**
	Postgraduate		15%				6.5%

Demographic characteristics		**Interested in technological issues**		**Interested in digital banking issues**	**Interested in speed, security, and correspondence issues**
Occupation	Public Sector	x^2=53.269, P<0.001	15%	n.s.	n.s
	Private Sector		**46%**		
	Freelance		21%		
	Unemployed		4%		
	Worker/ Farmer		4%		
	Student		4%		
	Retired		6%		

Besides, table 14 indicates that most of the USA customers of the three identified groups have similar demographic profiles, whilst no significant association was found between the examined demographic characteristics and the participation in the "opportunists" group. More specifically, most of the customers of the three groups (interested in web issues, digital banking, and digital banking issues) are young, single, and students. Furthermore, about half of the customers interested in web issues in the USA hold a university degree.

Table 14. Profiling of the USA bank customers according to their sociodemographic attributes.

Demographic characteristics		**Interested in web issues**		**Opportunists**	**Interested in digital banking**		**Interested in digital banking issues**	
Age	<26 years old	x^2=93.385 P<0.001	**83%**	n.s	x^2=21.429 P<0.001	**80%**	x^2=10.777 P<0.05	**62%**
	26-34		11%			10%		23%
	35-44		4%			10%		0%
	45-54		0%			0%		8%
	>54		2%			0%		8%
Marital Status	Married	x^2=88.808, P<0.001	2%	n.s	x^2=13.762, P<0.001	10%	x^2=13.769, P<0.05	8%
	Widowed		1%			0%		8%
	Divorced		0%			0%		15%
	Single		**49%**			**90%**		**69%**
Education	College	x^2=44.731, P<0.001	10%	n.s	n.s		n.s.	
	High School		38%					
	University		**46%**					
	Postgraduate		6%					

Demographic characteristics		Interested in web issues		Opportunists	Interested in digital banking		Interested in digital banking issues	
Occupation	Public Sector	x^2=70.115, P<0.001	10%	n.s	x^2=12.286, P<0.05	0%	x^2=14.308, P<0.05	8%
	Private Sector		0%			28%		8%
	Freelance		3%			4%		12%
	Unemployed		4%			0%		0%
	Worker/ Farmer		1%			1%		3%
	Student		**65%**			**67%**		**61%**
	Retired		0%			0%		8%

As Table 15 illustrates, most of the Latvian customers of both groups have similar demographic profiles. Most are students and high school graduates. Moreover, the significant majority of those who are interested in correspondence and security issues are less than 26 years old, and about 86% of those who are interested in using digital services offered by banks are single. No significant association was found between age and the second identified group and marital status and the first group.

Table 15. Profiling of Latvian bank customers according to their sociodemographic attributes.

Demographic characteristics		Interested in correspondence and security issues		Interested in the use of digital services offered by banks	
Age	<26 years old	x^2=37.231, P<0.001	**92%**	**n.s**	
	26-34		8%		
	35-44		0%		
	45-54		0%		
	>54		0%		
Marital Status	Married	n.s		x^2=14.286, P<0.001	14%
	Widowed				0%
	Divorced				0%
	Single				**86%**
Education	College	x^2=44.923, P<0.001	0%	x^2=5.143, P<0.05	0%
	High School		**85%**		**71%**
	University		15%		29%
	Postgraduate		0%		0%

Demographic characteristics		Interested in correspondence and security issues		Interested in the use of digital services offered by banks	
Occupation	Public Sector	x^2=15.077, P<0.001	23%	x^2=8.000, P<0.05	29%
	Private Sector		0%		0%
	Freelance		0%		0%
	Unemployed		0%		14%
	Worker/Farmer		0%		0%
	Student		**77%**		**57%**
	Retired		0%		0%

Therefore, a significant association exists between customers' demographic characteristics and their attitudes towards bank digital services.

Interviews outcomes

The interviews carried out in Greece, Latvia, and the USA (20 bank employees from each country) showed that the biggest transformation has yet to come. Despite all changes due to automation, the employees' role remains crucial since there will always be job positions that automation cannot replace. Most interviewees support the idea that a bank clerk's job is at risk and has changed dramatically over the last few years. In addition, new banking products are being created to satisfy customers as well. Therefore, training requirements to meet these new job demands are vital and must be ensured by each bank. Finally, it is necessary to ensure the fundamental and social rights of the employees. All employees should have access to continuous development and equal opportunities.

Digital transformation and automation have brought significant changes not only in services but also in the working conditions of employees. The difficulty of adapting to new working challenges and the risk of being fired is more relevant than ever as far as employees are concerned since automated jobs keep lowering the need for human resources in traditional banking. On the other hand, this digital transformation has created the opportunity to upgrade the workforce through training, which nevertheless, should be accompanied by the appropriate policies.

The new schema among the three entities banks, customers and employees can be organized in three levels as it is depicted in figure 3.

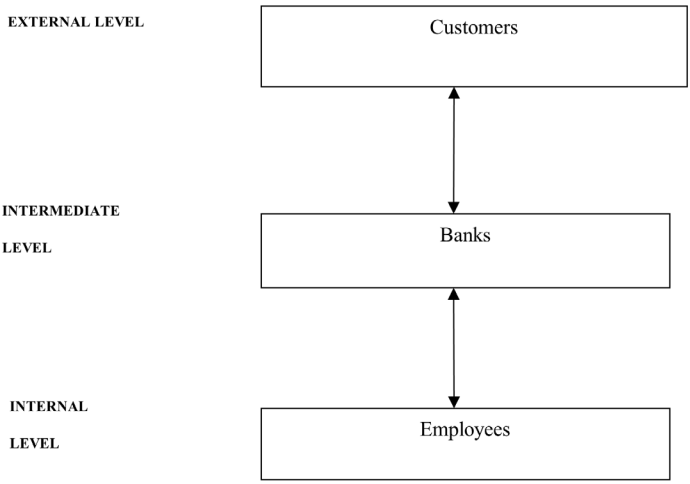

Figure 3: The 3-level schema

By comparing Figure 3 with Figure 1, it is noticed that there is a lack of personal communication between customers and employees.

Discussion and conclusions

This study carried out a three-level analysis, taking into account three entities: banks, customers, and employees. The central objective is to depict and analyze the new reality in the banking environment by considering individuals' perspectives concerning banking services digitalization.

The main factors influencing Greek banking customers' attitude to bank digital services are (a) digital banking issues, (b) speed and security issues, (c) website issues, (d) correspondence issues and (e) human touch. The key factors influencing the view of US bank customers towards bank digital applications are (a) digital banking issues, (b) website issues, and (c) correspondence issues. The main factors influencing the view of Latvian bank customers towards bank digital applications are (a) website issues, (b) digital banking issues, and (c) correspondence issues.

Cluster analysis yielded three groups of Greek bank customers: those interested in technological issues, those interested in digital banking issues, and customers interested in speed, security, and correspondence issues. Cluster analysis yielded four groups of USA bank customers; these are: those interested in web issues, the opportunists, those interested in digital banking, and those interested in the use of digital services offered by banks. Cluster analysis yielded two groups of Latvian bank customers: those interested in correspondence and security issues and those interested in the use of digital services offered by banks.

The profiles of the respondents from the three countries share several similarities and differences. Most Greek customers interested in technological issues are quite young, single, hold a university degree, and work in the private sector. The vast majority of those interested in digital banking issues are also young. About three-quarters of those interested in speed, security, and correspondence issues are single, and about two-thirds hold a university degree. Most of the USA customers of the three identified groups have similar demographic profiles, whilst no significant association was found between the examined demographic characteristics and the participation in the "opportunists" group. Most of the customers of the three groups (interested in web issues, digital banking, and digital banking issues) are quite young, single, and students. About half of the interested in web issues American customers hold a university degree. Most of the Latvian customers of both groups have similar demographic profiles. Most of them are students and high school graduates. Moreover, the significant majority of those interested in correspondence and security issues are less than 26 years old, and about 86% of those interested in the use of digital services offered by banks are single. No significant association was found between age and the second identified group and marital status and the first group.

The main points from the interviews carried out in the three countries are that the biggest transformation has yet to come, the role of employees remains crucial since there will always be job positions that cannot be replaced by automation, and the job of a bank clerk is at risk and has changed dramatically over the last years.

Based on the present study's findings, digital banking can be considered very fast and reliable, with a growing number of people adopting its services. However, the non-use of the Internet for transactions can be a limiting factor for bank customers when conducting fast transactions. Customers reported that digital banking offers significant processing speed that is incomparable to offline banking transactions.

Furthermore, the customers' daily transactions revealed that their adaptability to digital banking data channels was very high, as shown by the daily number of transactions and the frequency with which customers used digital banking. Finally, regarding the availability of digital channels, the research concludes that banking channels are affordable. Customers will trade using any other channel that is fast, accessible, and easily customizable.

It would be helpful for policymakers in banking institutions to consider the above conclusions and seriously consider customers' concerns and expectations regarding digital bank services. To sum up, digitalization in banking transactions is now a reality. The banking industry's responsible for convincing customers that this new reality is in their best interest.

Almost every research study contains elements of weakness or bias. In this study, several limitations must also be considered. The sample size is small and may not be adequate to generalize to the entire population. A larger sample representing all parts of Greece, Latvia, and the USA might offer more guaranteed results.

Apart from the sample, there are other limitations as well, since from the beginning, the research focused on a specific number of respondents and a specific short data collection

period. Also, for a faster and easier gathering of data, the questionnaires were completed digitally, and, in this way, the non-users of the technologies may not have been given the necessary attention and opportunity to give their own answers; they would have had such an opportunity if the questionnaires had been distributed in a different way. Besides, from the presented findings, access to digital banking takes place by individuals who are unhandicapped. A further study is needed to determine the impact of accessibility to digital banking among people with disabilities. These are some of the limitations that, in the future, could be a source of concern and inspiration for a complete and more expanded picture of this research.

The contribution of this study is to provide valuable information for banks to improve digital banking services and develop new products and programs. The originality derives from the updated identified factors that influence customers' attitudes toward the services provided by digital banking versus offline banking. The replicability of the regional or world-level results could generalize the approach for the policymakers regarding digital banking. Only further research and discussion can determine whether our findings can be generalized to other digital services industries.

Future work would be interesting if it compared those who exclusively use digital banking facilities with those who solely prefer conventional banking; this might shed further light on the reasons behind adopting digital banking. A cross-sectional study and future research should adopt a longitudinal approach to generalize the results.

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