THE INTEGRATION OF ARTIFICIAL INTELLIGENCE AND FINTECH IN GREEK BANKS, FOR THE BENEFITS OF SMALL AND MEDIUM-SIZED COMPANIES

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Abstract:

Artificial intelligence as a technological development has been around for decades, but it has been increasingly applied in the financial sector as part of the digital transformation only recently. The emerging trend tends to replace banking services with those of technology companies that are more modern, innovative and consumer-friendly. The objective of the present research is to investigate whether the financial institutions consider that the development of technologies will help not only the large organizations but also the small and medium-sized enterprises. In order to achieve this aim a quantitative, primary and descriptive research was employed to gather and analyze data and draw conclusions. In particular, a questionnaire survey was operated. The results showed that all parts of the financial system can benefit from the appropriate application of the artificial intelligence. Customers and especially SMEs, can enjoy better and more personalized services and access personalized financial products, reduce their operating costs while improving the efficiency of their internal processes.

Keywords: *Artificial intelligence; FinTech; Greek Banks; small and medium sized companies.*
JEL Codes: *G21, M15, O33*

Introduction

Artificial intelligence as a technological development has been around for decades. But why has this sector grown so rapidly in recent years? The answer to this question was given by the engineer and entrepreneur Gordon Moore, one of the founders of Intel, who, in 1965, created Moore's Law, which states that while the processing power of computers doubles every 18 months, the cost of production is decreasing. In other words, the cost of producing a computer chip of a given power, which cost 20,000 euros in 1970, costs less than 0.002 euros today. This increases the

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computing and storage power of computers, while at the same time reducing their cost, enabling rapid technological advances, including artificial intelligence (Theis & Wong, 2017). There is no doubt that the financial system will be affected as rapid technological developments affect the way it operates and interacts with customers (de la Mano & Padilla, 2018).

In recent years, artificial intelligence has been increasingly applied to the financial sector as part of digital transformation. The increasing adoption of artificial intelligence and machine learning technologies in the financial sector is driven by the rapid technological developments and the wealth of big data available to financial institutions, and by the pressure to increase efficiency resulting from intense competition and strict regulatory framework. At the same time, financial institutions will inevitably have to evolve to meet the needs of their customers who want to make their lives easier through technology (Xie, 2019).

The concept of Fintech includes any technological means used by financial services. The use of PayPal or credit card for online purchases, online store transactions with consumers and banks, the ability to monitor the bank account electronically are considered Fintech categories. The Fintech category includes companies that develop solutions in electronic payments, electronic banking, money transfers, transaction clearing and alternative currencies (BitCoin). The concept of Fintech broadly describes the field, entry, development and impact of technology in the field of finance.

The emerging trend tends to replace banking services with those of technology companies that are more modern, innovative and consumer-friendly. Fintech is nothing new, but it has been growing steadily in recent years. It is increasingly evolving to reshape financial services, commerce, payments, money transfers, asset management, insurance and ultimately money, as we know it today. More and more businesses, start-ups and organizations are offering technology to their user-customers in order to optimize service by offering speed, convenience, immediacy and many other advantages (Basdekis et al., 2022).

Artificial intelligence (AI) is a branch of computer science that deals with the design of intelligent computing systems, i.e. systems that exhibit characteristics that mimic intelligence in human behavior. Artificial intelligence is a classic application of behavior design, machine learning, information systems, etc. In addition to classic applications, such as machine learning and information systems, smart devices find application in the semantic web, online banking and other more modern applications (Tzanis et al., 2006).

The rapid development of the financial sector and the great involvement of technology have already transformed the banking, but also the financial sector in general, in Greece. Studies and research have confirmed the operational advantages of digital transformation and the evolution of financial technologies (Stournaras, 2020). In addition to improving customer service, the use of artificial intelligence technologies also concerns the optimization of existing processes in financial institutions, but also in organizations active in areas such as fraud detection, investment management tasks, risk management and market analysis.

Still in Greece, there is not enough data about the use of the AI and FinTech for the growth and the development of small and medium sized enterprises (Grigoriadou, 2020). On the one hand,

the financial crisis of 2008 slowed down the digital transformation of financial institutions, while the COVID-19 pandemic boosted the use of FinTech services by SMEs (OECD, 2022).

The scope of this research is to investigate whether financial institutions consider that the development of technologies will also help the development of small and medium-sized enterprises, and not only large organizations.

The Research Questions are:

1. Does employee adaptation to AI and SME-related FinTech depend on age, gender and education level?

2. Are Greek banks adapting and transforming to serve SMEs through AI and FinTech services?

3. Do Banks/organizations collaborate with staff to develop means of increasing SME efficiency through the use of AI and FinTech services?

Literature Review

Braggion et al. (2017) investigated whether the expansion of FinTech will threaten the financial stability in the future. It is true that banks are already accepting deposits and conducting transactions digitally. However, digital transactions enhance a number of issues such as flexibility, security and competition in payments, the way financial services are provided as well as the way and security of cross-border transfers and the issue of private and official currency. Analysts, such as Vives (2019), have argued that the main purpose of FinTech is to keep traditional banks out of the market. In this way, FinTech companies have been able to overcome the challenges of growing their customer base by achieving greater economies of scale.

According to Vives (2019), the use of new technologies has had a significant impact on the financial sector, due to lower transaction costs and the provision of new, higher quality products. Therefore, it can be argued that big data and appropriate statistical models can screen potential borrowers more effectively, which is vital to address the problem of information asymmetry. The use of sophisticated rate models also enables targeted pricing policies. New technologies can enable more efficient implementation of business plans and the provision of services to new and small businesses. Furthermore, according to Kruse, Wunderlich and Beck (2019), AI has a wide range of applications, particularly in data quality, financial policy and risk analysis, as well as fraud monitoring and detection. At the level of national banks, AI is integrated into functions that support the monitoring of micro- and macroeconomic indicators (Kruse et al., 2017), supervision, information management, and the prediction and detection of malicious activities (Fernandez, 2019).

Another event that facilitated the digitization of the banking sector was the Covid-19 virus pandemic, visible to both consumers and banks with SMEs in their customer base. The measures taken during the pandemic have transformed many banking operations and will lead to new developments in the future. What is certain, however, is that the need to confine oneself to the home led to the rapid adoption of digital technologies. This increased use of digital technologies has also meant less reliance on brick-and-mortar banking, accelerating the transformation of banking (Adarkar et al., 2020).

Specifically in the case of Greece, the implementation of capital controls in 2015 led to the first rapid transformation of banking transactions, with plastic money replacing paper money. The Covid-19 pandemic has further accelerated this transformation with the use of digital technology. Now that the crisis has subsided, there is clearer evidence of its impact on customer and business behavior and expectations (Adarkar et al., 2020).

Among the emerging trends there will undoubtedly be a greater openness to digital channels. In the wake of the financial crisis, workers may be more willing to adopt new remote work models. Banks, on the other hand, will face a long period of low interest rates and reduced profits due to tighter balance sheets and higher operating costs caused by the new security measures and will need to act quickly on the right decisions to survive. Banks must learn from the two crises that occurred in 2008 and 2019 respectively and immediately start their own digital transformation while creating greater operational and financial flexibility (Buehler et al., 2020). In the last global crisis, banks were seen as the biggest problem. However, banks are now considered to be at the center of solving the problem (Bensley et al., 2020).

A recent survey in Greece (Basdekis et al., 2022) reported that while there are several factors that influence the decision to use FinTech services, security factors are the most important to users. In terms of trust, the majority of respondents said they trust traditional banks more than other non-financial institutions. Regarding the adoption of new technologies by banks, Greek banks seem to recognize that they have given weight and invested significantly in digital transformation. Digital transformation is a one-way street and will continue to light the way to a technological revolution. The survey results also show that banks invest significantly in training, offering their employees the opportunity to acquire the skills they need to meet modern needs and further growth.

Methodology

Research objective

This study aimed to investigate the integration of Artificial Intelligence (AI) and Financial Technology (FinTech) in Greek Banks. A quantitative, primary and descriptive research design was employed to gather and analyze data. This approach allowed for the collection of numerical data to quantify relationships and differences among variables.

Participants

The study included employees of a banking institution. A purposive sampling technique was employed to ensure representation from various departments. A total of 102 participants were selected for the study.

Data analysis

The data analysis was performed using the statistical software IBM SPSS 26. Demographic characteristics were presented using frequencies. Likert scale variables were presented with M (mean) and SD (standard deviation).The factors created from corresponding questions, with high reliability ($\alpha \geq 0.857$), were assessed for their normality using the Shapiro-Wilk test. Due to the lack of normality, for comparing medians of three or more independent samples, the non-parametric Kruskal-Wallis test was employed. However, to compare differences in quantitative variables with

respect to gender, the parametric independent samples t-test was used since the sample sizes were large (n≥30).

Results
Descriptive statistics
Demographic data - Table 1 presents the demographic data of the sample, which consists of 102 people.

Table no. 1 - Demographic data

Feature	Category	N	f%
Gender	Male	62	60.78%
	Female	40	39.22%
Age	≤30	28	27.45%
	31-40	39	38.24%
	41-50	8	7.84%
	51-60	14	13.73%
	>60	13	12.75%
Educational level	Bachelor's degree	55	53.92%
	Master's degree	38	37.25%
	PHD	9	8.82%
Employee Tenure (years)	0-5	29	28.43%
	6-10	36	35.29%
	11-15	12	11.76%
	16-20	10	9.80%
	21-25	4	3.92%
	26-30	7	6.86%
	31-35	1	0.98%
	>35	3	2.94%
Employee Status	Trainee	12	11.76%
	Customer Service	18	17.65%
	Freelancer	10	9.80%
	Administrator	16	15.69%
	Bank clerk	21	20.59%
	Employee of a subsidiary company of a banking institution	11	10.78%
	Head of Department	5	4.90%
	Bank branch manager	2	1.96%
	Member of the Board of Directors	1	0.98%
	Other	6	5.88%

What kind of department do you work in?	Accounting		
		11	10.78%
	Administrative	7	6.86%
	Sales	25	24.51%
	Marketing	14	13.73%
	HR	7	6.86%
	Operations	10	9.80%
	Finance-corporate banking	11	10.78%
	Product	6	5.88%
	Research and Development	8	7.84%
	PR	3	2.94%

Commend: As to gender, 60.78% (N=62) of the respondents are male and 39.22% (N=40) are female
Source: Author

Regarding the age, 38.24% (N=39) of the participants are 30 years old or younger, 27.45% (N=28) from 31 to 40, 13.73% (N=14) from 51 to 60,12.75% (N=13) older than 60 years old and 7.84% (N=8) from 41 to 50.

Regarding the educational level, 53.92% (N=55) of the participants have a Bachelor's degree, 37.25% (N=38) a Master's degree and 8.82% (N=9) a PHD.

As to the employees' tenure, 35.29% (N=36) of the participants stated that they have been working between 6 and 10 years, 28.43% (N=29) up to 5, 11.76% (N=12) between 11 and 15, 9.80% (N=10) between 16 and 20, 6.86% (N=7) between 26 and 30, 3.92% (N=4) between 21 and 25, 2.94 (N=3) more than 35 and 0.98% (N=1) between 31 and 35.

Regarding the employees' status, 20.59% (N=21) stated that they are bank clerks, 17.65% (N=18) are working in the customer service, 15.69% (N=16) are administrators, 11.76 (N=12) trainees, 10.78% (N=11) employees of a subsidiary company of the banking institution, 9.80% (N=10) freelancers, 5.88% (N=6) are working in other positions, 4.90% (N=5) head of departments, 1.96% (N=2) bank branch managers and 0.98% (N=1) member of the board of the directors.

Referring to the department that they are currently working at, 24.51% (N=25) of the respondents are working on Sales, 13.73% (N=14) on Marketing,10.78% (N=11) was the percentage of those working on Accounting and on Finance and Corporate banking each, 9.80% (N=10) on Operations and 7.84% (N=8) on Research and Development. Also, 6.86% (N=7) was the percentage of those working on HR and Administrative each, 5.88% (N=6) are working on Product and 2.94% (N=3) on PR.

Definition of FinTech

Regarding the respondents' opinions on the definition of FinTech, the participants agree that those are services that improve the efficiency of the financial system (M=3.19, SD=0.79), new technologies that facilitate access to financial services (M=3.11, SD=0.79), anything related to cryptocurrencies and virtual money (M=3.08, SD=0.89), the applications used by all the bank's

customers (M=3.05, SD=0.84) and any ICT used to enhance financial services (M=2.97, SD=0.74). Additionally, they neither agree nor disagree that these technologies are used only by a bank and large organizations (M=2.07, SD=0.87).

Evolution of the use of AI and FinTech to serve SMEs

The statements that refer to the evolution of the use of AI and FinTech to serve SMEs show that the participants agree that the COVID-19 pandemic has made a decisive contribution to the evolution of financial services (M=3.07, SD=0.91), that in the future, technological developments will greatly differentiate the service of SMEs (M=3.04, SD=0.77), that banking institutions in Greece make extensive use of financial technologies to serve SMEs (M=2.98, SD=0.91) and that technological developments in recent years have improved the service of banking activities related to SMEs (M=2.97, SD=0.84).

Meaning of technological advancements and AI development for SMEs

Regarding the statements that refer to the meaning of technological advancements and AI development for SMEs, the participants agree that they mean faster service of requests (M=3.10, SD=0.88), simplification and reduction of procedures (M=3.09, SD=0.81), increase in customer volume (M=2.98, SD=0.74), more effective crisis management (M=2.94, SD=0.83), greater satisfaction for companies of all sizes (M=2.92, SD=0.91) and freeing up working time for employees (M=2.91, SD=0.86).

Approach of the Financial Institution

The statements that refer to the approach of the Financial Institution show that the participants agree that the bank or the organization invest resources in developing AI technologies (M=2.93, SD=0.85), that employees (M=2.92, SD=0.83) and the bank or the organization (M=2.91, SD=0.87) are constantly adapting to the use of financial technologies related to the development of SMEs, that they provide adequate training to employees in the use of financial technologies relevant to SME development (M=2.84, SD=0.79) and make extensive use of technological advancements to serve SMEs (M=2.83, SD=0.70).

Inductive statistics

Reliability analysis

The reliability of the questionnaire factors was tested using the Cronbach Alpha coefficient. Specifically, it emerges that the factor «Definition of FinTech» has reliability a=0.857 (high), «Evolution of the use of AI and FinTech to serve SMEs»a=0.899 (high), «Meaning of technological advancements and AI development for SMEs»a=0,947 (optimal), and «Approach of the Financial Institution» a=0.926 (optimal). The results of the factor normality test show that all the factors follow a non-normal distribution (p<0,001).

Effect of demographic profile

Gender

The results of the independent samples of t-test of the factors in terms of gender of the respondents show that there are statistically significant mean differences in the factor«Definition of FinTech» (t(102)= 8.65, p<0.001), «Evolution of the use of AI and FinTech to serve SMEs» (t(102)= 8.426, p<0.001)«Meaning of technological advancements and AI development for SMEs» (t(102)= 9.577, p<0.001) and «Approach of the Financial Institution» (t(102)= 9.976, p<0.001).

Age

The results of the Kruskal-Wallis tests of the factors with respect to the age of the respondents show that there are statistically significant mean ranks in the factor «Definition of FinTech» (H(4)=57.043, p<0.001), «Evolution of the use of AI and FinTech to serve SMEs» (H(4)=62.852, p<0.001)«Meaning of technological advancements and AI development for SMEs» (H(4)=63.118, p<0.001) and «Approach of the Financial Institution» (H(4)=58.67, p<0.001).

Educational level

The results of the Kruskal-Wallis tests of the factors in terms of the educational level of the respondents show that there are statistically significant mean ranks in the factor«Definition of FinTech» (H(2)=41.241, p<0.001), «Evolution of the use of AI and FinTech to serve SMEs» (H(2)=33.012, p<0.001) «Meaning of technological advancements and AI development for SMEs» (H(2)=44.910, p<0.001) and «Approach of the Financial Institution» (H(2)=39.990, p<0.001).

Discussion

The present research included 102 people, mostly men, up to 40 years old, working up to 15 years as bank clerks, administrators, trainees, in customer service or in a subsidiary company of a banking institution. Regarding the educational level, half the respondents have a Bachelor's degree and as to the department they are currently working at, most are in Sales, Marketing, Accounting, Finance Corporate banking and Operations.

In the 1st research question the employees' adaptation to AI and SME-related FinTech was studied. The results showed that men, up to 40 years old with a Master's degree or a PHD were more positive to the definition, the evolution of the use of AI and FinTech to serve SMEs, the meaning of technological advancements and AI development for SMEs and the approach of the Financial Institution. Similarly, Chavan (2008), and later Diouf and Pépin (2017), reported that this tension is also observed in countries other than Greece. However, a reversal of this trend is observed lately, since more and more women are receiving senior positions in the financial sector. In addition, there are studies in which the age of employees is disconnected from the digital transformation of financial institutions (Liu, 2021).

In the 2nd research question, the adaptation and transformation of the Greek banks to serve SMEs through AI and FinTech services was studied. The participants agreed that the COVID-19 pandemic made a decisive contribution to the evolution of financial services, that in the future, technological developments will greatly differentiate the service of SMEs, that banking institutions

in Greece make extensive use of financial technologies to serve SMEs and that technological developments in recent years have improved the service of banking activities related to SMEs.

OECD research (2022) points out that the pandemic simply accelerated the natural course of financial services growth to the benefit of SMEs. This contrasts with a 2021 survey (Meramveliotakis and Manioudis, 2021), where the disparity in the use of financial opportunities between SMEs and large organizations in Greece is highlighted. It is a fact that the pandemic changed corporate thinking, forcing SMEs to adapt to a new climate in the social sphere, technology, policies, cultural convergence, and relationships. Financial services should also adapt to the new climate (Bogdanova, 2022).

In the 3rd research question the collaboration of the banks or organizations with the staff to develop means of increasing SME efficiency through the use of AI and FinTech services was studied. More specifically, the respondents agreed that the bank or the organization invest resources in developing AI technologies, that they are constantly adapting in coordination with the employees to the use of financial technologies related to the development of SMEs, that they provide an adequate training to employees in the use of financial technologies relevant to SME development and make an extensive use of technological advancements to serve SMEs.

Regarding the benefits of adopting new financial technologies, Broby et al. (2018) mention as a key benefit the increase in productivity and therefore profitability. Regarding education, Morgan, Huang and Trinh (2019) state that both consumers and employees (not exclusively of financial institutions) need to be more educated in new financial technologies. Also, Yoshino, Morgan and Long (2020) observed in Japan that people with higher education better accept and use new financial technologies more often. Loukis, Arvanitis and Myrtidis (2020) observed that in the midst of the financial crisis, educational and technological resources were not adequately used by financial institutions to train employees, as the main purpose was to reduce operating costs. Nevertheless, they link training in new technologies and services to the economic environment of the country, which in recent years (2019) supports the change in behavior of financial institutions (OECD, 2022). It is a fact that banks are constantly developing innovative payment methods, including new organizations such as non-banking institutions, which introduce new operating models and change the way currencies are used for transactions, for example "digital currencies", as a part of their digital transformation (Koldovskyi, 2023).

Conclusion

Our research shows that all parts of the financial system can benefit from the correct application of artificial intelligence. Customers and especially SMEs can enjoy better and more personalized services and access personalized financial products, reduce their operating costs while improving the efficiency of their internal processes. Financial institutions can improve the effectiveness of supervision and achieve productivity and reduction of operating costs. Finally, the country can benefit from the formation and development of the economic environment.

Limitation of the Study

The main limitation of the study was that our data was collected from a single financial institution (bank) and employees from Athens. Another limitation was the inclusion of all sectoral contexts (e.g., in less 'information-intensive' sectors, like business loans). Therefore, similar research is required also from the prospect of customers (e.g., smaller size firms, having less experience in ICT use) and other national contexts (employees and firms in rural areas).

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