

## ИНСТИТУЦИОНАЛЬНЫЕ ИЗМЕНЕНИЯ И ЦИФРОВИЗАЦИЯ БИЗНЕС ОПЕРАЦИЙ В ФИНАНСОВЫХ УЧРЕЖДЕНИЯХ

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*В настоящее время наше общество сталкивается с новыми глубокими институциональными изменениями, вызванными цифровизацией и переходом от постиндустриальной экономики к экономике, усиленной искусственным интеллектом (ИИ). Экономика, основанная на искусственном интеллекте, в корне изменит каналы и системы управления производством, услугами и транзакциями. В результате, вероятно, будут сформированы более сложные формы экономики. Рыночные институты, такие как конкуренция, инновации, конкурентоспособность, будут проверены новыми изменениями. Революционные трансформационные изменения означают глубокий институциональный сдвиг в структуре занятости и рынка труда по мере формирования нового рабочего класса, прекариата. Многие традиционные рабочие места в экономике будут потеряны и заменены машинами. Однако новая экономика, основанная на использовании цифрового ИИ, также создаст новые рабочие места, хотя и другого типа и характера, и почти наверняка будет основана на принципах «экономики гиганта» и «экономики совместного использования». Наша статья посвящена этим проблемным институциональным экономическим вопросам, касающимся оцифровки и компьютеризации деловых операций в финансовых учреждениях, таких как банки или страховые компании. Мы обсуждаем последние тенденции и события в области цифровизации финансового сектора и их влияние на клиентов и других экономических агентов. Кроме того, описываем возможные риски и последствия для финансовых учреждений. Наши результаты могут быть интересными и полезными для исследователей в области*

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**Ключевые слова:** *финансовые институты; институциональное моделирование; искусственный интеллект; экономические преобразования.*

## **INSTITUTIONAL CHANGES AND DIGITALIZATION OF BUSINESS OPERATIONS IN FINANCIAL INSTITUTIONS**

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*Nowadays, our society faces new profound institutional changes driven by digitalization and the transition from the post-industrial economy to the economy enhanced with artificial intelligence (AI). The economy based on the artificial intelligence will fundamentally change the channels and the control systems of production, services, and transactions. As a result, a more complicated forms of economy will likely to be formed. Market institutions, such as competition, innovation, marketability, will all be tested by the new changes. Revolutionary transformational changes signify a deep institutional shift in the structure of employment and the labour market as the new working class, the precariat, is being forged. Many traditional jobs in the economy will be lost and replaced by the machines. However, the new digital AI-driven economy will also create new jobs, albeit of a different type and nature, and almost surely based on the principles of the “gig economy” and “sharing economy”. Our paper focuses on these troubling institutional economic issues with regard to the digitalization and computerization of business operations in financial institutions such as banks or insurance companies. We discuss the recent trends and developments in digitalization of the financial sector and their impact of clients and other economic agents. Moreover, draw possible risks and implications for the financial institutions. Our results might be interesting and useful for researchers in the field of AI, institutional economists, as well as stakeholders and policy-makers dealing with economics, finance, and labour markets.*

**Keywords:** *financial institutions; institutional modelling; artificial intelligence; economic transformation.*

**JEL:** *E19, P48*

### Introduction

Recently, German Gref, a Chairman of Sberbank, major Russian bank, claimed that two-thirds of the bank employees (mostly middle-tier and lower-level managers) were fired after the artificial intelligence (AI) took over their predominantly simplistic work and their jobs (Gusev, 2018). This statement reflects the recent developments in the financial and banking sector not only in Russia but also worldwide. These developments represent a part of the “information economy” that also required deep institutional changes through profound economic and social transformational processes (Mansell, 2006; Zielińska, 2016).

In general, AI represents the systematic automation processes of macroeconomics and constitutes an interesting topic both for the society and the economists representing a unique factor of economic growth. AI gains special economic significance due to its nature of self-learning algorithm that can automate such processes that have been believed to be non-automated for decades. Economists are also interested in the main consequence of economic growth as a result of fulfilling the production potential of artificial intelligence – the optimization of income distribution between labour and capital and the role of the state in regulating it and setting the balance (Nilsson, 1984; Redmont, 2003; Carrillo-Hermosilla and Unruh, 2006; Kologlugil, 2012; Carrillo-Hermosilla, 2015; Čábelková, Abrahám and Strielkowski, 2015; Šabic-Lipovaca, Strielkowski and Bilan, 2016; Klimina, 2016; Strielkowski, Tumanyan and Kalyugina, 2016; Jędrzejowska-Schiffauer and Schiffauer, 2017; Simionescu, Strielkowski and Kalyugina, 2017).

According to the World Economic Forum (2017), many people have a negative approach to the impact of artificial intelligence on the labour market as they fear it will take away their jobs. On the other hand, the job creation potential of other digital technologies such as Big Data analytics, mobile internet, the Internet of Things and robotics, is viewed as very promising.

With regard to the above, Volchik, Klimenko and Posukhova (2018) describe how the economic transition and the recent technological changes in economy would inevitably lead to the institutional changes on the labour market. The creative economy and the jobs of the future would also have a side effect in a form of creation an entirely new class of people – the precariat. Thence, the future of employment looks quite grim as many jobs seem to be very vulnerable to computerization and robotization (Frey and Osborne, 2017). However, one should distinguish both terms. The word “robot” was invented by the Czech writer Karel Čapek in the 1920s (Kurfess, 2005). The writer based the term on the Slavic word “robotá” which meant “serf labour” and was meant to describe an unintelligent machine designed for heavy loading and other simplistic tasks. Computerization (and AI that came with it) are the next step in this evolutionary process – AI-based systems are algorithms and advanced computer programs that might not have a robot’s heavy-armoured body but that are distinguished by the superior intelligence. Both robotics and AI can alter many traditional industries and bring in the new processes and knowledge (Strielkowski, 2017; Brown, 2018). One of the examples would include the energy sector which is now embracing Big Data, smart meters and autonomic power systems based on advanced information technologies (Lisin, Rogalev and Strielkowski, 2015; Lisin, Sobolev and Strielkowski, 2016; Rausser, Strielkowski and Štreimikienė, 2018; Brożyna, Mentel and Szetela, 2018; Newbery, Pollitt and Ritz, 2018).

The financial sector represented mostly by traditional banks and insurance companies seems to be the first picking up these new technologies due to the nature and the scope of its business operations (West and Phillips, 2018). For example, AI can be very useful for detecting fraud and unusual business operations – something even a trained human might oversee and fail to detect entangled in a digital jungle of data.

This paper discusses the gains and implications from digitalization in the financial sector as a form of the institutional change. We analyse many examples from various countries of

the world and scrutinize the implications both for the financial institutions and for their employees. Moreover, we look at the institutional changes that are happening in the financial sector right now and that are likely to take place in the future. The paper is based on a vast body of the research literature that allows us to draw comparisons, call up the relevant examples and extrapolate our ideas and outcomes.

### Digitalization of business operations

Emerging technologies, coupled with globalization, have been majorly disruptive in the financial services institutions (*Christensen, Raynor and McDonald, 2015; Gavurova, Kocisova and Kotaskova, 2017*). Internet enabled rapid exchange of data and information that enable to control many processes in the economy (*Vegeera, Malei and Sapeha, 2018*). The commercial potential of technologies is enormous (*Posner, 2010; Zemlickiene, Mačiulis and Tvaronavičienė, 2017*). However, the transition process often requires a high price that needs to be paid (*Strielkowski and Čábelková, 2016; Piotrowska and Košny, 2017*). This applies to all sectors of economy, but it is even more relevant in the sectors primarily dealing with data and information flows. For example, consider a situation when, from the comfort of his house, one can receive payments for services rendered, make payments, transfer money from one account to another, send money, and with debit or credit cards, and automated telling machines (ATMs) he would have no need to walk into a banking hall. Technological advancements, innovation, and the subsequent advent and proliferation of different technologies, such as the internet, the World Wide Web, and mobile telecommunications have presented businesses with opportunities to apply these technologies in their operations to achieve a competitive advantage. More particularly, in the financial services sector, financial institutions have adopted and used a combination of these technologies to offer improved and convenient services to their clients, which indeed, as Van den Poel and Lariviere (2004) observed, has been in tandem with demographic and other social changes. For example, people are leading increasingly busier lifestyles, and actually lack the time to visit the conventional banking halls, queue and wait to be served. An hour spent in the bank, unless absolutely necessary, is deemed as major inconvenience in the hustle and bustle of day-to-day economic and social lives.

Further, with these changes in the industry, a subsector in the financial services industry, the financial technology (fintech) has emerged, which offers a wide range of near similar services as the ones offered by traditional financial institutions, but without the same kind of regulation as the conventional financial institutions. According to Ng and Kwok (2017), fintech businesses and services are not stringently regulated as the traditional financial institutions and may therefore have a competitive advantage over the traditional financial institution. To exacerbate the dynamism in the operating environment of financial institutions, globalization, characterized by increased levels of integration, in different aspects of the society, have made it possible for financial institutions to offer branchless financial services, within and beyond the borders of the countries they are domiciled in. Amidst all these changes, it would not be possible to sustainably retain financial institutions in their traditional form and ensure their continued competitiveness.

The use of AI-based algorithms is particularly important in insurance which involves special type of mathematics for predicting gains and losses. Insurance companies (or other institutions that offer insurance products, such as banks and governments) charge a premium based on the risks and potential loss associated with such a risk. However, the question is how to measure and to assess this risk, as well as how to detect it properly. AI-based algorithms prove to be the best solution for that. The sale of insurance and reinsurance products is heavily dependent on the loss of insurance due to urbanisation, climate change and private property costs increases the liberalization of the state and supra-state regulation of financial and insurance markets. All these events are difficult to predict.

Regions such as Asia, Latin America and Eastern Europe are considered to be a growing market for insurance companies, as many countries in such regions are liberalizing their insurance industries, opening it to the competition of private companies. Global insurers face the risks of their own when it comes to regulations: inefficient capital standards reduce the ability of insurers to diversify risk, unnecessary compliance and ultimately increase customer costs and regulations that do not encourage international engagement companies to engage in direct foreign investment (FDI). Moreover, infrastructure companies have the lowest level of globalisation's commitment, with only 74 percent of companies involved in the services globalisation (*Fatima, 2017*). Companies in the banking, financial services and the insurance industry which already operate in and get involve with the globalization of services will lead to this trend.

Latin America has increased the isolation of its insurance markets by applying a replacement policy and voting policy in governments controlled by the populist government. However, even in Australia, whose insurance market has been open to the world since its inception, the government has intervened in 1973 by regulation, which is rapidly declining by more than half of the number of insurance companies – foreign companies in particular (*Boddewyn, 2016*).

Governments have also stepped up their economic policy activities in the West, expanded social insurance and force the insurance industry to relinquish business areas (*Teresiené, 2018*). Unlike banks, insurance companies, particularly global insurers, are driven by the law of large numbers in which various and non-affiliated risks are added. For example, the official liberalization of pricings for life insurance products and non-life motor insurance products in 2015 allows for more investment options for insurance funds (*Pope and Ma, 2008*).

British companies were an exception, continuing to promote their traditional foreign ties with the nations of the Commonwealth and generate more than half of their premiums abroad.

Of the key importance for the international insurance industry has been the following four issues: 1) the liberal economic reforms with the opening of many countries and the increasing internalization of primary insurers; 2) the creation of new insurance centers; and 3) the increasing concentration of reinsurers on major risks; and 4) the increasing importance of the state as last resort's insurer.

### **Traditional Financial Services Institutions**

Financial institutions include institutions such as banks, credit unions, pension funds, investment banks, and brokerage firms among others. According to Siklos (*2001*), financial institutions can be mainly categorized as depository, investment, and contractual institutions. Depository institutions, under which banks, credit unions, building societies, and mortgage companies fall, take deposits from customers, give loans, and facilitate a wide range of financial transactions (*Siklos, 2001*). On the other hand, contractual institutions enter into agreements with their clients to offer services such as insurance and management and execution of retirement and pension plans. Investment institutions on the other hand, according to Wright and Quadrini (*2013*), offer services such as investment funds management, and other commission services. Evidently, there are different types of financial institutions offering a wide range of financial services, which qualify them to be categorized as above. Important to note, these institutions offer services to individuals and other legal entities, such as corporations and businesses in general.

However, despite these categorizations of the financial institutions independently, there has been a gradual and certain gravitation towards financial institutions offering the different services as per the three categories above (*Wright and Quadrini, 2013*). It means that it is not uncommon today, to find a bank, offering insurance, pension fund management,

investment funds management and banking, and other services offered by contractual and investment institutions. Within these context and scope, of the evolving financial institutions, one-stop financial solutions and services to clients, that the report will analyze the viability of retaining the structure and form of the traditional financial institutions in the face of growing globalization and digitalization at the back of technological innovations and advancements.

Traditionally, banking, investment companies, brokerages, insurance companies, and other types of organizations used the branch operations model. Indeed, for a client to access any financial services, he or she had to physically visit a branch of the institution and transact the business at hand physically in that store. For example, as observed by Siklos (2001), to make deposits, withdraw cash, make payments, send money, and other transactions a person would wish to access in a bank or another financial institution required the person to present him or herself physically with proof of identity for the transaction to be affected primarily on paper. At some point, when records were on paper, according to Wright and Quadrini (2013), banking services could only be accessed at the bank and more particularly, the branch, where a person has his or her account. Indeed, passbooks, have only been phased out as the major banking transactions record keeping document, but are still in use in some low-transaction financial services institutions, such as credit unions and banks operating low-volume transactions savings accounts.

#### **Technological Advancements Emerging Financial Services Models**

In the face of new technological innovations and developments over the years, and the subsequent adoption and use of these technologies, financial institutions now offer their range of services with minimal to no human contact points in the process.

The use of cognitive technology coupled with AI brings the advantage of digitalization to banks and helps them to meet the competition of FinTech players. Artificial Intelligence is the future of banking as it brings the power of advanced data analysis to combat fraudulent transactions and improve compliance. Features such as AI bots, digital payment consultants and biometric fraud detection mechanisms lead to higher quality services for a wider customer base. Moreover, AI or any other technology that simulate human intelligence is a trend theme in banking and payment circles.

Few business sectors are currently more focused on the development of AI for its own betterment than banking, as financial institutions are looking to gain a competitive advantage over their peers by implementing technology to achieve improvements in speed, costs, accuracy and efficiency and meet the needs of customers in a more comprehensive manner.

As Michael Harte's opinion last year, Barclays's innovation group, the most obvious use case for AI in banking is "in the great algorithmic trading", which means "using vast amounts of high-speed data to overcome the competition and provide better instruments and value to customers" (Joyce, 2018).

As money laundering continues to be a persistent problem for the global banking sector, there is now a lot of anticipation of what technologies such as machine learning, in-depth learning, data mining and analytics can do to combat the threat, especially now banks are more likely to be fined due to inadequate failures in their anti-money laundering infrastructure.

According to the fintech research firm Autonomous Next, the adoption of AI in the financial services sector could save U.S. companies up to 1 billion dollars in productivity gains and lower total employment costs by 2030 (Körner, Schattenberg and Heymann, 2018).

Banks use AI to automate processes, interact with customers, build intelligent and real-time credit models and improve fraud monitoring, among other things. Robot consultants are an important field of AI application in financial services where fintechs' digital platforms provide 24-hour automated investment and algorithm-driven financial planning without human supervision.

Most obstacles to better banking include knowledge of the industry and skills that can be encoded in artificial intelligence. Real-time credit risk management is complex, but it is possible that banks have a great deal of advantage of artificial intelligence to provide real insight. Once your home is on a new foundation, it is much easier and less risky for banks to acquire the necessary skills to support new business models and new features: from cloud economy and sophisticated analysis of customers' interest.

With permission, financial institutions can use AI to access account holder data, including card expenses, direct deposit information and bill payments, to predict the behaviour of consumers and even to market the relevant products and services. As financial institutions look forward to the future, artificial intelligence will be crucial to the transformation of the industry. It appears that banks and credit unions must embrace fintech partners as the way to the age of artificial intelligence.

While the services offered by financial institutions, as identified by Wright and Quadrini (2013), including deposit taking and safe keeping of money and other valuables; credit and loans; and payment agents among others have remained the same, how the same are delivered has considerably changed over the years. With new disruptive technologies, according to Christensen, Raynor, and McDonald (2015), banking and other financial services have changed in form and type over the years, more particularly, how banks interact with their customers, and the convenience provided to customers.

From the introduction of computers to automatic telling machines and debit and credit cards, to the Internet, the World Wide Web, and related services; process data quickly (PDQ) machines; and most recently, innovations and developments in mobile computing, have in different ways affected how financial institutions deliver their services to their clientele. All these and other emerging technologies are tending towards the digitization of the financial services sector, which intimates an improvement in the range of services available and the way the services are offered to customers (Gomber, Kauffman and Parker, 2018; Au and Kauffman, 2008). Indeed, as enumerated in the example above, it is possible now, for a person, from the comfort of his or her home, or any other convenient location, can access a wide range of financial services through a computer, a mobile phone, or smartphones. These changes demonstrate that technological advancements, and globalization have harbingered immense changes in how financial institutions offer services, and how customers access and use these services.

The emerging technologies provide convenience and improved service delivery as compared to the traditional financial services delivery model, leveraging branch operations; it is no longer necessary to visit and access financial services at the branches of different financial services institutions. According to Ding, Verma, and Iqbal (2007), technological advancements, such as online and internet banking, have led to the development and evolution of self-service technologies, which fosters improved customer service delivery. Indeed, with advancements in self-service, characterized by reduced contact points between the service personnel and customers, customers take on more responsibilities, and therefore have more control over how they access their services. With technological advancements evidently, there is improved convenience.

The new and emerging technologies provide financial institutions with improved capabilities and capacities that foster enhanced and improved services delivery. Indeed, according to Hauswald and Marquez (2003), technological advancements in information technology have provided financial institutions, including credit, insurance, and securities exchanges, with improved processing and dissemination of information. In agreement, Kshetri (2016) observed with advancements in computing, firms in the financial services sector have improved abilities to collect, store, process, and use a lot of data and information (big data), to facilitate informed managerial decision-making. Such changes imply that financial institutions, have the ability to make real-time and better decisions, such as credit

ratings for loans and credit services provision, for banks; or improved investments analysis for improved investments management, for investment firms.

Other changes that are destined or portend further changes in the financial services sector are internationalization and globalization operations in line with the demands of global markets (Ng and Kwok, 2017); plastic money (debit and credit card), mobile banking, and the subsequent transition to cashless banking (Christensen et al., 2015); fintech and mobile payments (Au and Kauffman, 2008; Gomber et al., 2018). For example, fintech developments imply that new firms, such as telecommunication, information technology, and other firms, such as automobile manufacturers, can and have developed smartphone or web-based applications that offer services bordering on the kind of services offered by the traditional financial institutions, but without the same kind of regulation (Christensen et al., 2015; Gomber et al., 2018). These developments have led to the transition to a more responsive and dynamic banking model, characterized largely by an increased focus on self-service; agency banking; branchless operations; enhanced convenience, and by extension, improved customer services delivery but faced by a lot of competition from emerging business models.

### Conclusions and discussions

The implications for the financial services sector is that firms in the industry can now, without incurring the same levels of overheads and other costs of doing business, engage and offer wider range of services to customers, become more competitive, and operate more profitably. However, it is imperative that firms in the industry leverage the emerging technologies, to improve their business models. Changes, including the proliferation of computers; ATMs; the Internet and the World Wide Web; PDQs; mobile telecommunication and advancements in computing and processing power of mobile devices; and new services range with new technologies include branchless banking, internet banking, agency banking, and mobile banking. A failure to change and adapt commensurate with the changes in technology, coupled with enhanced management capabilities in a globalized operating environment, will result in reduced competitiveness of firms in this industry. It becomes necessary, in the context of all the above changes to acknowledge that inevitably, it is important for financial institutions to be proactive and responsive to changes in the operating environment, which implies a total change of the business model. From the foregoing, while these changes and challenges emerge, it may be possible, for fintech and emerging financial services providers to become obsolete, but if they are adaptable, they can still operate competitively.

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