

IT technologies in the digital transformation of separate branches of economy: semiotic perspective

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Abstract. The article is devoted to the study of the influence of IT technologies on modern processes of digitalization of economy, which gives quite an extensive research material for various theoretical studies including economics, finance, sociology, linguistics. It is noted that not all social or communicative phenomena can be explained exclusively with the help of categories of one or another school of thought. The authors propose looking at the impact of IT technologies on economic phenomena through the lens of semiotic analysis to understand the results of implementing advanced IT technologies in such socio-economic process as digitalization. The results of the research show that semiotic analysis not only reveals the range of sign systems used in the representation of digitalization but also serves as an explanatory tool for learning specific characteristics and objective patterns of polycode texts present in digital products such as websites or mobile applications. The authors are convinced that drawing the methodological tools of semiotics to the analysis of the influence of IT technologies on the process of digitalization of retail financial services will significantly contribute to cross-disciplinary studies of such topical phenomenon as IT technologies and their successful implementation in separate branches of economy.

1 Introduction

Strengthening the role of IT technologies in the life of ordinary people as well as businesses has become one of the main reasons of a large-scale digital transformation in economy in general and in separate branches and sectors of economy in particular. It is important to note that over the past 10 years, the industry of financial services has altered beyond recognition. In the sphere of finance, the beginning of the 2010s was characterized by the focus on the activity of large investment and commercial banks and other traditional financial intermediaries, while the end of the decade witnessed the appearance of a great number of

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start-ups, which, being non-banking and non-credit institutions, started offering retail financial services thus being regarded as competitors to traditional financial institutions[1].

There is no denying the fact that such radical changes happened in the result of lockdown during the COVID-19 pandemic which boosted the implementation of IT technologies in every sphere of life. Nevertheless, with the return to normal situation, no recovery of traditional banking happened, which only proves the growing popularity and demand for digital services which became possible due to the enhancement of IT technologies. Digital services are fast, easy, convenient, help to save time and can be conducted in a remote mode. People value them for their efficiency, availability, flexibility and constant development. To satisfy the growing needs of customers, banks need to follow the latest trends and turn into technological companies rather than remain banks in the full sense of the word. Competition for customers motivates financial institutions to constantly develop new products, seek ways to win the trust of potential clients and make services even more advanced.

2 Main part

2.1 Retail financial services: overview of the market

If asked about what banks and financial services are, people usually imagine a bank office where they can open an account, place a deposit, take out a loan, transfer money to somebody’s account. These are exactly what retail financial services are. Retail banking (consumer banking, personal banking) is banking which provides financial services to individuals rather than businesses.

A detailed classification of bank services is developed by M.S. Maramygin and A.V. Povarov [4] (Table 1).

Table 1. Classification of bank services.

<i>Classification criterion</i>	<i>Possible options</i>
Clients’ belonging to the subject of law	Natural person Legal entity
Economic intention	Savings Cash Settlement Loan Investment Stock Guarantee Information-consultative Safekeeping and transportation of valuables services
Conformity with banking specifics	Specific Non-specific
Complexity of service provision	Services that can be supplied unaided Services requiring no specific training Services requiring detailed technical knowledge Complicated services
Duration of relations	One-off Long-lasting
Frequency	Regular Irregular
Personalization of service	Personalized Universal

Degree of innovation	Traditional Advanced Innovative
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According to the criteria presented in Table 1, we would categorize retail financial services as serviced provided to natural people with various economic intentions, non-specific, regular and long lasting services requiring little of no specific training, or the one that can be rendered unaided, universal and traditional.

Broadly speaking, retail banks provide financial services for everyday expenses and life situations, e.g. purchase of a private house. Retail banks render such services:

- Bank accounts – check accounts, savings accounts, money market accounts. Check accounts / current accounts usually involve issuing debit cards to effect purchases. They can also be used to pay bills online. Saving accounts offer higher interest ratebut they have some limitations to withdraw or transfer money.
- Certificate of deposit (CD) – provide higher interest rates but involve keeping the money in the account untouched for a certain period of time to avoid being fined forearly withdrawal.
- Credit cards – are similar in use to debit cards but require repaying a loan.
- Safes – are repositories where small valuables and important documents are kept sothat they cannot be stolen or damaged if kept at home.
- Mortgage – retail banks help people buy a private house or refinance their debts connected with such purchases. Second mortgages allow people to borrow money upon the security of encumbered property using a share in their house to guaranteecredit.
- Unsecured consumer loans – serve various purposes. Customers are not obliged to pay a security deposit. Revolving credit lines provide opportunity to spend and repay money often without requesting a new loan every time they need money.

2.2 Implementation of IT technologies: interim results of digitalization of retail financial services

Financial sector is characterized by its capability for intensive diffusion of innovations in its internal environment, which causes transformation of all types of services and technologies. These transformations, in exchange, contribute to the spread of financial innovations in the external environment. As a result, customers develop a specific, innovation-driven digital customer culture.

One of the results of these processes is the intensification of implementation of IT technologies which has led to digital transformation of financial services, which is manifested in active transformation of business processes, development of omnichannel structure of financial operations alongside mobile financial applications which have successfully integrated into the segment of non-financial services including retail business.

It is essential to note that cross-segmental integration boosted competition between traditional providers of financial services and new players, non-banking and non-credit institutions. Over the period of 2013-2023 the general tendency consisted in the reduction of the number of banking institutions by 21755 units, which is 46,4% (Fig. 1), and the decrease of security by 154 units, which is 47,1% (Fig. 2) [3].

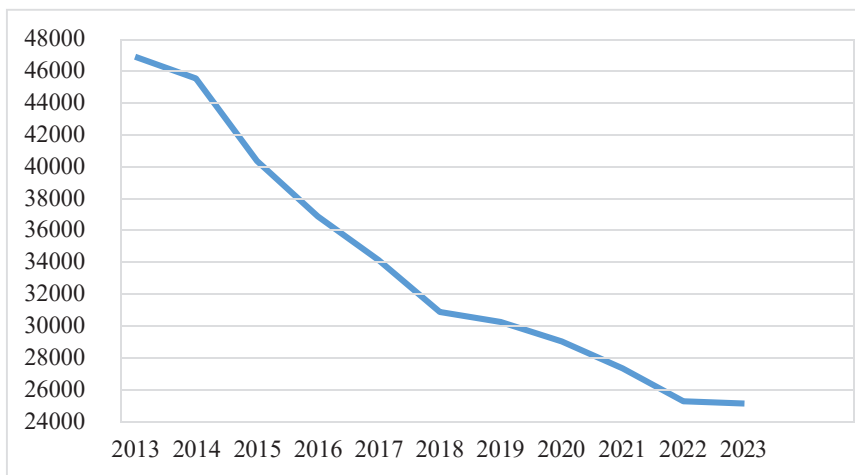


Fig. 1. Dynamics of institutional provision of payment services in Russia (total amount of banking institutions)

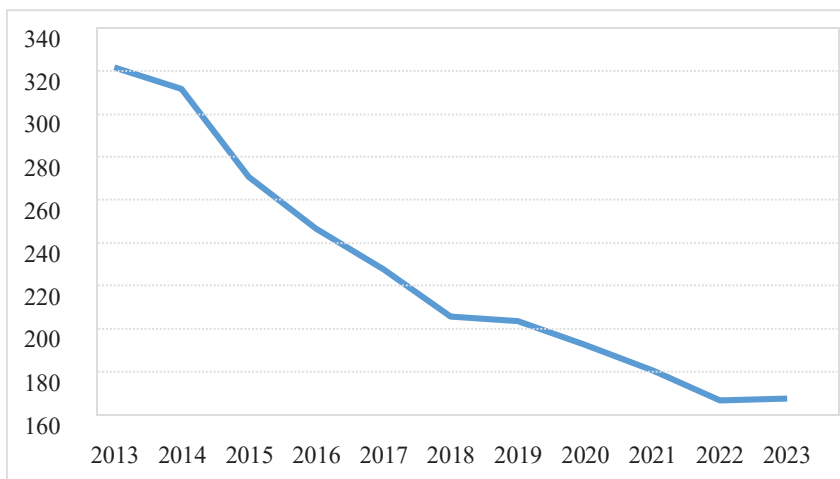


Fig. 2. Dynamics of institutional provision of Russian population with payment services per 1 million people (number of banking institutions, units per 1 million people)

In recent years, non-cash retail payments have become an integral part of life, and innovations and initiatives of the largest market participants are changing behavioral patterns and developing new habits. The role of innovation has become especially noticeable in the last 2-3 years, when mobile wallets, contactless payments and other consumer products have become available thanks to digital transformation of the industry.

Indeed, according to the report prepared by Bank of Russia based on the findings for 2021, more and more people are using bank card for everyday payments (Fig. 3) [4].

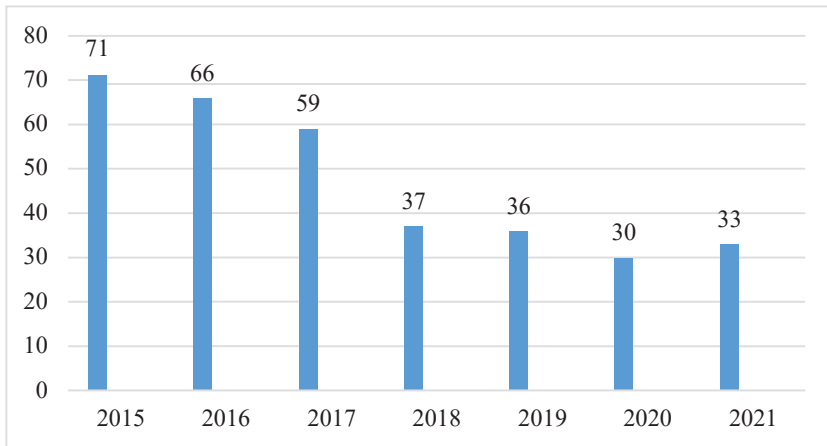


Fig. 3. Use of cash to pay for goods and services (% of the respondents)

By the results of 2021, 82% of Russian citizens have bank cards, 45% – more than one. supermarkets (Fig. 4) [4].

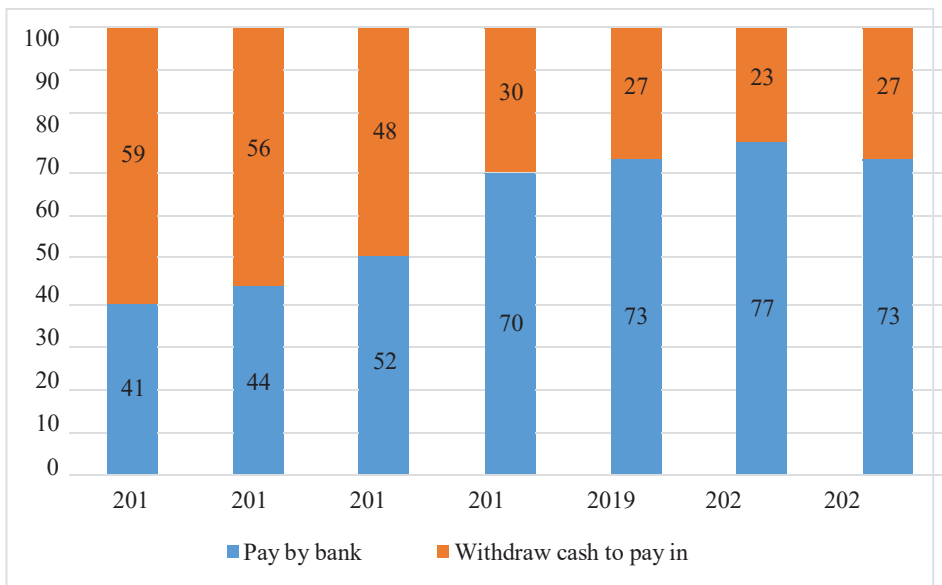


Fig. 4. Use of bank cards in Russia (% of the respondents-holders of bank cards)

The majority of outlets are equipped with non-cash payment facilities. Cards are used by 88% of Internet-stores customers, 63% of customers of big shopping malls, 62% of shoppers in supermarkets (Fig. 5) [4].

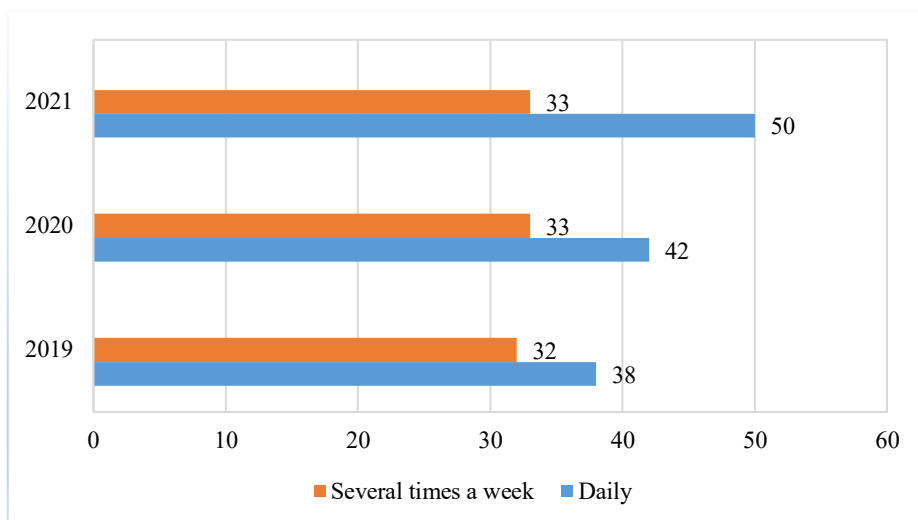


Fig. 5. Payment for goods and services by bank cards (% of the respondents-holders of bank cards)

The data presented above convincingly prove that retail financial services have shifted to digital channels. More and more people prefer using Internet-based services or interact with banks in distant mode because it is convenient, it saves their time and makes the services more effective. Banking institutions have to conform with the challenges of digital transformation of economy, which makes them dependent on the innovative character of the FinTech solutions and products they use. No doubt, digital technologies and high-tech banking products are the source of competitive advantages for financial institutions and serve as a factor of enhancing their economic efficiency.

Digitalization implies developing new technological products which actively involve advanced IT technologies. On the one hand, it is very convenient for clients. On the other hand, digitalization provides businesses with direct savings that can be obtained by reducing costs, as the representative of Sber notes [5]. This is primarily the cost of implementing processes, as speeds increase, physical and temporary costs go away. But digitalization is also important for banking institutions from the point of view of the need for their employees to get the customer experience that they expect from banks – it is important for banks to test their digital products on their staff, to see how many of their employees use their tools on a regular basis, what estimates they make, what percentage of return to the platform.

So, the results of digitalization are important both for banks (Table 2) [6] and clients. Banks enjoy economic efficiency while clients value comfort and the quality of services [7].

Table 2. Results of using digital technologies for client services (on the example of Sber).

Technologies used for client services	Results for 2019
Big data	Bank uses 1000 parameter to personalize online-services, big data analysis speeds up the process
	The platform processes 3 million transactions daily
Artificial intelligence	Recognition of a dialogue of a call-centre operator with a client allows to automatically classify the call and reduce the time of waiting by 30%
	11% of corporate client calls are handled automatically
Robotization	All decision on applications for credit cards are taken online

	Chat-bot decides 40% of client questions automatically
	Robots draft and register contracts, approve or disapprove issuing bank guarantees
	Voice robot based on neural network prolongs insurance of mortgage property by phone
	After signing one document for one service by a client robots independently draft contract for other services

Today, digital financial services, Internet banking platforms provide remote access to bank accounts and allow customers to receive savings and credit services through a web browser or using a specialized mobile application. As a result, the remote form of provision has spread to credit services – online lending services are offered to consumers by banks and microfinance organizations. Thus, digitalization results in removing financial intermediaries such as banking institutions as the majority of services can be provided directly to the client and in a remote mode [8].

All in all, digitalization of retail financial services is manifested in the following forms (Table 3) [9].

Table 3. Forms of manifestation of digitalization of retail financial services.

<i>Kinds of financial services</i>	<i>Forms of manifestation of digitalization of financial services</i>		
	Remote electronic interaction	Lack of intermediaries	Service personalization
Payment services	+	-	-
Saving services	+	+	+
Credit services	+	+	+
Investment services	+	+	+
Insurance services	+	-	+
Pension services	+	-	+
NB.: “+” means presence of form of manifestation, “-“ means absence of manifestation			

2.3 Applying semiotic method to the study of IT technologies impact on digitalization of retail financial services

Digitalization as a research problem is in focus of cross-disciplinary studies. Socio-economic disciplines study the effects of digital transformation on the development of economic systems. The area of information technologies is focused on technological issues of the process. Linguists study language specifics of media texts in various professional spheres. One area is of particular interest in terms of the presented research – semiotics, the science of signs [10]. Semiotics as a research methodology is used in the analysis of almost every sphere of human activity such as “semiotics and literature”, “semiotics of the literary text”, “semiotics and psycholinguistics”, “political semiotics”, “computer semiotics”, etc. [11-14]. Quite a lot of research is conducted in the sphere of marketing and online communication.

It is our understanding that digital innovative products offered by banks while providing

their clients with retail financial services represent a type of text. It is a digital type of text according to the channel it is transmitted. At the same time, it has some properties which help to distinguish digital texts among other types of texts. In particular, digital texts are polycode and by their very nature cannot avoid using signs of different sign systems [15]. Polycode texts represent “united graphic space of semiotically heterogeneous constituents – a verbal text in oral or written form, images as well as signs of other nature” [16].

We will conduct semiotic analysis on the example of the digital products of Sberbank, which is one of the most active proponents and leaders of digitalization.

Let’s start by analyzing the mobile application “Sberbank online”.

Mobile application is a certain format of technical organization of information and communication content. To be aware of development and typical features of mobile applications is essential for understanding the basic principles of its functioning. For instance, the basic principles of an application consist in the existence of:

- a dominant – a semantic centre – an image or some graphic object with a caption; functionality – a convenient user-friendly interface with various polycode means and wide navigation system;
- ergonomics – satisfies readability criteria based on psychophysiological specifics of human perception of information;
- aesthetic qualities;
- wise structural division of the page – ensures efficiency and ease in use, draws attention to the most important aspects;
- text – is subject to minimizing the amount of textual information. The starting page of the application looks as follows (Fig. 6) [17]:

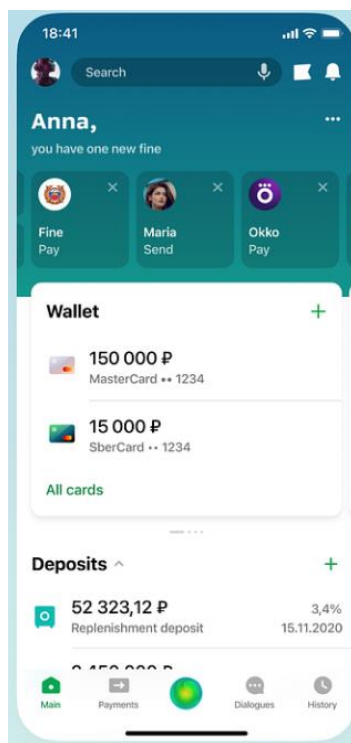


Fig. 6. The starting page of Sber mobile application for Android smartphones

The verbal constituent is rather small – there is an address to the holder of the account

with the first name and a greeting welcoming him / her in the application, some basic functions, names of people the holder of the account transfers money to / receives from. A visual component is presented more widely and is more varied. We can see different icons – signs which should mean something to the user: (from left to right) the sign of a camera, the + sign which allows to expand the options shown in the screen, a logo of a mobile operator MTC whose connection services are obviously used by the holder of the account, a green arrow sign in a circle showing the direction of the movement from left to right – it stands for money transfer option. A bigger area is occupied by an electronic purse section – the word “Purse” is capitalized and is written in a bigger size font; the amount of money available, the symbol of a plastic card with the name / logo of the payment system and the name of the card itself and its last four digits in the number. Below is the Dialogue section – we can see a + sign meaning a “write a message” option and several images of people with their name written below the images.

In terms of semiotics, we deal here with different semiotic codes. The author of the text uses them not by chance, but on purpose – he / she understands what sense these signs take within a certain text and a certain context, what the combination of different semiotic codes means, and, of course, how it influences the reader.

The semiotic codes found in Fig. 6 can be classified into the following groups: verbal codes (words, phrases) and non-verbal – images (pictures of people in the Dialogues section), icons (universal symbols of activities), logos (MTC, МИР), numbers (the amount of money in the purse), various symbols like crosses, + signs and punctuation marks.

What is also important is the combination of different sizes of font – more important information is presented in a bigger size (an address to the holder of the account) and the color variations – the page background is white with some areas with a slightly visible tint of light blue. The majority of non-verbal components is presented in the green colour meaning harmony, peace and quiet, balance, life and development. Textual elements are mostly written in black which is the usual colour for a text in a book or some other printed matter.

The example of semiotic analysis of the starting page of Sber mobile application shows that an innovative digital product can be viewed as a polycode text as it combines elements belonging to various semiotic systems – verbal and non-verbal. Play of colours and sizes of fonts is one more feature of the visual component of the application, and it is wisely used by the developer to create the necessary attitude of the user.

3 Conclusion

Retail financial services provided online enjoy great popularity among consumers in Russia. This is the result of wide implementation of IT technologies which greatly influence digital transformation of financial sector. Competing for clients, banks develop and launch new, more advanced IT products which are fast, flexible and convenient. We believe that using the resources of various semiotic systems helps the developers of innovative products to attract wider audiences of customers as wise combination of verbal and non-verbal elements induces the necessary attitude of potential clients. People are satisfied with the services and the way they are provided, which only proves the efficiency of the strategy banking institutions follow in the digital transformation of the financial sector.

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