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Drivers for the adoption of digital platforms: An empirical analysis of Russian small and medium-sized enterprises

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ABSTRACT

Digitalization is one of the key factors in increasing competitiveness, which significantly expands the capabilities of enterprises, transforming the business models of companies and significantly changing the process of creating value for the consumer. One of the components of the digital economy that can become a driver for the development of entire industries are digital platforms, which in modern conditions may bring significant benefits both for large enterprises, and as well as for small and medium-sized enterprises. Despite the high importance of using digital platforms, the use of digital platforms among small and medium-sized businesses is not widespread in Russia. This article aims to identify the factors that contribute to the adoption of digital platforms among small and medium enterprises.

KEYWORDS:

digital platforms, small and medium business, digitalization, entrepreneurship, digital economy.

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1. INTRODUCTION

Today, Russia is creating conditions for the development of digital platforms and expanding the range of their users, with special attention paid to small and medium-sized enterprises (SMEs). It is necessary to note significant progress related to the physical and virtual factors of the use of digital technologies: for example, the share of households and the population using the Internet both for making trade transactions and for receiving state and municipal services demonstrates a steady increase. According to data provided by the All-Russian Omnibus Gfk[1], in 2019, the number of Internet users over the age of 16 in Russia was 90 million people, or 75.4% of the adult population. Compared to the previous year, the number of users increased by 3 million people. The growth of Internet users, as well as the use of digital platforms, is promoted, in particular, by the activities of the Regional Public Center for Internet Technologies, for example, the All-Russian educational campaign "Digital Dictation", etc.[2]

Moreover, in the context of the spread of COVID-19, an increasing number of businesses and citizens have begun to actively use digital platforms. Under the current conditions, it has become particularly noticeable that in a number of areas, digital platforms have become the dominant participants in economic relations, which leads to the transformation of industries, changes in the configuration of economic agents, and the creation of potential for economic growth [Nambisan, S., 2018; Ojasalo, J., 2016].

In the current conditions, the issues of identifying the key success factors that contribute to the introduction of digital platforms in the activities of organizations are becoming relevant. In this connection, it was conducted a study that also allowed us to identify the drivers that contribute to the successful spread of digital platforms among small and medium-sized enterprises.

2. IDENTIFICATION AND ANALYSIS OF FACTORS CONTRIBUTING TO THE INTRODUCTION OF DIGITAL PLATFORMS IN THE ACTIVITIES OF ENTERPRISES

To identify the factors that contribute to the introduction of digital platforms in the activities of enterprises, the authors of the work conducted a study that includes three stages.

At the first stage of the study, to identify the factors contributing to the development of digital platforms, an interview was conducted with a focus group consisting of representatives of five large companies representing telecommunications services, international consulting services, industry, transport and logistics services, and software development. Representatives of these companies were included in the focus group on the basis that the organizations have experience in creating/advising on the introduction of digital platforms. The interview was conducted using Skype, the duration of each interview was from 20 to 30 minutes. The interview was also attended by 12 representatives of small and medium-sized businesses who have experience working with digital platforms.

[1] Internet connectivity in Russia. GfK research. URL: https://www.gfk.com/ru/press/issledovanie-gfk-proniknovenie-interneta-v-rossii.
[2] Internet access. The market of Russia and the CIS. URL: https://www.tadviser.ru/index.php.

As a result of the interview, there were identified the factors that, according to the participants, have the greatest impact on the development of platforms:

- reaching a critical mass of users;
- availability of funding;
- accumulation of knowledge and information return for the developer/owner of the platform;
- state policy in the field of antimonopoly regulation;
- creating a competitive advantage for the platform developer/owner;
- cooperation between the owners of the platform.

Representatives of the companies who took part in the interview noted that today digitalization and the introduction of platform solutions in the organization's activities are a global trend, and many domestic enterprises are actively developing industry 4.0 technologies.

During the interview, respondents identified differences in the approach to the development of digital platforms. So, there are many examples of organizations that turn to vendors to develop the platform, while others prefer to develop the platform independently, even though it requires a large investment in the selection of a qualified team, and takes much more time. However, according to the interview participants, this step is justified, since the organization is less dependent on external expertise and is able to take into account all the specifics of a particular organization.

The common factors highlighted by all respondents, regardless of the type of platform and the size of the organization, were the accumulation of knowledge and information return, which allows not only to accumulate and analyze a large amount of information within the organization, which only increases over time, but also to obtain information about the industry as a whole. Platform dynamics is also influenced by other reinforcing feedback mechanisms related to technology adoption and growth of organizations [Trachuk, Linder, 2015]. In addition, changes in social norms and practices of consumers, organizations and public sector can play an important role. According to previous studies, due to conservative ways of working, different groups of participants may not initially realize the value of the platform, and thus potential reinforcing feedback mechanisms may remain unused [Trachuk, Linder, 2018].

When it comes to digital platforms in general, building a critical mass of end users, developers, and service providers, as well as achieving self-sustaining growth and scalability, is a key element to the success of platforms. Initially, the development of the platform may be funded, promoted, or otherwise subsidized using external funding, but in the long run, the success of the platform depends on a viable business model and the ability to attract customers.

In the initial stages of platform development, a common problem is the so-called "chicken and egg" situation, in which too few developers and service providers of the platform constrain the growth of the end-user client base, and vice versa. To reach critical mass, it is necessary to properly allocate resources for development. If there are many competing and incompatible platforms, there is a risk that none of the platforms will reach critical mass. For example, in the context of a "smart city", individual cities may develop fragmented platforms that target only a small group of potential customers, and the number of end users remains low or decreases when government-funded development efforts end.

Reaching critical mass and being able to scale the platform depends crucially on the network effects, created by the platform. Direct network effects refer to situations in which the value of a group of subjects depends on the size of the same group of subjects. For example, the value of a social media platform to the end user increases with the total number of end users. In contrast, indirect (or cross sectional) network effects refer to cases in which the value of a group of subjects depends on the size of another group of subjects. For example, the value of a mobile phone operating system platform to end users depends on the number of application developers (and the applications developed by them), and vice versa. In addition, data plays a crucial role in modern Internet platforms, and network effects due to the accumulation of data can be significant [Raunio, M., 2018].

Understanding of network effects is essential for understanding the bilateral (and multilateral) markets at which the platform mediates transactions among supply and demand participants. If we look at the research already conducted in this area, we can find evidence that in two-way markets, the platform owner can subsidize one side of the market to increase the adoption of the platform, and charge the other side of the market [Parker, Van Alstyne, 2005]. In multilateral platforms, the discovery of edge resources [Ghazawneh, Henfridsson, 2013], such as applied programming interfaces, can increase the scale of network effects, as third parties can integrate their applications into the platform.

Respondents also note that in order for organizations to have an incentive to take risks and invest in the development of the platform, it must be a source of competitive advantage for them. This requires that they have the ability to retain customers to some extent, and therefore the desire for excessive openness in the development of the platform may not be the best option. From the platform owner's point of view, openness reduces switching costs for users and increases competition.

However, it is worth noting that there is a tendency to implement the "Winner takes all" scenario, in which the market leader can use the mechanisms to increase profits at the expense of the platform and block competitors. This can negatively affect the focus on innovation and development of the industry. This risk is an important public policy issue. This point of view is also supported by the Federal Antimonopoly Service of Russia, which notes the importance of the digital platforms development in Russia[3].

A winner-take-all situation is more likely when the network effects are positive and strong, the costs of multiple

[3] Elena Zaeva: At the present time our task is to ensure the conditions for the innovative development of digital markets in a competitive environment // FAS. March6, 2019. URL: https://fas.gov.ru/news/27093.

addressing are high, and there are no differentiation opportunities in the market [Fine, 2000]. At [Rysman, 2009] it is also mentioned the possibility for suppliers of additional goods to differentiate their offers as a factor that can lead to a winner-take-all situation.

In the context of digital platforms, the overall network effects can be strong due to the accumulation of data on the platform. In addition, the costs of multiple targeting can be high due to non-standard development toolkits or applied programming interfaces, resulting in extensive integration efforts for developers who want to use different platforms. For example, in the context of "mobility as a service", there may be separate application implementations for paying for public transport and planning trips for each city, and there may be additional costs for access to data on different platforms.

There are also factors that can balance the competition and reduce the likelihood of a winner-take-all situation. One of the mechanisms to overcome this situation is the phenomenon of competitive exclusion, at which a large number of developers on the platform reduces the incentives for innovation due to excessive competition [Boudreau, 2012]. In addition, competition may increase if the market leader invests less in the development of the platform than competitors [Markovich, Moenius, 2009]. Finally, a firm can use a platform expansion strategy in which it leverages assets in one industry to gain a competitive advantage in another [Markovich et al., 2011].

At the second stage of the study , we used a consistent approach, including a qualitative and quantitative assessment of factors, to identify the drivers of the use of digital platforms.

At the stage of qualitative analysis, the research literature was analyzed, as well as semi-structured interviews with representatives of small and medium-sized enterprises were conducted, which allowed us to identify the factors that influence users of digital platforms and act as drivers of their implementation and use in the activities of small and medium-sized enterprises.

As a result, we developed a classification in which the factors, depending on the benefits received by the business, were divided into four groups. The proposed classification is presented in Table 1.

The quantitative stage of the study was carried out by sending electronic questionnaires to representatives of small and medium-sized enterprises (SMEs) of various industries and regions of the Russian Federation. In preparation for the quantitative stage of the study, a questionnaire was developed in which the questions were formulated as follows: "How much do you agree with the statements below?", for the answers, a 7-point Likert response scale was used (1 – "completely disagree", 4 – "I do not know, agree or disagree", 7 – "completely agree"). Questionnaires were sent to 378 enterprises, responses were received from 164 SMEs, the response was 43.4%, which is a sufficient result to build up a regression equation. The characteristics of the sample are presented in Table 2.

Based on the results of the analysis of the questionnaires, we identified the frequency of mentioning factors (Table 3).

In the course of further research, we conducted a correlation analysis, which allowed us to identify the factors that are most significant when making a decision about the introduction and use of digital technologies.

3. RESULTS OF THE STUDY

As a result of the correlation analysis, nine factors were identified that, according to the Cheddock scale, have the greatest influence on the decision of small and medium-sized enterprises to use digital platforms in their commercial activities (Table 4).

The results of the factor analysis were used to calculate the strength of the influence of factors on the decision to use digital platforms in the commercial activities of SMEs.

In general, the results of the regression analysis confirmed the correctness of the selected factors. The equation-based model was able to explain 81.8% of the factors variation in the decision to use digital platforms (Table 5).

The regression model showed that all factors have a positive impact on the decision to implement digital platforms in the activities of small and medium-sized enterprises.

According to the results of the study, the most important factor was the "Ability to establish business relationships with people, communities and companies of interest to the user" ($\beta = 0.624$), which indicates that SMEs expect platforms primarily to provide an opportunity to build long-term business relationships. This raises the question of the quality of registered users of the platform. Hence, it can be assumed that SMEs are interested in tracking the business reputation of the counterparty in the profile of a particular enterprise. It is assumed that the availability of such an opportunity will positively affect the perception of the platform.

The next important criterion is "Ability to recruit a critical mass of users to sell products/services" ($\beta = 0.587$), which reveals one of the most important for SMEs functions of the platform: finding customers and gaining a foothold in the market.

The third most important factor is "Optimization of business processes of the enterprise and increase of flexibility of enterprise management" ($\beta = 0.504$). This factor is particularly important in the context of a pandemic, when the ability to quickly adapt to rapidly changing conditions and ensure the functioning of the organization becomes particularly relevant. Thus, platforms that provide remote user work, as well as provide new sales channels, are gaining popularity. These platforms include cloud storage, online meeting platforms, aggregators, etc.

Another important factor that has a significant impact on SMEs is the presence of a single window for solving various tasks. SMEs that actively use online platforms and applications strive to optimize the time and effort spent on obtaining a service. Today, there are many platforms and applications where in order to be able to carry out transactions, get advice, submit an application, you need to register, and the number of such services that are useful for SMEs is growing. However, the need to register on each individual resource makes it difficult to work and

Table 1
Factors contributing to the introduction of digital platforms in the commercial activities of enterprises

Factor group	Factors
Economic	Reduction of the market analysis cost Reduction of transaction costs, including the search for a business partner improving the profitability of business
Market	Getting access to industry information Ability to establish business relationships with people, communities, and companies of interest to the user Ability to recruit a critical mass of users to test new products/services Accumulation of a large number of suppliers and consumers on one site Facilitating access to foreign markets and markets in other regions Development of a new sales channel Automatic calculation and presentation of analytics for express analysis of offers and post-fact analysis of transaction statistics
User	Implementation of electronic document management Presence of a single window for solving various tasks Support for interaction with regulatory authorities Ease of control over processes and requests Optimization of business processes of the enterprise and increase of flexibility of enterprise management Minimum set of actions on the part of users Reliability and quality of the platform Ability to test the platform Availability of personnel capable of using the platform
Network	Ability to build alliances by stimulating mutual consumption of products and services

Source: compiled by the authors based on a semi-structured interview.

Table 2
Characteristics of the sample of small and medium-sized enterprises that answered the questionnaire questions

Characteristics of the sample companies	Number of companies	Share in the sample (%)
Sector		
Manufacturing industry	64	39
Agricultural industry	14	8
Construction	21	13
Trade	37	23
Services	26	16
Other	2	1
Company life cycle		
Less than 1 year	20	12
From 1 year to 5 years	103	63
More than 5 years	41	25
Average number of employees		
No more than 15 people	70	43
From 15 to 100 people	64	39
From 100 to 250 people	30	18
Revenue without VAT per year		
No more than 120 million rubles	86	52
From 120 million to 800 million rubles	52	32
From 800 million to 2 billion rubles	26	16

Source: compiled by the authors.

causes confusion. Having a single account for different types of services will not only reduce a lot of unnecessary fuss and trouble, but also allow SMEs to easily switch between different services within the same ecosystem, which can increase awareness of additional services that are useful to SMEs.

Another factor of interest is "Ability to build alliances by stimulating mutual consumption of products and services". As mentioned earlier, organizations are interested in building long-term business relationships; at the same time, a good way to increase their awareness and sales can be to cooperate with companies that provide complementary products/services. In this case, companies can help partners find a consumer (for example, construction companies cooperate with furniture and construction stores, etc.).

The analysis showed that the factors "Getting access to industry information", "Reduction of the market analysis cost" and "Reduction of transaction costs", although significant for SMEs, are not the key ones. Taking into account the factors mentioned earlier, it is certain that small and medium-sized enterprises are willing to pay for access to a digital platform if it provides advantages that are not available to SMEs that do not use the platform, if they can get a service of high quality from "trusted" users, and if the goal of obtaining a service/finding customers is achievable.

Table 3
Frequency of mentioning drivers for using digital platforms

No.	Factors	Frequency of mentions (%)
	Economic	
F1	Reduction of the market analysis cost	93.5
F2	Reduction of transaction costs, including the search for a business partner)	96.3
	Market	
F3	Getting access to industry information	58.2
F4	Ability to establish business relationships with people, communities, and companies of interest to the user	92.3
F5	Ability to recruit a critical mass of users to sell products/services	93.4
F6	Accumulation of a large number of suppliers and consumers on one site	92.7
F7	Facilitating access to foreign markets and markets in other regions	76.9
F8	Development of a new sales channel	88.7
F9	Automatic calculation and presentation of analytics for express analysis of offers and post-fact analysis of transaction statistics	42.3
	User	
F10	Implementation of electronic document management	86.7
F11	Presence of a single window for solving various tasks	93.2
F12	Support for interaction with regulatory authorities	90.4
F13	Ease of control over processes and requests	88.1
F14	Optimization of business processes of the enterprise and increase of flexibility of enterprise management	77.3
F15	Minimum set of actions on the part of users	43.6
F16	Reliability and quality of the platform	78.9
F17	Ability to test the platform	52.3
F18	Availability of personnel capable of using the platform	85.9
	Network	
F19	Ability to build alliances by stimulating mutual consumption of products and services	95.6

Source: compiled by the authors based on a completed interview.

Table 4
Factors that have the greatest impact on the decision to use digital platforms

Гипотеза	Факторы
H1	Reduction of the market analysis cost
H2	Reduction of transaction costs, including the search for a business partner
H3	Getting access to industry information
H4	Ability to establish business relationships with people, communities, and companies of interest to the user
H5	Ability to recruit a critical mass of users to sell products/ services
H6	Accumulation of a large number of suppliers and consumers on one site
H7	Presence of a single window for solving various tasks
H8	Optimization of business processes of the enterprise and increase of flexibility of enterprise management
H9	Ability to build alliances by stimulating mutual consumption of products and services

Source: compiled by the authors based on a completed interview.

4. CONCLUSIONS AND RECOMMENDATIONS

Today, many digital services for SMEs have a low subscription price. However, for platforms for which a fee is charged (this includes platforms where purchases are made by the largest customers), a grace period for new users can be offered, which will attract entrepreneurs to the topic being studied, as well as give them the opportunity to test the platform, and then make a decision about buying a license or other rights to use the platform.

Considering the introduction of digital technologies, including digital platforms, in the activities of small and medium-sized

Table 5
Factors contributing to the introduction of platforms in the commercial activities of enterprises

Independent indicators	Non-standardized coefficients	Standardized coefficients
Constant (β_0)		17.520
Reduction of the market analysis cost	0.364	0.381
Reduction of transaction costs, including the search for a business partner	0.396	0.394
Getting access to industry information	0.251	0.244
Ability to establish business relationships with people, communities, and companies of interest to the user	0.624	0.627
Ability to recruit a critical mass of users to sell products/services	0.587	0.573
Accumulation of a large number of suppliers and consumers on one site	0.478	0.485
Presence of a single window for solving various tasks	0.498	0.523
Optimization of business processes of the enterprise and increase of flexibility of enterprise management	0.504	0.498
Ability to build alliances by stimulating mutual consumption of products and services	0.453	0.421
Number of observations	164	
Regression results for the dependent variable: $R = 0.958560926$ Adjusted $R^2 = 0.818839049$ $F = 35.527$ $p < 0.05$ Стандартная ошибка оценки: 0.239338331		

enterprises, it is worth noting that the level of digitalization in Russia is still low, however, we can already say that these technologies bring significant benefits to organizations, which stimulate their use. Based on the results of the analysis, there were identified the factors contributing to the development and implementation of software platforms and products in the commercial activities of SMEs. The authors believe that taking into account the identified factors in the development and promotion of platforms will contribute to a more active involvement of SMEs in their use, which will ultimately have a positive impact on their economic activity.

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