DOI: 10.17323/2587-814X.2024.3.7.23

Constructing a model to identify the determinants of successful software import substitution

Svetlana V. Begicheva [a]
E-mail: begichevas@mail.ru

Antonina K. Begicheva [b]
E-mail: abegicheva@hse.ru

Dmitry M. Nazarov [a]
E-mail: slup2005@mail.ru

[a] Ural State University of Economics, Yekaterinburg, Russia
[b] HSE University, Moscow, Russia

Abstract

In the process of import substitution, higher educational institutions face several challenges in transitioning from the predominant use of foreign software to domestic alternatives. These challenges include a lack of user experience with domestic digital solutions, difficulty in transferring data between systems and other issues. The difficulties associated with the transition period create resistance to the digital transformation process. Research on import substitution in universities has identified three main themes: the challenges and risks associated with switching to domestic software, exploring the feasibility of a complete transition to Russian software and providing recommendations for selecting Russian solutions. This study aims to identify the factors that influence the adoption of import substitution software products in

higher education. The article proposes a structural model to identify the factors that contribute to successful software import substitution. The model is based on the theories of innovation diffusion and technology adoption, and it was developed using SmartPLS software. The model is based on data collected from a survey of professors and staff at the Ural State University of Economics. The results of the study indicate that the attitude towards adopting import substitution software depends on several factors, including the personal characteristics and innovative features of the software. The most significant determinants of a positive attitude towards transitioning to domestic software include user involvement and self-efficacy. In addition, a positive perception of the need for import substitution can influence individual acceptance of transitioning to Russian software and recognizing import substitution as an economic policy of the country. The theoretical significance of the study lies in its proposal of an original model for identifying the determinants of successful software import substitution that differentiates between individual acceptance and public recognition of software import substitution. The findings of the study could be useful to university management in planning and implementing measures for an import substitution strategy.

Keywords: software import substitution, technological innovations, resistance to innovations, theoretical approaches to technology acceptance, diffusion of innovations theory, structural equation modeling

Citation: Begicheva S.V., Begicheva A.K., Nazarov D.M. (2024) Constructing a model to identify the determinants of successful software import substitution. *Business Informatics*, vol. 18, no. 3, pp. 7–23. DOI: 10.17323/2587-814X.2024.3.7.23

Introduction

The Concept of Russia's Technological Development, adopted on May 20, 2023, emphasizes that by 2030 the share of domestic high-tech products, including telecommunications equipment and software, in total consumption should be at least 75%. Development of own technologies to ensure long-term competitiveness and training of qualified specialists skilled in working with Russian software should help to solve the problem of import-independence.

The Ministry of Science and Higher Education of the Russian Federation developed and approved methodological recommendations in 2022 in order to organize the effective transition of educational organizations of higher education to the predominant use of domestic software in 2022–2024 [1]. The website of the Ministry has a section "Import substitution of IT in science and higher education" with registers of hardware and software solutions for educational and research organizations [2].

Researchers have observed challenges and obstacles in implementing digital transformation in universities, particularly when transitioning to domestic software [3–8]. According to Burnyashov [3, 4], the problem of import substitution of software products used in educational programs is multifaceted: partial lack of Russian analogues of software, problems of financing the transition of universities to new software products, lack of incentives for managers and teachers of universities, the need to develop new methodological support for the educational process. The study [5] supplements this list with the lack of necessary time and human resources to

transfer the IT infrastructure of universities to Russian software, as well as the reluctance of teachers of the age to retrain, which is aggravated by the shortage of young teachers of IT disciplines. Work [6] notes the problem of resistance of university teachers to the replacement of foreign software with domestic developments.

The authors of the articles [3–9] offer recommendations on leveling the problems related to import substitution of software products in universities. However, as far as we know, at the moment there are no studies that include statistical analysis of determinants of acceptance of the need for import substitution by teachers and staff of educational organizations for successful full-fledged transition to Russian software.

The article aims to analyze statistically the factors influencing the acceptance of switching to Russian software by university staff in the context of achieving technological sovereignty.

1. Materials and methods

1.1. Theoretical basis of the study

Let us consider import substitution in education as "the process of development and penetration of innovations into widespread practice" [10], in other words, as a process of involvement of university faculty and staff in the adoption of technological innovation. The authors [11] point out that there are two traditional approaches to the study of factors influencing the adoption and implementation of new technologies in the activities of organizations. The first approach is based on the *theory of diffusion of innovations* [12–13], the second – on the *technology acceptance model* [14–15].

The *theory of diffusion of innovation* explains how new products, technologies, practices, ideas, etc. spread among consumers, and defines innovation as an idea, action or object that is perceived by members of a social system (organization, settlement, society, etc.) as new [12, 13]. Within the framework of this theory, the problem of diffusion and acceptance of technological innovation is considering the characteristics of the technology being introduced. Rogers in his study [13] explained that certain characteristics of an innovation can promote or hinder its adoption by different users, and planned five key factors affecting the perception of the innovation:

- advantage of the innovation over previously used technologies;
- compatibility of the innovation with previously used technologies;
- the perceived complexity of deploying and using the innovation;
- the availability of the innovation for trial and testing prior to deployment;
- results of peers using the innovation.

Moore and Benbasat [16], based on the ideas of innovation diffusion theory, proposed a questionnaire to assess users' perceptions of IT innovations. In the study [16], they identified the most important factors influencing the user's decision to adopt and use IT innovations:

- voluntary use of an IT innovation;
- advantage of the new IT innovation;
- compatibility with existing practices;
- ease of **u**se of the IT innovation;
- the opportunity to test the IT innovation before implementation;
- visibility of the results of using the IT innovation.

Followers of the theory of diffusion of innovations by Rogers consider the characteristics of the technology being introduced [17]. Proponents of the *technology acceptance model*, developed based on the theories of reasoned action and planned behavior of Ajzen [18], consider the problem of innovation implementation from the point of view of an individual user. The theory of technology acceptance pays special attention to the user's attitude towards technology and their intention to implement the innovation. Davis initially proposed the technology acceptance model [14], which was later revised by Davis, Bagozzi, and Warshaw [15].

The technology acceptance model considers behavioral intention, which is influenced by subjective norms and social attitudes which condition actual behavior (individual's acceptance of technologies).

As an illustration, let us cite the conceptual model of information technology acceptance proposed in the article by Venkatesh et al. [19] and improved in [20] (*Fig. 1*).

The technology acceptance model identifies the following key factors that influence users' perceptions of new technologies:

- perceived usefulness is the individual expected benefit of the innovation: the greater the perceived usefulness, the easier it is for the user to adopt the innovation;
- perceived ease of use – individual expected ease of use of the innovation: if the technology is easy to learn, the user will adopt it more quickly, but if the interface of the technology is awkward, the users' attitude towards the innovation will be determined accordingly;
- external variables, such as social influence, are an important factor in determining user attitudes towards an innovation.

1.2. Research design

The review of studies [12–16] allowed us to identify the determinants of successful implementation of innovative products. In order to build the model, we classified these factors into the following constructs: (1) "Personal characteristics of the user", (2) "Innovative characteristics of Russian software". The construct "Attitude towards acceptance of the necessity to switch to Russian software" will act as an intermediate dependent variable of the model. We will consider the concept of acceptance of Russian software as a symbiosis of individual acceptance and use of the innovation by the user in the educational process, and awareness of the importance of software import substitution to stimulate national economic interests. When forming the research design, we considered the results of [21], devoted to the determinants of successful digital transformation.

1.3. Research variables

1.3.1. Personal characteristics of the user

"The user personality characteristics" construct includes four variables based on the analysis of studies [12–16]: (1) "Knowledge," (2) "Individual innovation sensitivity," (3) "Self-efficacy," and (4) "Engagement." We explain the choice of variables below.

Knowledge refers to the accumulated experience related to the application of a technology or product. Knowledge allows us to assess the relative advantage of the innovation compared to the technologies in use, the perceived difficulty of implementing the innovation and the compatibility of the innovation with the technologies in use - the key factors of innovation adoption stated by Rogers [12]. Rogers argued that the faster a user realizes how to use a new technology, the faster it will be adopted. We can argue that knowledge is one of those key individual characteristics that is important for the initial stage of the innovation adoption process.

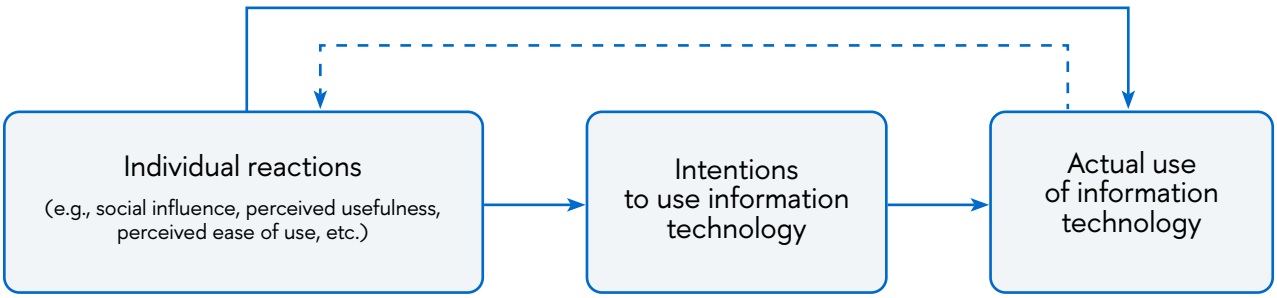

Fig. 1. Basic concept underlying user acceptance models [19, 20].

Individual innovation susceptibility is the user's endorsement of new technologies. Users with a high level of individual innovation sensitivity adopt and use new technologies before others do [12]. Individual innovation susceptibility influences the voluntariness of innovation application at the individual level, which is one factor of successful innovation adoption planned by Moore and Benbasat [16]. According to Rogers' model of innovation diffusion [12], innovators and early adopters are individuals with high innovation susceptibility and are likely to inform others about new technologies. We can say that innovativeness is a characteristic of pioneers in the application of new technologies who are subsequently looked up to by others.

Self-efficacy refers to a person's belief in their ability to solve a particular task successfully. Self-efficacy is a user's subjective confidence that Russian software products are easy for him/her to learn and use. Confidence in self-efficacy when mastering a new software product correlates with the factor "ease of use of information technology" [16].

Involvement means interest in acquiring a new skill and also correlates with the perception of the value, significance and importance of a particular technology. Engagement is the active interest and motivation to use new software products. High involvement has the goal of acquiring knowledge and skills related to IT products and encourages the acceptance and application of new technologies in work. An engaged user will voluntarily decide to use Russian software, which, according to the study [16], characterizes high technology acceptance.

1.3.2. Innovative characteristics of Russian software

The construct "Innovative characteristics of Russian software" comprises two variables: (1) "Relative advantage of Russian software" and (2) "Technological innovativeness of Russian software".

Relative advantage is a criterion for comparing an innovation and a traditional product or technology [12, 16]. The more confidently the user realizes the relative advantages of innovation, the more effective the process of its adoption [12, 16]. The perception that Russian software will be more functional, convenient, reliable and superior to previously used software is a relative advantage. The higher the level of relative advantage of the software, the higher its level of recognition and acceptance.

We can interpret **technological innovativeness** as a necessary condition for the process of innovative decision making [12]. A new technology, by definition, must be original and different from existing technologies [12]. For software to be innovative, its technological innovativeness must be sufficiently high and perceived as such by the consumer [22].

1.3.3. Attitudes towards the need to switch to Russian software

According to the studies of Davis et al. [14], who proposed the technology acceptance model, the actual acceptance (use) of technologies is caused by the intention (desire) to use them to solve problems. A positive attitude to the need to switch to Russian software means the intention to use it.

Davis et al. [14] pointed out that behavioral intentions and beliefs influence technology adoption both by individual users and by all members of an organization. In our study, attitudes towards the need to switch to Russian software will be as a variable mediating individual acceptance and recognition of import substitution as an economic policy of the country.

1.3.4. Individual acceptance of the transition to Russian software and recognition of import substitution as the country's economic policy

In order for a particular technology to be adopted, it is necessary that it have a certain value and advantage over traditional technologies. Adoption of an innovation, depending on the scale of impact, has two components: acceptance of the value of the innovation for the individual and acceptance of the value of the innovation for society.

Accepting the value of Russian software at the individual level, the user is ready to use it for personal purposes and integrate it into the educational process.

Recognizing the value of the innovation for society, the user believes that the recipient of the benefit when using the innovative technology will be the public. Recognizing the value of innovation for society in our study means realizing the importance of software import substitution to stimulate Russia's national economic interests.

As dependent variables of the model, we will consider the constructs "Individual acceptance of switching to Russian software" and "Recognition of import substitution as an economic policy of the country".

1.4. Hypotheses of the study

Within the framework of the research, we assume that individual user characteristics and innovative characteristics of Russian software form the attitude towards the need to switch to Russian software, all of which affects acceptance (both individual and recognition of the value of innovation for society) of Russian software.

Based on the research analysis, we put forward the following hypotheses.

H1: Knowledge, individual innovative sensitivity, self-efficacy and involvement have a positive impact on the user's personal characteristics that determine his/her attitude towards the need to switch to Russian software.

H2: The relative advantage of Russian software and the technological advantage of Russian software have a positive impact on innovative characteristics of software that determine the user's attitude towards software import substitution.

H3: Personal characteristics of the user and innovative characteristics of the software have a positive impact on the user's attitude towards the need to switch to Russian software.

Agreeing to switch to Russian software shows a positive attitude and a willingness to use it. We will use this statement when planning hypotheses H4 and H5.

H4: The user's desire to use Russian software has a positive effect on individual acceptance.

H5: The user's desire to use Russian software positively influences the recognition of the value of this innovation for society.

Figure 2 presents the conceptual model of the study.

1.5. Research methodology

In order to study the factors influencing the acceptance of the need to switch to Russian software, we compiled a questionnaire. The constructs' questions are derived from a study focused on digital transformation adoption issues [21]. The questionnaire comprises 28 questions related to the main scales: personal characteristics of the user – 10 questions; 8 questions – to present innovative characteristics of Russian software; 4 questions concerning the attitude to the necessity of switching to Russian software; 3 questions – to characterize individual acceptance of switching to Russian software and 3 questions – to assess the recognition of the value of switching to Russian software for society. Employees of the Sociological Laboratory and the Department of Economic Theory and Applied Sociology of the Ural State University of Economics took part in the survey. All questions were rated on a 5-point Likert scale, with 1 being the minimum value and 5 being the maximum value. *Appendix 1* presents an operationalization of the research variables.

To validate the theoretical model of the study and build a structural model, we apply the structural equation modeling (SEM) method based on partial fewest squares (PLS) analysis using SmartPLS software [23].

The model using the PLS-SEM approach comprises two sub-models: (1) the *hierarchical measurement model* determines the relationships between latent variables (hypothetical constructs) and observed variables, (2) the *structural equation model* determines causal relationships between constructs.

The reliability and consistency of scales are examined to test the hierarchical measurement model. Assessing the fit of the structural equation model involves estimating the path coefficients and their significance.

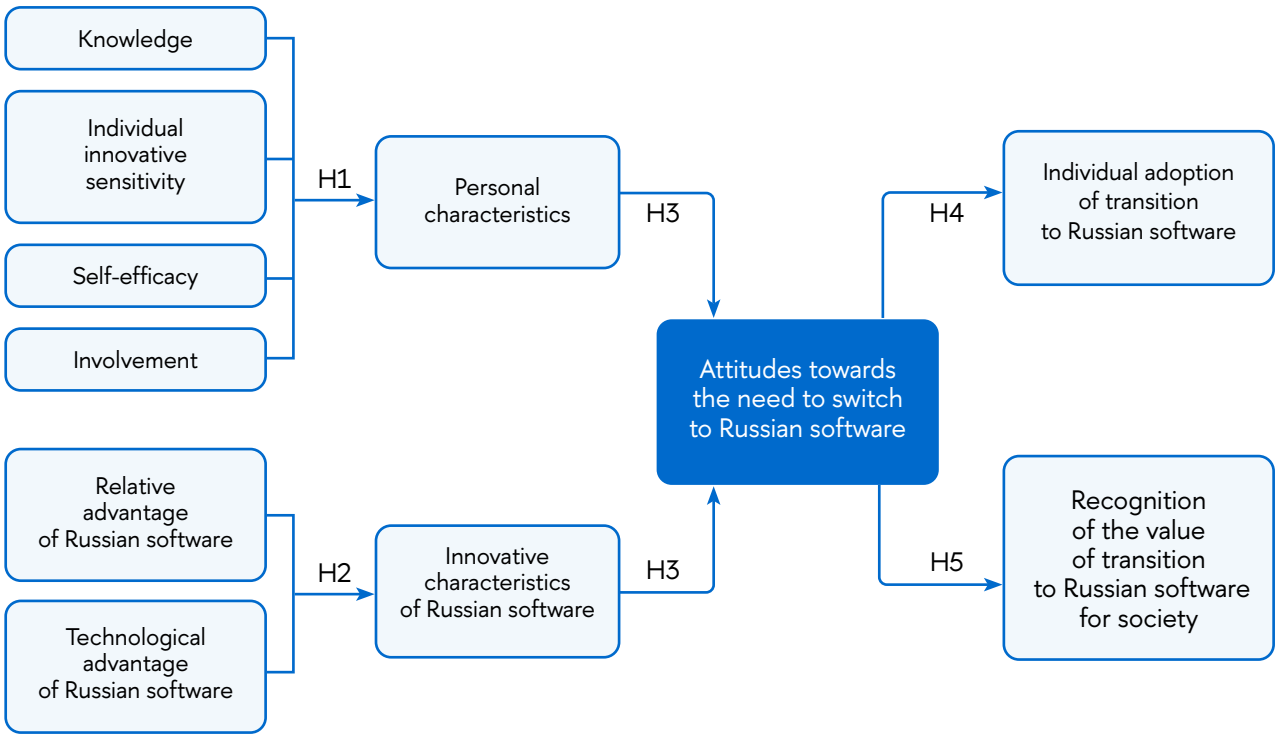

Fig. 2. Conceptual model of the study.

The aim of the PLS-SEM approach is to isolate the maximum proportion of explained total variance in the dependent latent variables in the PLS model. The PLS method allows us to investigate causal relationships under conditions of a small or medium-sized sample and does not require the assumption of a normal distribution of sample data [24–26].

2. Results of the empirical study

112 faculty and staff members of the administrative and educational support sectors of the Ural State University of Economics took part in the survey. We conducted the survey from January to February 2024.

Table 1 contains the results of frequency analysis to study the socio-demographic characteristics of the survey respondents.

Table 1.

Socio-demographic characteristics of respondents

Socio-demographic groups		Share
Age	18–35	23.2%
	36–49	35.7%
	50–64т	30.4%
	65 years and older	10.7%
Gender	Female	72.3%
	Male	27.7%
Position	Head of department, head of institute	5.36%
	Teacher	66.96%
	Administrative and training support staff member	27.68%
Total answers		112

The largest share of respondents (35.7%) belongs to the age group of 36–49 years old. 72.3% of respondents are women. The segment of respondents from faculty members made up about 66% of the respondents.

The two-stage analytical approach of PLS-SEM comprises the following stages: evaluation of the hierarchical measurement model (at this stage the validity and reliability of the selected indicators are assessed) and evaluation of the structural model.

2.1. Evaluation of a hierarchical measurement model

At the first stage of modeling using the structural equation method, it is necessary to verify the structure of the diagnostic toolkit.

To verify the reliability, we analyzed the factor loadings of each of the variables included in the analysis (*Table 2*).

Factor loadings show how significantly each variable affects the factor. Factor loadings greater than 0.7 are preferred in the model [27]; factor loadings having a value greater than 0.4 are an acceptable result. Note that the factor loadings of all variables in the model exceed the recommended value of 0.7.

Another important indicator that assesses representativeness of variables within individual constructs is convergent validity, as measured by the average variance extracted (AVE) indicator. The convergent validity criterion has a value of AVE > 0.5, showing that the variance explained by the factors included in the model is higher than the measurement error.

Table 2.

Verification of reliability of model variables

Variable	Factor load	Convergent validity (average variance extracted, AVE)
Knowledge		
I know what Russian software products can replace foreign software used in implementing disciplines nowadays	0.853	0.740
I am well aware of the pros and cons of Russian software – analog of foreign software used in implementing disciplines at the moment	0.863	
I can tell others about the possibilities of Russian software – analog of foreign software used in implementing disciplines now	0.864	
Individual innovation sensitivity		
I usually start using innovative technologies before anyone else	0.844	0.729
I tend to update my devices as new technologies emerge and new models are released	0.853	
I tend to inform others about devices created using innovative technologies	0.864	
Self-efficacy		
I think it will be easier for me to learn and start using previously unfamiliar software than for others	0.770	0.773
I think I will master the skills of working with Russian software in a relatively short time	0.937	
I am confident in my software skills, and I think I will have no difficulties working with Russian software	0.921	

Variable	Factor load	Convergent validity (average variance extracted, AVE)
Involvement		
I am open to the use of Russian software – the analog of foreign software used in implementing disciplines now	1.000	0.749
Relative advantage of Russian software		
Russian software is likely to have more capabilities than the foreign software used in implementing disciplines now	0.910	0.781
Using Russian software will be more convenient than the use of foreign software used in implementing disciplines now	0.934	
Russian software is more reliable compared to foreign software used in implementing disciplines now	0.900	
Training to work with Russian software is more relevant than training to work with foreign software used in implementing disciplines now	0.782	
Technological innovativeness of Russian software		
I think that Russian software is created using innovative technologies	0.874	0.836
Russian software is innovative	0.941	
Russian software products are original and new	0.915	
Russian software products noticeably differ for the better from foreign software used in implementing disciplines now	0.927	
Attitude towards the need to switch to Russian software		
I have a positive attitude to the use of Russian software	0.872	0.725
I have no difficulties in working with Russian software	0.822	
I am actively in favor of using Russian software in the educational process	0.860	
Individual acceptance of switching to Russian software		
I am ready to use Russian software in the educational process	0.909	0.729
If the need arises, I will use Russian software in the learning process	0.849	
I will continue to use Russian software in the future	0.837	
Recognizing the value of switching to Russian software for the society		
Our society should actively use Russian software	0.958	0.836
Organizations of various spheres of activity should use Russian software in their work	0.968	
We need to gradually increase the use of Russian software	0.931	

This value was achieved in all constructs of the model (*Table 2*).

In the next step, we conducted an internal consistency check of the variables given by the survey questions in order to determine how well each individual question describes the trait-construct. *Table 3* contains the results of the internal consistency test of the variables. Cronbach's Alpha measures consistency of the variables forming each construct. The composite reliability value (*rho_c*) demonstrates the extent to which the construct variables represent their construct. We can conclude that internal consistency is confirmed because all values of Cronbach's Alpha and composite reliability (*rho_c*) are above 0.8.

That for all model constructs, the value of the reliability coefficient (*rho_a*) lies within the bounds given by Cronbach's Alpha and composite reliability (*rho_c*) demonstrates a high level of consistency.

To test the statistical independence of the model constructs, it was necessary to assess their discriminant validity. We evaluated them using the HTMT (heterotrait-monotrait ratio) criterion, according to which one construct differs from another construct and can be included in the model if the HTMT value between constructs exceeds the threshold value of 0.9 [27]. The test showed sufficient discriminant validity of the model constructs: the maximum HTMT value was 0.856.

We can argue that the hierarchical measurement model has an adequate level of convergent reliability, internal consistency, and discriminant validity.

2.2. Evaluating the structural model

We start the structural model estimation by analyzing the values of variance inflation factor (VIF) – a metric for assessing the collinearity of the model variables. The value of VIF > 5 shows a high correlation between the variables [27]. The maximum value of VIF of the model was 3.865.

The scheme (*Fig. 3*) represents the configuration of the structural model.

Table 3.

Checking the internal consistency of the model

Construct	Cronbach's Alpha	Reliability factor (*rho_a*)	Composite reliability (*rho_c*)
Knowledge	0.824	0.825	0.895
Individual innovation sensitivity	0.816	0.825	0.890
Self-efficacy	0.853	0.900	0.910
Relative advantage of Russian software	0.905	0.911	0.934
Technological innovativeness of Russian software	0.934	0.935	0.953
Attitude towards the necessity of switching to Russian software	0.810	0.814	0.888
Individual acceptance of switching to Russian software	0.833	0.848	0.899
Recognition of the value of transition to Russian software for society	0.934	0.935	0.953

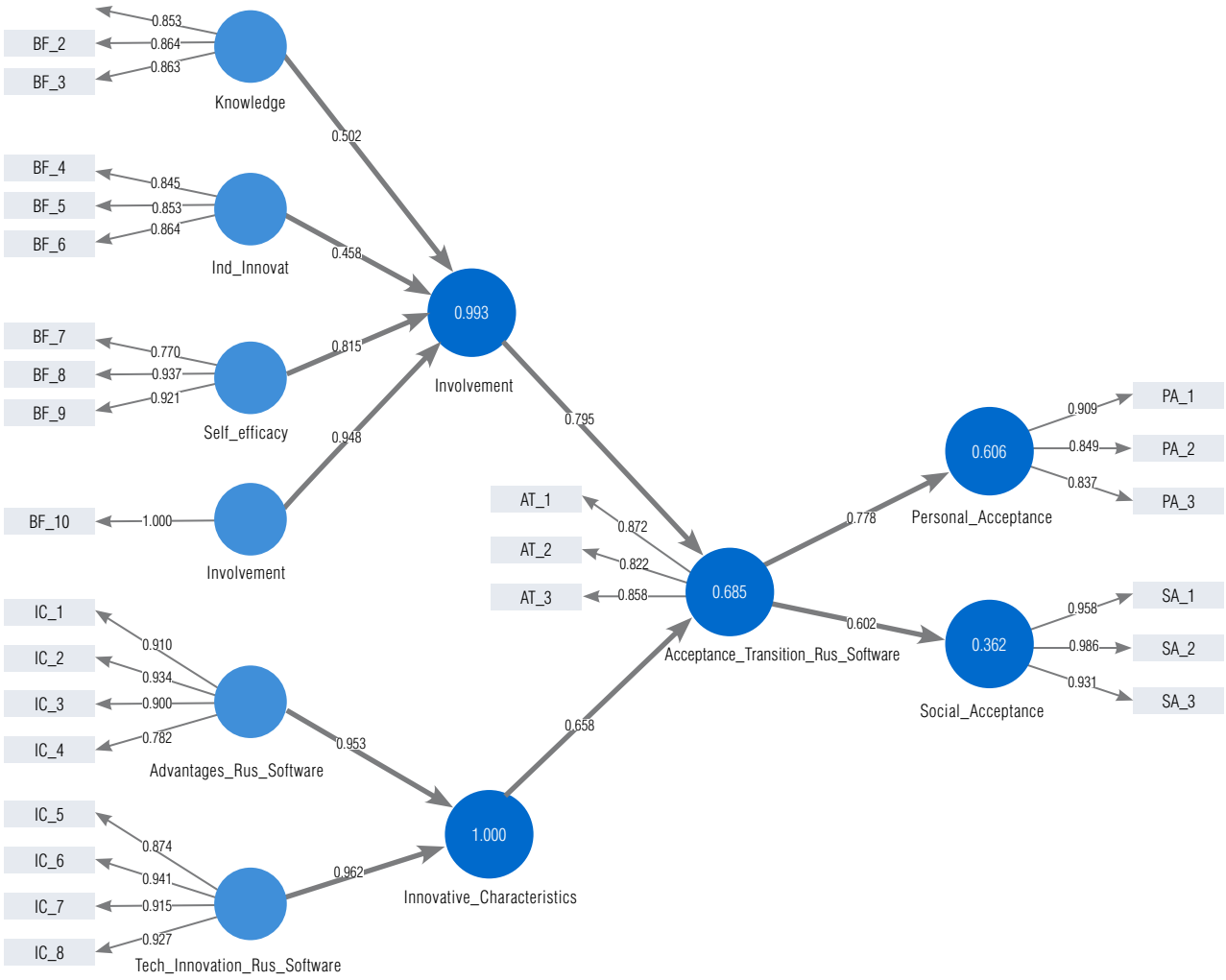

Fig. 3. Configuration of the structural model.

The structural model's adequacy is evaluated by utilizing the R^2 coefficients of determination. *Figure 3* shows the values of R^2 coefficients in circles denoting the model constructs.

The analysis of relationships between the model constructs includes the interpretation of β-coefficients and their corresponding values of *t*-statistics.

Table 4 presents the results of the structural model analysis.

Let us note the criteria necessary to analyze the data in *Table 4*:

- high *p*-values (>0.05) show that the research hypothesis is rejected;
- values of *β*-coefficients show the closeness of the relationship between the constructs.

3. Discussion

Thus, analyzing the results of hypothesis testing we can draw the following conclusions:

- the research hypothesis about the influence of knowledge level on personal characteristics

Table 4.

β-coefficient values and results of hypothesis testing

Hypothesis	Influence	β-coefficient	t-statistic	p-value	Solution
H1	Individual innovation responsiveness → Personal characteristics of the user	–0.004	0.040	0.968	rejected
H1	Involvement → Personal characteristics of the user	0.720	8.177	0.000	accepts
H1	Knowledge → Personal characteristics of the user	0.113	1.327	0.184	rejected
H1	Self-efficacy → Personal characteristics of the user	0.313	2.531	0.011	accepted
H2	Relative advantage of Russian software → Innovative characteristics of Russian software	0.495	30.845	0.000	accepted
H2	Technological innovativeness of Russian software → Innovative characteristics of Russian software	0.549	29.820	0.000	accepted
H3	Personal characteristics of the user → Attitude to the necessity of switching to Russian software	0.625	8.193	0.000	accepted
H3	Innovative characteristics of Russian software → Attitude towards the need to switch to Russian software	0.286	3.617	0.000	accepted
H4	Attitude towards the need to switch to Russian software → Individual acceptance of switching to Russian software	0.778	17.995	0.000	accepted
H5	Attitude towards the need to switch to Russian software → Recognition of the value of switching to Russian software for society	0.602	8.180	0.000	accepted

influencing the user's attitude towards the necessity of switching to Russian software was rejected;

- the research hypothesis about the influence of individual innovation susceptibility on personal characteristics influencing the user's attitude towards the need to switch to Russian software was rejected;
- all other research hypotheses were confirmed.

Complementing the findings on the results of hypothesis testing by analyzing the values of β-coefficients we can state that:

- there is a significant influence of involvement and self-efficacy on personal characteristics influencing the user's attitude towards the necessity of switching to Russian software, the value of the influence of involvement (0.720) exceeds the value of the influence of self-efficacy (0.313);
- there is **a** statistically significant average in strength influence of relative advantage of Russian software (0.495) and technological innovativeness of Russian software (0.549) on innovative characteristics of Russian software influencing user's attitude to the necessity of switching to Russian software;
- comparing the power of influence of personal characteristics of the user (0.625) and innovative

characteristics of Russian software (0.286) on the intention to use Russian software we note the excess of the power of influence of personal characteristics;

- intention to use Russian software significantly influences both individual acceptance of switching to Russian software (0.778) and recognition of the value of switching to Russian software for society (0.602).

Personal characteristics, specifically involvement and self-efficacy, have the greatest influence on the intention to use and adoption of Russian software, as revealed by the results of the structural model analysis. Considering the mechanisms of working with resistance when implementing a project on software import substitution in a higher educational institution, it is necessary to influence these two factors of motivation for successful implementation of Russian software.

The indicators of personal characteristics of the user and innovative characteristics of Russian software together explain 68.5% of the variance of the indicators of attitude to the need to switch to Russian software ($R^2 = 0.685$). Whereas the indicators of attitude to the necessity of switching to Russian software explain 60.6% of the variance of indicators of individual acceptance of switching to Russian software ($R^2 = 0.606$) and 36.2% of the variance of indicators of recognizing the value of switching to Russian software for society ($R^2 = 0.362$).

Conclusion

The purpose of the study was to identify significant factors influencing the adoption of Russian software solutions in educational organizations. The concepts of innovation diffusion theory and technology acceptance model served as the basis for the research model. To test the hypotheses of the research, we used the method of modeling by structural equations with the use of the results of a questionnaire survey of teachers and staff of the university.

The results of the study have theoretical significance and prospects for further practical application.

The study confirmed one conclusion of the technology acceptance model about the influence of behavioral intentions to use information technology on its direct use. We got a statistically significant result that the attitude towards the need to switch to domestic software acts as a mediating factor between the independent and dependent variables of the study. The analysis is consistent with the ideas of the followers of the theory of diffusion of innovations: individual acceptance of import substitution and recognition of the value of switching to domestic software for society are influenced by both personal characteristics of the user and innovative characteristics of Russian software. A positive attitude to the necessity of import substitution mediates the influence on individual acceptance to a greater extent than on the recognition of the value of transition to Russian software for society. This shows that there are additional factors not considered in the model that influence the recognition of import substitution as a basic priority of Russian economic development.

The results of the study have practical significance. By systematically analyzing the factors that impact successful transition to domestic software in higher educational institutions, university management can strategically plan and improve import substitution activities.

The study has several limitations. First, the study was carried out on a relatively limited sample size, which may cause a representativeness error. Second, the social desirability effect may have influenced the respondents' answers. Interviewees may have consciously or unconsciously chosen socially approved answers and overestimated or underestimated their agreement with the need for import substitution.

Subsequent research should consider other important factors influencing the acceptance of software import substitution. It would be interesting to conduct similar studies in organizations of various sectors of the Russian economy, both in commercial companies and in government agencies. ■

References

1. Ministry of Education and Science of Russia (2022) *Methodological recommendations for the transition of educational organizations of higher education to the primary use of domestic software (messengers and video conferencing), including domestic office software*. Available at: https://minobrnauki.gov.ru/importozameshcheniye/Метод_рекомендации_отеч_ПО_ВУЗы.pdf (accessed 24 May 2024) (in Russian).
2. Ministry of Education and Science of Russia (2022) *Import substitution of IT in the field of science and higher education*. Available at: https://minobrnauki.gov.ru/importozameshcheniye/ (accessed 24 May 2024) (in Russian).
3. Burnyashov B.A. (2022) Import substitution of the software used in the educational process in Russian universities. *Informatics and Education*, vol. 37, no. 1, pp. 27–36 (in Russian).
4. Burnyashov B.A. (2023) Russian cloud office application packages in the educational process of universities. *Informatics and Education*, vol. 38, no. 2, pp. 5–15 (in Russian).
5. Innopolis University (2022) *Analytical report on determining the potential for import substitution of software (in the system of higher and secondary vocational education)*. Innopolis: Innopolis University (in Russian).
6. Pasurin D.A. (2023) Problems of software import substitution in universities. *Digital models and solutions,* vol. 2, no. 4, pp. 63–75 (in Russian).
7. Muzalevskaya A.A., Gajdamakina I.V. (2023) Prerequisites and opportunities for import substitution of software in the training of specialists in Russian universities. *Scientific Notes of Orel State University*, no. 2(99), pp. 275–279 (in Russian).
8. Polonskij A.M. (2022) Import substitution of software and organization of student education using domestic or free software. *Aktual'nye problemy ekonomiki i upravleniya (Actual problems of economics and management)*, no. 2(34), pp. 65–82 (in Russian).
9. Savvateeva T.P. (2019) Problems of software import substitution for teaching of bachelor students to information systems design. *Modern problems of science and education,* no. 5 (in Russian).
10. Zagvyazinskij V.I. (2001) *Learning Theory: A modern interpretation*. Moscow: Academia (in Russian).
11. Kalinichenko N.S., Velichkovskij B.B. (2022) The technology acceptance phenomenon: current state and future research. *Organizational Psychology*, vol. 12, no. 1, pp. 128–152 (in Russian).
12. Rogers E.M. (2010) *Diffusion of innovations*. New York: Simon and Schuster.
13. Rogers E.M., Agarwala-Rogers R. (1980) *Communication in organizations*. Moscow: Economy (in Russian).
14. Davis F.D. (1985) *A Technology Acceptance Model for empirically testing new end-user information systems: theory and results*. PhD dissertation. Cambridge: Massachusetts Institute of Technology.
15. Davis F.D., Bagozzi R.P., Warshaw P.R. (1989) User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, vol. 35, no. 8, pp. 982–1003.
16. Moore G.C., Benbasat I. (1991) Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, vol. 2, pp. 192–222. https://doi.org/10.1287/isre.2.3.192

17. Parasuraman A. (2000) Technology Readiness Index (TRI): A multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, vol. 2, no. 4, pp. 307–320. https://doi.org/10.1177/109467050024001

18. Ajzen I. (1991) The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, vol. 50, pp. 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

19. Venkatesh V., Morris M., Davis G., Davis F. (2003) User acceptance of information technology: Toward a unified view. *MIS Quarterly*, vol. 27, no. 3, pp. 425–478. https://doi.org/10.2307/30036540

20. Abraham C., Boudreau M., Junglas I., Watson R. (2013) Enriching our theoretical repertoire: The role of evolutionary psychology in technology acceptance. *European Journal of Information Systems*, vol. 22, no. 1, pp. 56–75. https://doi.org/10.1057/ejis.2011.25

21. Oh K., Kho H., Choi Y., Lee S. (2022) Determinants for successful digital transformation. *Sustainability,* vol. 14, no. 3, 1215. https://doi.org/10.3390/su14031215

22. Ram S. (1987) A model of innovation resistance. *Advances in Consumer Research*, vol. 14, pp. 208–212.

23. SmartPLS (2024) *SmartPLS 4. The world's most user-friendly statistical software*. Available at: https://www.smartpls.com/ (accessed 25 May 2024).

24. Chu Y., Chi M., Wang W. (2019) The impact of information technology capabilities of manufacturing enterprises on innovation performance: Evidences from SEM and fsQCA. *Sustainability*, vol. 11, no. 21, 5946. https://doi.org/10.3390/su11215946

25. Miceli A., Hagen B., Riccardi M.P. (2021) Thriving, not just surviving in changing times: How sustainability, agility and digitalization intertwine with organizational resilience. *Sustainability*, vol. 13, no. 4, 2052. https://doi.org/10.3390/su13042052

26. Zhang J., Long J., von Schaewen A.M.E. (2021) How does digital transformation improve organizational resilience? – Findings from PLS-SEM and fsQCA. *Sustainability*, vol. 13, no. 4, 11487. https://doi.org/10.3390/su132011487

27. Hair J.F., Hult G.T.M., Ringle C., Sarstedt M., Danks N., Ray S. (2021) *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook*. Springer.

Appendix 1.

Operationalization of the study variables

Variable	Name	Questions
Construct 1: Personal characteristics of the user		
Knowledge	BF_1	I know what Russian software products can replace foreign software used in implementing disciplines nowadays
	BF_2	I am well aware of the pros and cons of Russian software – analog of foreign software used in implementing disciplines at the moment
	BF_3	I can tell others about the possibilities of Russian software – analog of foreign software used in implementing disciplines now
Individual innovation sensitivity	BF_5	I usually start using innovative technologies before anyone else
	BF_6	I tend to update my devices as new technologies emerge and new models are released
	BF_7	I tend to inform others about devices created using innovative technologies
Self-efficacy	BF_8	I think it will be easier for me to learn and start using previously unfamiliar software than for others
	BF_9	I think I will master the skills of working with Russian software in a relatively short time
	BF_10	I am confident in my software skills and I think I will have no difficulties working with Russian software
Involvement	BF_11	I am open to the use of Russian software – the analog of foreign software used in implementing disciplines now
Construct 2. Innovative characteristics of Russian software		
Relative advantage of Russian software	IC__1	Russian software is likely to have more capabilities than the foreign software used in implementing disciplines now
	IC__2	Using Russian software will be more convenient than the use of foreign software used in implementing disciplines now
	IC__3	Russian software is more reliable compared to foreign software used in implementing disciplines now
	IC__4	Training to work with Russian software is more relevant than training to work with foreign software used in implementing disciplines now
Technological innovativeness of Russian software	IC__5	I think that Russian software is created using innovative technologies
	IC__6	Russian software is innovative
	IC__7	Russian software products are original and new
	IC__8	Russian software products noticeably differ for the better from foreign software used in implementing disciplines now
Construct 3. Attitudes towards the need to switch to Russian software		
Attitudes towards the need to switch to Russian software	AT_1	I have a positive attitude to the use of Russian software
	AT_2	I have no difficulties in working with Russian software
	AT_3	I am actively in favor of using Russian software in the educational process
Construct 4: Individual acceptance of the transition to Russian software		
Individualized acceptance	PA_1	I am ready to use Russian software in the educational process
	PA_2	If the need arises, I will use Russian software in the learning process
	PA_3	I will continue to use Russian software in the future
Construct 5. Recognizing the value of the transition to Russian software for society		
Recognizing the value of transition to Russian software for the society	SA_1	Our society should actively use Russian software
	SA_2	Organizations of various spheres of activity should use Russian software in their work
	SA_3	We need to gradually increase the use of Russian software

About the authors

Svetlana V. Begicheva

Cand. Sci. (Econ.);

Associate Professor, Department of Business Informatics, Ural State University of Economics, 62, 8 Marta Str., Yekaterinburg 620144, Russia;

E-mail: begichevas@mail.ru

ORCID: 0000-0002-0551-1622

Antonina K. Begicheva

Lecturer, Postgraduate Student,, School of Software Engineering, Faculty of Computer Science, HSE University, 11, Pokrovsky Blvd., Moscow 109028, Russia;

Research Assistant, Laboratory of Process-Aware Information Systems (PAIS Lab), Faculty of Computer Science, HSE University, 11, Pokrovsky Blvd., Moscow 109028, Russia;

E-mail: abegicheva@hse.ru

ORCID: 0000-0001-6657-1760

Dmitry M. Nazarov

Dr. Sci. (Econ.);

Head of Department of Business Informatics, Ural State University of Economics, 62, 8 Marta Str., Yekaterinburg 620144, Russia;

E-mail: slup2005@mail.ru

ORCID: 0000-0002-5847-9718