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THE IMPACT OF DIGITAL TRANSFORMATION ON FINANCIAL INCLUSION: A COMPARATIVE ANALYSIS OF UKRAINE AND EU COUNTRIES

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ABSTRACT

Objective: This study examines remote servicing in the services market, focusing on its effectiveness, technological foundations, and strategic importance for organizations.
Methods: The theoretical basis draws on academic research and expert studies on improving the efficiency and quality of remote servicing. The methodological approach includes systems theory, dialectical analysis, decision-making methods, economic analysis, mathematical programming, modeling, optimization techniques, analytical calculations, and expert survey and rating assessment methods.
Results: The study analyzed modern remote servicing technologies, identified key development trends, and clarified their strategic role for companies. It substantiated the advantages, disadvantages, and main challenges of implementing remote servicing, particularly in Ukraine. A procedure for constructing a balanced scorecard system was defined, and a methodology was developed to assess the impact of remote servicing implementation. A comparison of the total cost of ownership (TCO) between remote and traditional servicing was carried out, and revenue sources generated by remote servicing operations were identified.
Conclusion: A TCO model for remote servicing was created, enabling calculation of the costs associated with both remote and classical servicing based on departmental operational expenses. A methodology for comparing TCO was developed, considering both initial investments and ongoing costs over the evaluation period, as well as scenarios involving internal development or leased resources. The assessment of remote servicing as an investment project allows prioritization of company services according to coverage and effectiveness. The proposed technology for selecting mechanisms to enhance service efficiency and quality supports the identification of typical tasks and the economic justification for acquiring remote servicing solutions from external providers.

Keywords: Remote Servicing; Indicators Of The Company; Planning Horizon; Economic Analysis.

O IMPACTO DA TRANSFORMAÇÃO DIGITAL NA INCLUSÃO FINANCEIRA: UMA ANÁLISE COMPARATIVA ENTRE A UCRÂNIA E OS PAÍSES DA UE

RESUMO

Objetivo: O estudo analisa o atendimento remoto no mercado de serviços, com foco em sua efetividade, fundamentos tecnológicos e relevância estratégica para as organizações.
Métodos: A base teórica apoia-se em pesquisas acadêmicas e estudos especializados sobre eficiência e qualidade no atendimento remoto. A abordagem metodológica inclui o método sistêmico, o método dialético, técnicas de tomada de decisão, análise econômica, programação matemática, modelagem, métodos de otimização, cálculos analíticos, além de métodos de levantamento e avaliação por especialistas.
Resultados: Foram analisadas as tecnologias contemporâneas de atendimento remoto, identificadas suas principais tendências de desenvolvimento e esclarecido seu papel estratégico para as empresas. O estudo fundamenta as vantagens, desvantagens e desafios associados à implementação dessas tecnologias, com destaque para o contexto da Ucrânia. Foi definida uma sistemática para construção de um sistema de indicadores balanceados e desenvolvida uma metodologia para avaliar o impacto da adoção do atendimento remoto. Realizou-se a comparação do custo total de propriedade (CTP) entre o atendimento remoto e o atendimento tradicional, bem como a identificação das fontes de receita decorrentes do funcionamento do atendimento remoto.
Conclusão: Foi elaborado um modelo de CTP para o atendimento remoto, permitindo estimar os custos associados às modalidades remota e clássica com base nas despesas operacionais dos departamentos. Desenvolveu-se ainda uma metodologia comparativa de CTP que considera investimentos iniciais, custos recorrentes e cenários de desenvolvimento interno ou de terceirização por meio de leasing. A avaliação do atendimento remoto como projeto de investimento possibilita a priorização de serviços segundo sua cobertura e eficácia. A tecnologia proposta para seleção de mecanismos de melhoria da eficiência e qualidade do atendimento permite identificar tarefas típicas e avaliar a viabilidade econômica da adoção de soluções remotas.

Palavras-chave: Atendimento Remoto; Indicadores da Empresa; Horizonte de Planejamento; Análise Econômica.

1 INTRODUCTION

Currently, remote retail services are gradually ceasing to be a novelty for domestic clients. Remote servicing is increasingly becoming a part of everyday practice, the convenience of its use constantly attracts new users. However, the current state is far from ideal.

For the effective implementation of remote servicing (RS), first of all, it is necessary to build and establish common business processes for servicing the population. It is not enough to say that a company is ready to serve individuals; it must be able to provide such services. The key to promotion and growth, including in the field of servicing individuals, is the correct model for organizing business processes within the organization, the presence of an enterprise strategy in the field of providing retail services, including through remote channels.

At the same time, in companies that have already implemented remote servicing solutions for the retail sector, their use is actively gaining momentum. The ability to use the Internet and cellular communications are obvious advantages for clients of working with such enterprises. And with the active promotion of remote servicing, communicating its advantages to clients, the growth in popularity of remote services is easy to predict.

There is an opinion that providing information infrastructure for the private sector is a particularly labor-intensive and costly task, and solutions are expensive. Undoubtedly, investments are required, but their volumes should not be exaggerated. The factor of the effectiveness of the investments made is important here - the selected system should ultimately bring benefits to the company (Chugunov, Makohon, Pasichnyi, Nikitishin, Adamenko, Krykun, & Sobchuk, 2018). Thus, the task arises of developing criteria for assessing the effectiveness of both economic and image, expressed in increasing the level of competitiveness of the company and its attractiveness to customers.

When choosing a remote servicing system (RSS), many factors should be taken into account: the prospects of the services offered through this system; the efficiency of using the system, its competitiveness, profitability; compatibility with existing services of the company; usefulness for clients in the long term, etc. Solving the selection problem requires the presence of an appropriate methodology, and the

development of such a methodology is a very urgent matter. At present, Ukrainian enterprises have virtually no practice of using calculations of the efficiency of distance learning systems in the process of their selection: decisions are made on the basis of promises from manufacturers of such systems or on the basis of previous personal experience of using a particular system. The development of a methodology for conducting the necessary calculations is aimed at significantly increasing the efficiency of enterprises in the field of remote servicing by focusing investments in the most profitable direction.

Digital transformation is having a significant impact on financial inclusion in both Ukraine and the European Union (EU). Financial inclusion involves the availability and use of financial services by all segments of the population. Let's consider how digital technologies are contributing to this process in the above-mentioned regions.

Ukraine:

Development of digital payments: The growing popularity of mobile applications and online banking has expanded the population's access to financial services. The introduction of contactless payment technologies and QR codes simplifies transactions and reduces dependence on cash (Nyzhnyk, Martynova, Sharko, Savitskyi, Marshuk, & Vlasenko, 2023).

Fintech startups: Fintech companies are actively developing in Ukraine, offering innovative solutions for lending, insurance, and investing. This helps to bring into the financial system those who previously did not have access to traditional banking services (Hnydiuk, Datsenko, Krupelnytska, Kudyrko, & Prutska, 2021).

Government initiatives: The introduction of digital identification systems, such as "Diya", facilitates citizens' access to financial services and helps reduce the level of the shadow economy.

EU countries:

Digital Single Market Strategy: The EU is actively working to create a single digital market that facilitates cross-border payments and promotes competition between financial institutions.

Regulation and standardization: The implementation of the PSD2 (Revised Payment Services Directive) is stimulating open banking by allowing third-party service providers to access banking data with the customer's consent. This contributes to the development of new financial products and services.

Financial literacy: EU countries invest in increasing the financial literacy of the

population, which contributes to a more conscious use of digital financial instruments.

Comparison:

Digital penetration rate: EU countries have a higher level of penetration of digital financial services compared to Ukraine, which is due to a more developed infrastructure and a higher level of digital literacy of the population.

Regulatory environment: The EU has a more unified and stricter regulation in the field of digital finance, while in Ukraine the regulatory framework is still being formed, which can create both opportunities and challenges for fintech companies.

Innovation: Both regions are experiencing active development of fintech innovations, however, in Ukraine this process is more dynamic due to less market regulation and higher adaptability to new technologies.

In general, digital transformation contributes to increasing financial inclusion in both Ukraine and EU countries, however, the specifics and The extent of this impact depends on local conditions, the level of infrastructure development, and the regulatory environment (Hnydiuk, Datsenko, Krupelnytska, Kudyrko, & Prutska, 2021).

Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018), Gomber, P., Koch, J., & Siering, M. (2017), Ketterer, J. A. (2017), Mikhaylov, A. (2021), Pazarbasioglu, C., Mora, A. G., Uttamchandani, M., Natarajan, H., Feyen, E., & Saal, M. (2020), Petersen, K., & Ali, M. (2022), Zalan, T., & Toufaily, E. (2017), the listed works examine issues of determining the efficiency of automated systems in the service sector.

At the same time, the analysis of sources shows that due to the significant specificity of information systems (the presence of an established organizational, technical and software infrastructure), the use of general theory is very difficult in practice.

Thus, the need for scientific and methodological consideration of improving the mechanism for increasing the efficiency and quality of service in the services market determined the goal, objectives, object and subject of this study.

The purpose of the article is to improve the mechanism for increasing the efficiency and quality of remote services in the services market based on the implementation of a remote service system in the context of digital transformation.

The object of the article is remote servicing in the services market. The subject of the article is organizational, economic, regulatory, scientific, technical and other relations arising in the process of implementing remote servicing systems.

2 METHODS

The theoretical basis of the article is the research and works of specialists in the field of improving the efficiency and quality of remote servicing in the services market, their application to the stated goals and objectives of the study. The methodological basis of the study is a system approach, a dialectical method, methods based on decision theory, economic analysis, mathematical programming, modeling, optimization methods, calculation and analytical method, methods of expert survey and rating assessment.

3 RESULTS AND DISCUSSIONS

In assessing the effectiveness of remote servicing, two directions can be distinguished: comparison of the achieved or planned economic effect (consideration of the task of implementing remote servicing as an investment project) and assessment of the current efficiency of work (cost of customer service, profitability, etc.).

Methods for assessing investment projects are well known: 1. Net Present Value - NPV (Net Present Value); 2. Profitability Index - PI (Profitability Index). 3. Internal Rate of Return - IRR (Internal Rate of Return). 4. Payback Period - PP (Payback Period). 5. Discounted Payback Period - DPP (Discounted Payback Period).

Among the most suitable comparison methods, the following can be distinguished: 1. The method of comparing the total cost of ownership of remote servicing (this method analyzes the comparison of costs for the implementation and maintenance of remote servicing). 2. The method of comparing the current costs of operating a separate department of the company and remote servicing (this method is distinguished by the absence of initial investments, instead of which the concept of the cost of renting the necessary resources is introduced). 3. The method of comparing the costs of individual operations (not the activity of the direction as a whole is considered, but the comparative cost of conducting individual operations).

The first two methods are intended, first of all, for making a decision on the implementation of remote servicing. The third method is for clarifying the choice of a more effective system for a specific company, or for making decisions on the development of an existing remote servicing system in the company in the area of

providing new types of services in this system.

The Total Cost of Ownership model includes four components: capital expenditures, the cost of support, administration and end-user operations.

Capital expenditures are determined by the following components: 1) the cost of purchasing remote servicing software; 2) the cost of purchasing additional software for remote maintenance: web server, cryptographic protection tools, etc.; 3) the cost of purchasing hardware (server, automated workstations for support staff, etc.); 4) the cost of building the necessary network infrastructure; 5) the cost of performing integration work to connect remote maintenance with the enterprise's information systems; 6) the cost of selecting and training personnel.

For remote servicing, the total cost of support and administration is determined by the following components: 1) the cost of support from the remote servicing manufacturer; 2) the cost of the work of the employees of the in-house support service for the company's clients; 3) the cost of the work of the employees providing technical support for remote servicing; 4) the cost of the work of the branch operators performing operations to connect clients to remote servicing; 5) marketing expenses for promoting the system; 6) the cost of renting premises and security. The cost of end user transactions is made up of: 1) the cost of a client's transaction within remote servicing - equal to zero (which is one of the most attractive aspects of remote servicing); 2) the cost of the work of the operators transferring documents from remote servicing to one of the company's systems; 3) the cost of the work of the operators posting documents in the company's internal accounting system - equal to zero for some of the transactions automatically performed in the accounting system, otherwise equal to the cost of similar work of the operators in classical servicing (Fernandes, A., & Gabriel ,M. L. D. S., 2025).

When assessing the implementation of a remote servicing system as an investment project in the service sector, there are two main sources of income received by an enterprise from a functioning remote servicing system: 1) receiving payment from clients for using existing products through remote servicing channels; 2) saving the company's costs on servicing clients, expressed as the difference in the cost of providing services in the company and with remote servicing.

It seems appropriate to use the income received from the company's cost savings as the main source of income from remote servicing for the population. To determine the amount of this income, let us assume that a certain percentage of clients

in the company stopped being served and began using remote servicing. In this case, the company's saved costs on servicing clients can be attributed to the income received from remote servicing (Cherneha & Timoshenko, 2022).

It should be noted that the amount of income calculated in this way is an indicative indicator, since in order to receive real income, the company should reduce the corresponding number of personnel in the branches, which in reality, most likely, will not happen. However, by reducing the load on the branches, the company can attract additional clients there with the same number of personnel. Accordingly, this assessment can be considered sufficiently adequate and suitable for assessing income from the implementation of remote services.

A practical calculation was carried out, which considered the financial indicators of the project (net present value; return on investment index; internal rate of return; payback period; discounted payback period).

The construction of a remote servicing selection methodology can be carried out based on the expert assessment method. However, this method has a number of shortcomings: it does not describe the procedures for conducting expert assessments; it does not assess the degree of consistency of expert opinions. The listed shortcomings are mainly explained by the difficulty of translating various expert judgments into quantitative assessments showing how much more or less one quantity is than another. To eliminate these problems, the author chose an expert method based on pairwise comparison (prioritization) of all factors selected for inclusion in the model and assigning them a quantitative assessment using the pairwise comparison method (Tambuskar, S. 2025).

Each time, only two factors are compared, the expert determines the relationship between them as "more" (>), "less" (<), "equal" (=). The obtained expert assessments are assigned a numerical measure a, which is taken to be equal to 1.5 when the relationship between two factors is defined as “greater” (>); 1.0, in case of equality of factors (=); 0.5 - in case of “less” (<). The Fie expert must take into account the results of previous comparisons.

In the course of the study, the following types of remote banking services were compared as an example: Internet banking, Telephone banking, SMS banking, WAP banking; PDA banking. And the following types of banking products available to them: receiving account and bank card balances; receiving account and bank card statements; intra-bank transfers and conversion; interbank transfers; consumer

lending; deposit transactions; payment for services (cellular communications, utilities, etc.); bank card servicing.

A bank from the group of client retail banks was selected as the bank. For each type of banking product, a pairwise comparison of the capabilities of various types of remote bank servicing was carried out according to the degree of implementation of remote presentation of this product to the client.

Comparison of the attractiveness of different types of remote servicing in banks shows that Internet banking will be used by 28% of clients, PDA banking - 25%, Telephone banking and SMS banking by about 18% each, WAP banking - 16%.

Taking into account the availability coefficient (Internet - 0.17; Telephone - 0.67; SMS - 0.67; WAP - 0.037; PDA - 0.0035), Telephone banking and SMS banking will be used by 44% of clients, Internet banking - 18%, WAP banking - 3%, PDA banking - 0%.

Thus, from the point of view of providing remote services with priority of complete coverage of bank services for the maximum number of its clients, it is profitable for banks to develop services in the order of selecting services with the most effective product assessment. The choice of types of remote servicing in banks can be quite typical (Internet banking, Telephone banking, etc.) for most banks, but deviations from this strategy are possible (CPC banking for VIP clients). Of course, this selection strategy does not allow us to evaluate other selection factors (economic, organizational, etc.), but with its help we can set priorities for further development of these factors (Fernandes, G. C., & Alves, M. A., 2025).

Different companies have different approaches to making decisions about implementing remote servicing. In practice, the following decision-making algorithms are currently used: by selecting a system based on an assessment of functionality; by selecting based on an assessment of a single solution.

The disadvantages of these algorithms are: lack of analysis of the economic efficiency of implementing a system; a potentially large number of iterations and, as a result, significant time and resource costs for the selection process; no guarantee of successful completion of the selection process, etc.

To develop new algorithms that are free from these disadvantages, we will classify typical tasks that companies face: 1. Consideration of the decision to implement a specific remote servicing. 2. The decision to implement remote servicing has been made, but it is necessary to select a specific system from a specific supplier.

3. The decision to implement remote servicing will be made if certain conditions are met.

If the first two categories include implementation projects that are intended to bring benefits, then the last category includes implementation projects that do not claim to bring benefits on their own, but in one way or another improve the core business.

During the study, methods for selecting a remote servicing system were created.

The task of calculating the economic efficiency of remote servicing is typical for companies that already use remote servicing for legal entities from a supplier of such systems, and have received an offer from this supplier to buy a similar system for servicing individuals. Such a company needs to decide how economically justified such an acquisition will be.

The proposed system implements the following types of remote servicing: 1. Internet client - a fully functional Internet servicing system. 2. Telephone client - information and payment system of Telephone servicing. 3. Mobile client - information and payment system of Internet servicing on pocket computers and smartphones (PDA servicing). 4. Information client - a specialized "lightweight" system for providing clients with statements (a type of Internet servicing). 5. Notification Server - a mobile information system designed to notify clients via SMS, fax and voice communication, e-mail and other channels (SMS servicing system).

Building a solution taking into account economic efficiency is most typical for large companies that are active players in the customer retail service market or are actively entering this market. They, as a rule, choose remote servicing, considering all remote servicing available on the market (Hnydiuk, 2020).

The company has decided on the need to implement remote servicing and announced a tender on the market of suppliers of such solutions. Several companies have submitted their proposals, and the company needs to choose a suitable solution for it.

The company's experts evaluate the preferences for types of remote servicing using the paired comparison method.

According to the obtained assessment (Internet service - 27%, PDA service - 24%, Telephone service and SMS service - 17% each, W AP service - 15%), it is impossible to single out preference for any particular type of remote servicing, and a customer survey was conducted for all of them. The number of interested clients in

choosing one or another type of remote servicing is determined by the following indicators: Internet - 22%; Telephone - 52%; SMS - 73%; WAP - 5%; KPK - 5%.

In accordance with the obtained results of comparison of preferences by types of remote servicing (SMS-service - 44%, Telephone-service - 30%, Internet-service - 20%, PDA-service - 4%, WAP-service - 2%), the following types of remote servicing should be considered: SMS-service, Telephone-service, Internet-service. However, the SMS-service system has already been implemented in the company, and the choice will be made only from the Internet-service and Telephone-service systems.

4 CONCLUSIONS

Thus:

1. A model of the total cost of ownership for remote servicing has been created, allowing to determine the costs of both remote servicing and classical servicing, which involves using the total costs of the department for the calculation, related to the time of execution of a separate operation.

2. A methodology for comparing the total cost of ownership has been developed, which not only calculates the total cost of ownership when implementing remote servicing and calculates the cost of the company's department, but also calculates the independent development of remote servicing by the company, while the total cost of ownership includes both the initial investment and the costs of ongoing work during the evaluation period.

3. A methodology for comparing current costs per department has been developed, which, unlike existing ones, in the absence of initial investments, involves leasing the necessary resources and allows to calculate the amount of investment in opening a department by the term of the remote servicing life cycle and to conduct a proportionate comparison with the same planning horizon.

4. Unlike the existing ones, the conducted assessment of the implementation of remote servicing as an investment project allows, from the point of view of providing remote services by priority of the completeness of coverage of the company's services for the maximum number of its clients, to develop the company's services in the order of their selection with the maximum effective product assessment.

5. The developed technology for selecting a mechanism for increasing the efficiency and quality of service in the services market allows not only to classify typical

tasks that arise before companies for the development of new algorithms, but also to determine how economically justified the acquisition of remote servicing from a supplier will be.

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