http://doi.org/10.23925/2179-3565.2025v16i4p210-217

RISUS - Journal on Innovation and Sustainability
volume 16, número 4 - 2025
ISSN: 2179-3565
Editor Científico: Arnoldo José de Hoyos Guevara
Editor Assistente: Vitória Catarina Dib
Avaliação: Melhores práticas editoriais da ANPAD

CONTROL AND INCREASE OF ECONOMIC EFFICIENCY OF REMOTE SERVICE OF THE ENTERPRISE IN THE SERVICES MARKET IN CONDITIONS OF DIGITALIZATION SYNERGY

Controle e aumento da eficiência econômica do atendimento remoto da empresa no mercado de serviços em condições de digitalização

Ganna Datsenko*[,1], Iryna Hladii[1], Liudmyla Maister[1], Svitlana Kuznetsova[2], Nataliia Bogatska[1]
[1]Vinnytsia Institute of Trade and Economics of State University of Trade and Economics, Ukraine
[2]National Technical University Kharkiv Polytechnic Institute, Ukraine
E-mail: datsenko@gmail.com, Hladii@gmail.com, Maister@gmail.com, datsenko@gmail.com, Bogatska@gmail.com

ABSTRACT

The article analyzes modern distance learning technologies, identifies the main trends in the development of distance learning and its role in solving the company's strategic problems, substantiates the advantages and disadvantages of modern distance learning technologies, substantiates the problems of modern distance learning technologies in the world; determines the procedure for constructing a balanced scorecard, develops a methodology for assessing the impact of distance learning system implementation based on the created balanced scorecard system of the company; determines the effectiveness of the current service based on the calculation of expenses for the distance learning system; compares the total cost of ownership when implementing a distance learning system; establishes sources of income received from a functioning distance learning system; determines the number of licenses purchased when implementing a distance learning system; develops a model for calculating the economic efficiency of the current work of an already used distance learning system, conducts dynamic modeling of the company's strategy for determining the number of clients connected to the distance learning system, develops practical recommendations for a financially optimal strategy for purchasing a remote service system; determines the advantages and disadvantages of distance learning system selection algorithms, classifies typical tasks for developing new algorithms without disadvantages; to develop a methodology for selecting a RSS for each category of companies and to build an algorithm for deciding on the implementation of a RSS using the method of calculating economic efficiency; an algorithm for constructing a decision on the implementation of a RSS using the method of calculating comparative economic efficiency has been developed; an algorithm for constructing a decision on the implementation of a RSS using the method of calculating boundary conditions has been developed.
Keywords: Economic efficiency, Services market, Remote service, Enterprises

SUBMETIDO EM: 16/10/2025
ACEITO EM: 05/12/2025
PUBLICADO EM: 30/12/2025

RISUS - Journal on Innovation and Sustainability
volume 16, número 4 - 2025
ISSN: 2179-3565
Editor Científico: Arnoldo José de Hoyos Guevara
Editor Assistente: Vitória Catarina Dib
Avaliação: Melhores práticas editoriais da ANPAD

CONTROLE E AUMENTO DA EFICIÊNCIA ECONÔMICA DO ATENDIMENTO REMOTO DA EMPRESA NO MERCADO DE SERVIÇOS EM CONDIÇÕES DE DIGITALIZAÇÃO

Control and increase of economic efficiency of remote service of the enterprise in the services market in conditions of digitalization synergy

Ganna Datsenko*[,1], Iryna Hladii[1], Liudmyla Maister[1], Svitlana Kuznetsova[2], Nataliia Bogatska[1]
[1]Vinnytsia Institute of Trade and Economics of State University of Trade and Economics, Ukraine
[2]National Technical University Kharkiv Polytechnic Institute, Ukraine
E-mail: datsenko@gmail.com, Hladii@gmail.com, Maister@gmail.com, datsenko@gmail.com, Bogatska@gmail.com

RESUMO

O artigo analisa as tecnologias modernas de ensino à distância, identifica as principais tendências no desenvolvimento do ensino à distância e seu papel na solução dos problemas estratégicos da empresa, comprova as vantagens e desvantagens das tecnologias modernas de ensino à distância, comprova os problemas das tecnologias modernas de ensino à distância no mundo; determina o procedimento para a construção de um balanced scorecard, desenvolve uma metodologia para avaliar o impacto da implementação do sistema de ensino à distância com base no sistema de balanced scorecard criado pela empresa; determina a eficácia do serviço atual com base no cálculo das despesas do sistema de ensino à distância; compara o custo total de propriedade ao implementar um sistema de ensino à distância; estabelece fontes de receita recebidas de um sistema de ensino à distância em funcionamento; determina o número de licenças adquiridas ao implementar um sistema de ensino à distância; desenvolve um modelo para calcular a eficiência econômica do trabalho atual de um sistema de ensino à distância já utilizado, conduz a modelagem dinâmica da estratégia da empresa para determinar o número de clientes conectados ao sistema de ensino à distância, desenvolve recomendações práticas para uma estratégia financeiramente ideal para a compra de um sistema de serviço remoto; determina as vantagens e desvantagens dos algoritmos de seleção de sistemas de ensino à distância, classifica tarefas típicas para desenvolver novos algoritmos sem desvantagens; desenvolve uma metodologia para selecionar um RSS para cada categoria de empresas e constrói um algoritmo para decidir sobre a implementação de um RSS usando o método de cálculo da eficiência econômica; foi desenvolvido um algoritmo para construir uma decisão sobre a implementação de um RSS usando o método de cálculo da eficiência econômica comparativa; foi desenvolvido um algoritmo para construir uma decisão sobre a implementação de um RSS usando o método de cálculo das condições de contorno.

Palavras-chave: Eficiência econômica, Mercado de serviços, Serviço remoto, Empresas

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 very 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 (QIAN, JUN, PHILIP E. STRAHAN, 2007).

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. 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 clients (KIM, H., S. JEONG, H. YOE, N. KIM, S. LEE, WEN-ZHENG Y., 2014).

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 based on the promises of the manufacturers of such systems or on 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 distance learning by focusing investments in the most profitable direction.

1 MATERIALS AND METHODS

In the course of the research, the works of domestic and foreign scientists and practitioners on the problem under consideration were studied, such as (VALINEJAD, F., & RAHMANI, D., 2018), (TEMESVÁRI, Z. M., MAROS, D., & KÁDÁR, P., 2019), (MAENG, K., KIM, J., & SHIN, J., 2020), (D'AMATO, D., KORHONEN, J., & TOPPINEN, A., 2019), (AIHKISALO, T., PAASO T., 2012), (BI, Z., L. XU, WANG C., 2014), (CIRANI, S., L. DAVOLI, G. FERRARI, R. LEONE, P. MEDAGLIANI, M. PICONE, VELTRI L., 2014).

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 servicing in the services market based on the implementation of a remote servicing system.

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

Theoretical and methodological basis of the study. The theoretical basis of the study is the research and works of domestic and foreign 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.

2 RESULTS

Scientific results of the article.

1. A model of the total cost of ownership for the RSS has been created, allowing to determine the costs of both RSS maintenance and classical maintenance, 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 the RSS and calculates the cost of the company's department, but also calculates the independent development of the RSS by the company, while the total cost of ownership includes both the initial investment and the costs of current work during the evaluation period.

3. A methodology for comparing current costs for a 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 life cycle of the RSS and to conduct a proportionate comparison with the same planning horizon.

4. Unlike existing ones, the conducted assessment of the implementation of the LMS as an investment project allows, from the point of view of providing remote services by priority of complete 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 the RSS from the supplier will be.

3 DISCUSSION

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

2. The decision to implement RSS has been made, but it is necessary to select a specific system from a specific supplier.

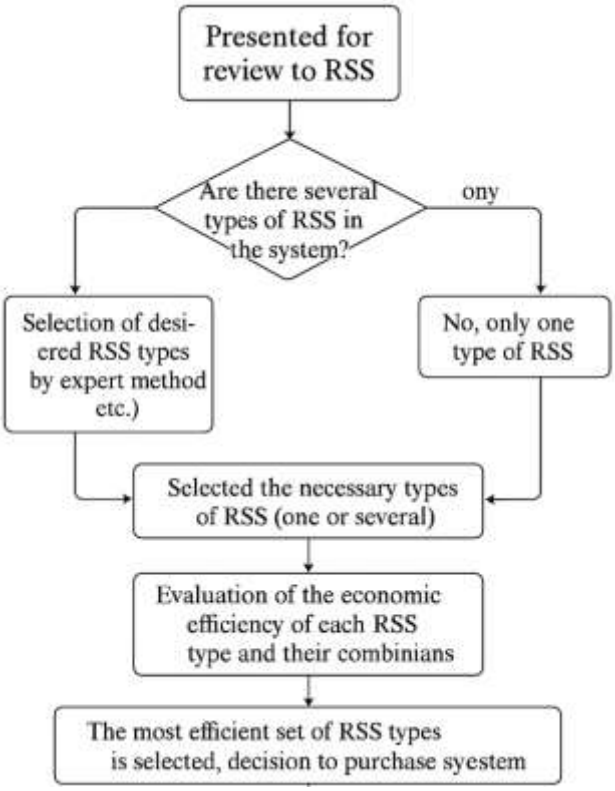
3. The decision to implement RSS will be made if certain conditions are met.

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 independent benefits, but in one way or another improve the main activity.

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

The task of calculating the economic efficiency of RSS is typical for companies that already use RSS 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 problem of choosing a RSS for this case is solved according to the algorithm presented in Figure 1.

Figure 1 - Algorithm for choosing RSS



The following types are implemented in the proposed system:

1. Internet client - a fully functional Internet service system.
2. Telephone client - information and payment system for Telephone service.
3. Mobile client - information and payment system for Internet service on pocket computers and smartphones (PDA service).
4. Information client - a specialized "lightweight" system for providing clients with statements (a type of Internet service).
5. Notification Server - a mobile information system designed to notify clients via SMS, fax and voice communication, e-mail and other channels (SMS service 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 RSS by considering all the RSSs available on the market.

The company has decided on the need to implement RSS and has 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.

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

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

of LMS is determined by the following indicators: Internet - 22%; Telephone - 52%; SMS - 73%; WAP - 5%; PDA - 5%.

In accordance with the obtained results of comparison of preferences by types of DO (SMS service - 44%, Telephone service - 30%, Internet service - 20%, PDA service - 4%, WAP service - 2%), the following types of DO 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.

Remote service allows enterprises to:

reduce transaction costs (premises rental, staff salaries); expand the geography of service provision without significant capital investments; increase service throughput without a proportional increase in costs. This turns remote service into a cost-effective business model, especially in the context of the digitalization of the economy.

Key indicators of economic efficiency:

To control remote service, the following should be assessed:

Cost per Service Unit (CPU). Profitability of remote channels (Return on Remote Services, RRS). Operating Efficiency Index (OEI). Average online service check (Average Revenue Per User, ARPU). Customer Retention Rate (CRR). The economic feasibility of remote service is determined by comparing costs and revenues across different service provision channels.

Main areas of economic optimization:

Outsourcing of part of functions: involving third-party service providers to reduce fixed costs. Process automation: reducing labor costs through the implementation of chatbots, CRM and ERP systems. Investments in analytical platforms: fast and accurate processing of large amounts of customer data helps increase profitability. Subscription and prepayment models: ensuring predictable cash flows.

Risks and economic challenges:

Initial costs of digitalization (development of IT infrastructure, licensing, data protection). Increased competition in digital service markets, which puts pressure on margins. Cyber risks and information security costs. Changes in regulation (GDPR, local requirements for the protection of personal data), which require additional investments in compliance with the norms.

Economic control tools:

ABC analysis of costs for servicing different customer groups. Break-even analysis to determine the break-even point of implementing remote services. Monitoring the ROI of each digital channel in dynamics. Comparative analysis of service models (traditional/remote) based on NPV, IRR and Payback Period indicators.

CONCLUSION

The analysis of modern distance learning technologies was conducted, the main trends in the development of distance learning and the role of distance learning systems in solving strategic tasks of enterprises were established. The advantages and disadvantages of modern distance learning technologies were determined, and the problems of modern distance learning technologies were substantiated. The procedure for constructing a balanced scorecard system was determined. A methodology for assessing the impact of the introduction of distance learning systems was developed based on the created balanced scorecard system of the company.

The theoretical significance of the research results lies in the fact that the developed models and methods for improving the mechanism for increasing the efficiency and quality of service in the services market will facilitate the implementation of the RSS for various categories of enterprises and develop theories of economics, organization, and management in relation to the services sector. The practical significance of the research lies in the fact that scientific provisions are focused on the possibility of their practical application in real conditions of the services market for most categories of enterprises, as well as in the educational process of higher educational institutions with an economic profile.

Controlling and increasing the economic efficiency of remote service requires a systematic approach to analyzing costs, revenues, and investments in digital transformation.

Successful implementation of the strategy ensures the enterprise not only saves resources, but also sustainable competitive growth in the digital economy.

REFERENCES

Achimugu P., Oluwagbemi O., Oluwaranti A., Afolabi B. (2009). Adoption of Information & Communication Technologies in Developing Countries: An Impact Analysis, Journal of Information Technology Impact, vol. 9, no. 1, 37–46.

Agiwal M., Roy A., Saxena N. (2016). Next Generation 5G Wireless Networks: A Comprehensive Survey, *IEEE*, vol. 18, no. 3, pp. 1617-1655.

Aihkisalo, T., Paaso T. (2012). Latencies of Service Invocation and Processing of the REST and SOAP Web Service Interfaces. *In IEEE 8th World Congress on Services*. Honolulu, HI: IEEE, 100–107.

Bi, Z., L. Xu, Wang C. (2014). Internet of Things for Enterprise Systems of Modern Manufacturing*." IEEE Transactions on Industrial Informatics* 10 (2): 1537–1546. doi:10.1109/TII.2014.2300338.

Cherchata, I. Popovychenko, U. Andrusiv, V. Gryn, N. Shevchenko, Shkuropatskyi O. (2022). Innovations in Logistics Management as a Direction for Improving the Logistics Activities of Enterprises", *Management Systems in Production Engineering*, Vol. 30, Issue 1, pp. 9-17.

Cirani, S., L. Davoli, G. Ferrari, R. Leone, P. Medagliani, M. Picone, Veltri L. (2014). A Scalable and Self-configuring Architecture for Service Discovery in the Internet of Things. *IEEE Internet of Things Journal* 1 (5): 508–521. doi:10.1109/JIOT.2014.2358296.

D'amato, D., Korhonen, J., & Toppinen, A. (2019). Circular, Green, and Bio Economy: How Do Companies in Land-Use Intensive Sectors Align with Sustainability Concepts? *Ecological Economics*, 158, 116-133. Retrieved from: https://doi.org/10.1016/j.ecolecon.2018.12.026

Dias M. P. I., Karunaratne B. S., Wong E. (2014). Bayesian Estimation and Prediction-Based Dynamic Bandwidth Allocation Algorithm for Sleep/Doze-Mode Passive Optical Networks, J. Lightwave Tech., vol. 32, no. 14, pp. 2560-68.

Duan Y., Mullins R., Hamblin D., Stanek S., Sroka H., Mavhado V., Araujo J. (2002). Addressing ICTs Skill Challenges in SMEs: Insights from three country investigations," *Journal of European Industrial Training*, vol. 26, no. 9, p. 430–441.

Elazhary, H. (2019). Internet of Things (IoT), mobile cloud, cloudlet, mobile IoT, IoT cloud, fog, mobile edge, and edge emerging computing paradigms: Disambiguation and research directions. *Journal of Network and Computer Applications*, 128, 105-140. https://doi.org/10.1016/j.jnca.2018.10.021

Jin Q., Li T. T. (2020). Operation Improvement of Third-Party Logistics Enterprise Based on Activity-Based Costing Method, ICMSS 2020: Proceedings of the 2020 4th International Conference on Management Engineering, *Software Engineering and Service Sciences*, 250–254.

Kim, H., S. Jeong, H. Yoe, N. Kim, S. Lee, Wen-Zheng Y. (2014). Design and Implementation of ICT-based System for Information Management of Livestock Farm. *International Journal of Smart Home* 8 (2): 1–6. doi:10.14257/ijsh.2014.8.2.01.

Maeng, K., Kim, J., & Shin, J. (2020). Demand forecasting for the 5G service market considering consumer preference and purchase delay behavior. *Telematics and Informatics*, 47. Retrieved from: https://doi.org/10.1016/j.tele.2019.101327

Qian, Jun, Philip E. Strahan (2007). How laws and institutions shape financial contracts: The case of bank loans. *Journal of Finance* 62: 2803–34.

Scott J. E. (2007). An e-Transformation Study Using the Technology–Organization–Environment Framework, in 20th Bled eConference, eMergence: Merging and Emerging Technologies, *Processes, and Institutions*, Bled, Slovenia.

Temesvári, Z. M., Maros, D., & Kádár, P. (2019). Review of Mobile Communication and the 5G in Manufacturing. *Procedia Manufacturing*, 32, 600- 612. Retrieved from: https://doi.org/10.1016/j.promfg.2019.02.259

Valinejad, F., & Rahmani, D. (2018). Sustainability risk management in the supply chain of telecommunication companies: A case study. *Journal of Cleaner Production*, 203, 53-67. Retrieved from: https://doi.org/10.1016/j.jclepro.2018.08.174
Williams, Colin C., Muhammad Shahid (2016). Informal entrepreneurship and institutional theory: Explaining the varying degrees of (in) formalisation of entrepreneurs in Pakistan. *Entrepreneurship and Regional Development* 28: 1–25.
Williams, Colin C., Alvaro Martinez-Perez (2016). Evaluating the impacts of corruption on firm performance in developing economies: An institutional perspective. *International Journal of Business and Globalisation* 16: 401–22.