Algorithm For Increasing Population Loyalty To Smart City Projects

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Abstract: In the modern world, digital technologies penetrate into all spheres of society and open up completely new opportunities for the development of smart cities. The rapid spread of the Internet is leading to an increase in the number of platforms and virtual communities that allow companies to effectively harness the potential of consumers to develop new products. Despite the huge number of studies on smart city projects, an algorithm for promoting innovative smart city projects among the local population has not yet been developed, which would increase the population's loyalty to the ideas of digital transformation of urban areas. As a result of the study, the stages of promoting smart city projects among the population were identified, and a comprehensive algorithm for promoting smart city projects was developed. The scientific novelty of the obtained result lies in the development of a procedure for promoting smart city projects among the local population in order to increase loyalty to the ideas of digital transformation of urban areas.

1 INTRODUCTION

In the modern world, along with an increase in the city's population, problems arise, including overload of city services, transport collapses, increased consumption of resources, etc. To solve emerging problems, local authorities resort to digital technologies, which become the technological basis for the development of modern cities. So many cities are beginning to claim the status of "smart city" (Neirotti, De Marco, Cagliano, Mangano, & Scorrano, 2014).

In the literature, a "smart city" is understood as a safe and ecological urban center with developed infrastructure, which ensures sustainable economic growth and a high quality of life for its residents (Höjer, Wangel, 2014). In general, a smart city is described as a concept that involves the adoption and deployment of digital technology infrastructure to support social and urban growth through economic improvement, citizen engagement and improved government efficiency (Appio, Lima, & Paroutis, 2018).

The goal of developing smart city technologies is to improve the quality of management of city flows and the speed of solving complex problems. The use of smart city technology solutions allows local government structures to deal with problems more effectively and quickly than using a conventional operational approach. Thanks to digital technologies in smart cities, authorities can monitor the development of the urban environment, identify the most effective tools for improving the quality of life, and directly interact with communities and urban infrastructure (Cassandras, 2016).

In the modern world, digital technologies penetrate into all spheres of society and open up completely new opportunities for the development of smart cities (Lee, Phaal, & Lee, 2013). Thus, the relevance of this study is due to the need for targeted use of digital tools for successful interaction between residents and city authorities.

In articles concerning the formation and development of smart cities, aspects related not only to digital technologies, but also aspects of an institutional, economic, and social nature are increasingly being explored. The most important condition for the development of smart cities is the factor of human capital, the willingness and ability of the local population to participate in the

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implementation of smart city projects, to be involved in the processes of digital transformation of urban areas, and to show loyalty to innovative solutions. Thus, the smart people factor includes various aspects: lifelong learning ability, social and ethnic plurality, flexibility, creativity, cosmopolitanism, openness and participation in public life. The development of smart cities is directly related to the ability of the local population to propose smart solutions to urban problems, and the management goals of a smart city should be focused on its residents. That is why many authors promote the idea that city residents should be considered as the final link in the chain of creating a smart city, while their expectations regarding the quality of life in the city are not always taken into account (Mayangsari, & Novani, 2015).

Modern processes associated with the digital transformation of cities affect most areas of everyday life, and thanks to the work of the "smart city" program, cities are gradually turning into intelligent ecosystems. The digital environment includes all key aspects of urban life: healthcare, education, energy, transport, resource and urban space management. In this regard, assessing the readiness of the local population to participate in the development of a smart city, the loyalty of the population to smart city projects becomes a vital condition for their successful functioning. A smart city is characterized by services for the population aimed at meeting needs. In this regard, it is important to understand how the loyalty of the population allows local authorities and businesses to develop the concept of smart cities.

Despite the huge number of studies on smart city projects, a procedure for promoting smart city projects among the local population has not yet been developed to increase loyalty to the processes of digital transformation of urban areas. Based on this, the purpose of this study is to identify the stages of promoting smart city projects to increase the loyalty of the population to the processes of digitalization of the urban environment, and to develop a comprehensive algorithm for promoting smart city projects.

With the development and emergence of new technologies, the number of tools that help the population interact with business representatives, non-profit organizations, and authorities is increasing. Such interaction and free access to information leads to the fact that local authorities and private organizations have to focus on customer focus in order to build long-term relationships and increase consumer loyalty to their products and services (Ceballos, & Larios, 2016).

Along with the progress of digital technologies, the population is given the opportunity to actively participate in the activities of various organizations. Today, there are many potential mechanisms for involving consumers in the activities of companies. Consumers can act as information intermediaries, sharing ideas with organizations regarding new products or improving existing ones. In addition, consumers also have the opportunity to directly participate in the product development process and implement innovative projects themselves.

In a market overflowing with innovative products and services, it is very important for companies to develop a strategy aimed not only at attracting new customers, but also retaining existing ones. For this purpose, types of loyalty programs are created and developed that help companies build a dialogue with the client and involve him in constant interaction (Ruiz-Mafe, Marti-Parreno, & Sanz-Blas, 2014). A business interested in its customers must constantly improve approaches and methods for analyzing customer behavior. To assess the attitude of consumers towards certain goods, services, projects, term "loyalty" is used (Uncles, Dowling, & Hammond, 2003). Loyalty makes it possible to determine the likelihood that a consumer will choose another brand, this is especially important when it undergoes changes in price or some other indicators. As loyalty increases, the propensity of consumers to perceive the actions of competitors decreases. Loyalty is reflected, first of all, in the behavior and attitude towards the goods or services of any organization or company. Loyalty is, first of all, the positive attitude of the consumer, his emotions, experiencing which he wants to seek services from the company again and again.

Modern definitions of consumer loyalty, formed in the scientific and business literature on marketing, include the definition of consumer loyalty as a set of feelings or experiences that incline the consumer to consider the possibility of making repeated purchases of specific products, as well as the possibility of making a repeated visit to an enterprise, retail outlet, Website. Consumer loyalty is the result of ensuring customer satisfaction, their required positive experience and the achieved level of product value that can be obtained from a business at a given specific point in time (Yim, & Kannan, 1999).

The loyalty has a dual nature in relation to the competitiveness of the organization. In modern conditions of competition in the service market, the formation and maintenance of customer loyalty is becoming increasingly important. However, for a customer to become loyal, it is necessary for the

organization to provide competitive advantages in the form of quality services and responsive customer service (Jai, Tong, & Chen, 2022).

A factor contributing to the formation of customer loyalty is the very existence of such customers in the organization. They become a kind of competitive advantage for the institution, helping it improve its prospects in the services market. Currently, the services market is experiencing fierce competition between enterprises to attract customers. Studying the degree of customer loyalty becomes an important basis for making management decisions as part of the formation of a customer-oriented model of relationships with consumers. However, it becomes difficult to measure loyalty because every consumer does not use the same service all the time. To assess consumer loyalty, two groups of methods are used. The first group is mathematical methods that are based on constructing a loyalty curve, calculating the net support index and determining the influence of factors that form loyalty. The second group is empirical methods that allow researchers to identify customer loyalty and determine its level (Iastremska, & Strokovych, 2014).

Assessing consumer loyalty is of particular importance when implementing smart city development projects, since in this case the results of project implementation are not always obvious. Consequently, the problem arises of developing tools for promoting smart city projects among the local population to increase loyalty to the ideas of digital transformation of urban areas.

2 METHODS

Currently, there is already an extensive set of tools for conducting behavioral analysis, each of which can be successfully applied depending on specific data or requests to assess customer loyalty to a particular product. However, there is still no algorithm for promoting smart city projects to increase the loyalty of the population to the processes of digitalization of urban areas.

The object of the study is the loyalty of the population to innovative projects of smart cities; the subject of the study is the algorithm for promoting smart city projects to increase loyalty to the processes of digital transformation of the local population. The information base for the study was scientific articles on this topic, indexed in international databases of scientific publications, as well as author's developments.

The research consists of the following stages: formulation of the problem, consideration of previous studies, development of the author's algorithm for promoting smart city projects among the local population.

3 RESULTS

An algorithm for promoting smart city projects, which can be used to increase the loyalty of the local population to the processes of digital transformation of an urbanized area, is presented in Figure 1.

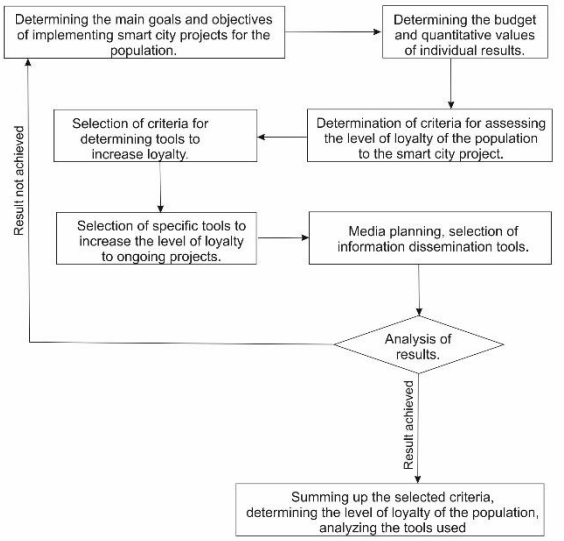

Figure 1: Algorithm for promoting smart city projects.

The presented algorithm includes seven consecutive stages. To effectively promote a smart city project, it is extremely important to determine the main goals of the innovations being introduced. As a rule, the main goals of implementing smart city projects are related to the goals of sustainable development, improving the safety of the urban environment, efficient use of resources, and solving transport problems. An important condition for achieving the desired results when promoting a smart city project is the availability of resources for the campaign to promote smart city ideas, which requires determining the budget for planned activities, as well as the allocation of certain funds. In order to implement the planned activities, it is necessary to select tools that can be used as part of the promotion of the smart city project, for which a list of criteria is formed by which the tools for promoting the smart city project can be selected. Next, specific tools are selected, as well as the implementation of planned activities. At the final stage, the results obtained are analyzed, the loyalty of the population to the smart city project is determined after the implementation of the procedure for promoting the project among the local population.

4 DISCUSSION

The results of the study show that in order to increase the loyalty of the population to smart city projects, it is necessary to alternately use all the tools. When implementing a campaign to promote smart city projects, it is necessary to empirically determine which of the methods used works and how effectively (Baek, Yoo, 2018).

At the same time, almost the entire toolkit of tools for increasing the loyalty of the population can be used when implementing smart city development projects. This is due to both the significant differentiation of companies and enterprises implementing projects for the development of smart cities, and a large arsenal of products and services that form the digital space of urbanized territories.

Each product or service has its own target market, a group of consumers to which it is directed. However, the distinction between target and non-target consumer groups is often unclear and ambiguous. This is due to the fact that consumers have different income levels, exhibit different purchasing behavior, have different levels of brand loyalty and other characteristics.

That is why it is important to identify the most significant consumers and adapt offers to them. Sometimes the diversity of customers is so broad that a one-size-fits-all offering designed for the average consumer will not satisfy anyone's needs. It is important for businesses to correctly tailor their offerings to target consumer groups based on their experiences and preferences.

This problem arises in almost all marketing activities, but it plays a special role in loyalty programs in the context of digitalization of relationships with consumers.

5 CONCLUSIONS

One of the main tasks in implementing initiatives to digitalize the urban environment is the task associated with changing the behavior of users of digital solutions, creating conditions for involving the local population in the development processes of smart city projects. User behavior is influenced by many factors. Local governance structures can influence citizens' choices in implementing development concepts through various strategies. This requires the development of consistent policies aimed at ensuring that local people use the smartest solutions. An important condition for involving the population is the formation of trust in digital solutions, as well as receiving benefits from using smart city solutions. Therefore, local authorities should be interested in encouraging public participation in the development and implementation of smart solutions. In this regard, it is important to use modern channels for obtaining information from the local population about problems in implementing smart city ideas, as well as interacting with users on the benefits, costs, timing and other attributes of smart solutions. Openness and exchange of information with users when errors occur in the service provided is especially important, so that users do not lose confidence in smart city solutions.

People living in different cities, different professions, ages and genders behave differently. Therefore, before implementing smart solutions, it is necessary to study needs or implement pilot projects to understand user behavior. Such behavioral factors should be taken into account in design decisions. Thus, the public and private sectors must work together to influence users through educational and marketing opportunities, using tools such as awareness campaigns, financial incentives, and the use of social media. Smart solutions must be innovative to attract users. In this regard, as part of the development of smart cities, new solutions related to the use of big data and artificial intelligence are being actively implemented. Big data is also a tool for personalizing many marketing and educational initiatives. Since smart solutions use personalized data in real time, user privacy and security are of utmost importance. Insufficient security of digital technology solutions is a significant factor in reducing user loyalty to such solutions. Users stop using these services after a security breach because they perceive risks in using digital technologies.

In this study, with the aim of developing an algorithm for promoting smart city projects to increase the loyalty of the population to the processes of digital transformation of urban areas, the following results were obtained.

Firstly, the scientific literature on tools for increasing consumer loyalty in the context of the formation of a digital society is analyzed and the problem of the need to develop a procedure for promoting smart city projects is formulated.

Secondly, it is proposed to distinguish seven stages when promoting smart city projects, which logically complement each other as part of the implementation of the procedure for promoting smart city projects.

Thirdly, an algorithm for promoting smart city projects is proposed to increase the loyalty of the local population to the processes of digital transformation of urbanized territories, expanding the existing tools

for managing the processes of digitalization of urbanized territories.

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REFERENCES

Neirotti, P., De Marco, A., Cagliano, A. C., Mangano, G., Scorrano, F., 2014. Current trends in Smart City initiatives: Some stylised facts. Cities, 38, 25–36.

Höjer, M., Wangel, J., 2014. Smart Sustainable Cities: Definition and Challenges. ICT Innovations for Sustainability, 333–349.

Appio, F. P., Lima, M., Paroutis, S., 2018. Understanding Smart Cities: Innovation ecosystems, technological advancements, and societal challenges. Technological Forecasting and Social Change.

Cassandras, C. G., 2016. Smart Cities as Cyber-Physical Social Systems. Engineering, 2(2), 156–158.

Lee, J. H., Phaal, R., Lee, S.-H., 2013. An integrated service-device-technology roadmap for smart city development. Technological Forecasting and Social Change, 80(2), 286–306.

Mayangsari, L., Novani, S., 2015. Multi-stakeholder co-creation Analysis in Smart city Management: An Experience from Bandung, Indonesia. Procedia Manufacturing, 4, 315–321.

Ceballos, G. R., Larios, V. M., 2016. A model to promote citizen driven government in a smart city: Use case at GDL smart city. In 2016 IEEE International Smart Cities Conference (ISC2) (pp. 1-6). IEEE.

uiz-Mafe, C., Marti-Parreno, J., Sanz-Blas, S., 2014). Key drivers of consumer loyalty to Facebook fan pages. Online information review, 38(3), 362-380.

Uncles, M. D., Dowling, G. R., Hammond, K., 2003. Customer loyalty and customer loyalty programs. Journal of consumer marketing, 20(4), 294-316.

Yim, C. K., Kannan, P. K., 1999. Consumer behavioral loyalty. Journal of business research, 44(2), 75-92.

Jai, T. C., Tong, X., Chen, H. S., 2022. Building brand loyalty on social media: theories, measurements, antecedents, and consequences. Journal of Brand Management, 1-23.

Iastremska, O., Strokovych, A., 2014. Assessment of customer loyalty. The Advanced Science Journal, 6, 84-89.

Baek, T. H., Yoo, C. Y., 2018. Branded app usability: Conceptualization, measurement, and prediction of consumer loyalty. Journal of Advertising, 47(1), 70-82.