Innovative technologies in the hotel business as a factor in the sustainable development of the hospitality industry in the Rostov region

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Abstract. This study is aimed at analyzing the functioning features of the hotel services market in the city of Rostov-on-Don and the Rostov region, identifying factors for its sustainable development due to the introduction and application of innovative technologies in the hotel business. The intensive development of the hotel industry contributes to the need to develop new technologies for serving tourists in hotels, the introduction of innovative services and technical innovations. The article examines the key principles of innovation and the main types of innovation in the hotel industry, and assesses the accommodation facilities of the city of Rostov-on-Don for the use of innovative technologies in the process of operation. In the hospitality industry, one can observe trends in the active implementation of new technologies: digitalization, streaming, virtual reality, etc. The transition to a digital future is sustainable and helps hotels successfully operate in accordance with ESG criteria and customer expectations. Processes related to innovation are aimed at establishing in full the results of research on a commercial basis to expand the list of products or services, improve their consumer characteristics, and develop innovative production technologies in order to strengthen the position of products in the market.

1 Introduction

Today, hotel technology related to customer service is developing much faster than ever. All kinds of solutions are emerging to automate and speed up work, helping to simplify customer service and increase the efficiency of all processes. The industry is influenced by a number of factors: geopolitical risks, global digitalization, and the introduction of new technologies into the industry. As a result, there is high market volatility.

For the hospitality industry, innovation, innovation and new technologies are in line with the industry and very close in spirit. The hospitality industry is highly competitive, with innovation serving as a key resource to maintain or achieve competitive advantage. As an industry where businesses face stiff competition, it is important for them to maintain their competitiveness by differentiating themselves from others through continuous improvement and innovation.
Innovation in the hotel industry is a system of organizational, economic, research, technological and other measures. They are aimed at a complete renewal of tourism services, which leads to new opportunities for interaction with consumers. In the hospitality industry, innovation can be represented by innovative products/services that are new to the customer, i.e. either new in an absolute sense, or new for the hotel enterprise.

In the hospitality industry, one can observe trends in the active implementation of new technologies: digitalization, streaming, virtual reality, etc. The use of innovations and innovative technologies in the tourism and hospitality industry helps to improve the quality of services provided and improve service processes. This presupposes the presence of a holistic set of measures and organizational developments that make it possible to improve the process of development, production, operation and maintenance. All this leads to the effective use of not only material and economic, but also social resources.

The purpose of the work is to analyze the specifics of using innovative technologies in the hospitality industry and study the innovative activities of hotels in the Rostov region and the city of Rostov-on-Don.

Considering the increased popularity of innovative technologies in the hospitality industry, it is necessary to study the prospects for introducing innovations into the activities of accommodation facilities in the Rostov region; for these purposes, it is important to generalize the experience of foreign countries in which projects to serve tourists using the latest technologies are most successfully implemented. The use of innovative technologies in the process of serving tourists can become a highly profitable area of activity for hotels in the Rostov region.

2 Materials and methods

The intensive development of the hotel industry contributes to the need to develop new technologies for serving tourists in hotels, the introduction of innovative services and technical innovations. Important in this sense are the works of such authors as: Mohd Amy Azhar Mohd Harif, Muhammad Nawaz, Waseem Ul Hameed 2022 [1], Nestor Montalvan-Burbano, Jose Antonio Plaza-Ubeda, Miguel Perez-Valls, David Sabando-Vera, 2019 [2], Juliana Lucena do Nascimento, Rogério Mazali, 2023 [3], Hakseung Shin, Richard R. Perdue, 2022 [4], Primitiva Pascual-Fernández, María Leticia Santos-Vijande, José Ángel López-Sánchez, Arturo Molina 2021 [5], Zuzana Sándorová, Terézia Repáňová, Zuzana Palenčíková, Norbert Beták, 2020 [6], Susan L.Slocum, Daniela Y.Dimitrov, KelleyWebb, 2019 [7], Jude Walker, Vimbiso Ngara Manyamba, 2020 [8].

Since the introduction of innovations in the hospitality industry affects the performance of hotels, it is very important to study the trends and features of the development of the hotel business in the world and in Russia. The works of the following authors are devoted to these issues: N.Y. Goryushkina, D.V. Shkurkin, A.S. Petrenko, N.S. Yarovaya, 2016 [9], A. O.Nabil, ChannoufAsmaAl-Zaidi, 2016 [10], MehmetAliKöseoğlu, MehmetAltinEricChan, OmerFarukAladag, 2020 [11], L.N. Kazmina, V.S. Makarenko, V.V. Provotorina, T.N. Grigorenko, G.E. Ekinil, E.M Shevchenko, Petrenko, A. [12-16].

Among the authors studying the issues of organizing the provision of innovative additional services in hotel enterprises are: Ö zgürDavras, MeltemCaber 2019 [17], AsunciónBeerli-Palacio, JosefaD. Martín-Santana, CrisantoRomán-Montoya 2020 [18], ShanLiu, BaojunGao, MichaelGallivan, YemingGong 2020 [19].

The research methodology of the hospitality industry in the context of regional specifics is devoted to the works of such authors as: S. Karampela, D. Kavroudakis, T. Kizos, 2019 (опыт Греции) [20], H.A.M. Shaffril, A. Hamzah, S.Md. Yassin, B.A. Samah, J.L. D’Silva,
In the study, the methodology takes on a complex nature due to the versatility of the topic under consideration. A variety of general scientific methods were used, coupled with conceptual, logical and comparative analysis obtained in the process of data research. The scientific principles, conclusions and recommendations contained in the article are based on the use of the logical analysis method and the economic-statistical method.

3 Results

The use of advanced technologies, carefully developed service systems that meet the needs of consumers is primarily focused on the needs of innovative development of the organization.

The key principles of innovation in the hospitality industry are: the principle of scientific novelty, relevance, the principle of significance, relevance, the principle of realism, the principle of efficiency and safety (Figure 1).

<table>
<thead>
<tr>
<th>Principle of Scientific Novelty</th>
<th>• when creating innovation, it is necessary to use the latest scientific knowledge, research and development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principle of Relevance</td>
<td>• innovation must be relevant for a specific enterprise, region or country as a whole</td>
</tr>
<tr>
<td>Principle of Significance</td>
<td>• involves solving important problems of the enterprise</td>
</tr>
<tr>
<td>Principle of Demand</td>
<td>• innovation must be necessary for consumers and meet their needs</td>
</tr>
<tr>
<td>Principle of Realism</td>
<td>• innovation must take into account the capabilities of the enterprise and be feasible</td>
</tr>
<tr>
<td>Principle of Efficiency</td>
<td>• the innovation must bring a beneficial effect after its implementation</td>
</tr>
<tr>
<td>Safety Principle</td>
<td>• innovation must be safe for people and not harm the environment</td>
</tr>
</tbody>
</table>

Fig.1 Principles of Innovation

The ultimate goal of introducing and using any innovation is to create and develop transformations and increase business competitiveness. This approach works in any industry, including the hotel industry.

In the development of hotel enterprises, innovations have their own specifics:
– create new needs or develop existing needs;
– innovative strategies determined by the organization are important;
– client-oriented developments aimed at a specific consumer are significant;
– innovative activity depends not only on the manager’s attitude to innovation, but also on the motivation of organizational personnel to an innovative type of behavior.

The main types of innovations in the hotel industry are presented in Figure 2.

![Diagram of Major innovations in the hotel]

Now new demands have been placed on the service sector, including the hospitality industry. And this is not just an individual approach, high-quality goods/services, but also, above all, safety, which is fully guaranteed by digital technologies. The list of innovative technologies actively used in the hospitality industry is presented in Figure 3.

One of the easiest adaptations hotels can make as part of their innovation approach is to go digital. Many modern hotel businesses have replaced legacy systems with digital solutions to reduce costs and improve hotel operations. The transition to a digital future is sustainable and helps hotels successfully operate in line with ESG criteria and customer expectations.

Customer control is a common theme in hotel innovation, and smart hotels are beginning to take their place in this new future. A smart hotel is an experience that allows customers to control devices using a range of technologies, including artificial intelligence, augmented reality and digital connectivity.

Simplification of operational processes is aimed at automating routine human processes, reducing personnel losses. With electronic authorizations and a central repository of information, front office staff seamlessly collaborate with reservations and finance to resolve day-to-day issues and drive ongoing improvements. Employees can track end-to-end operations and the status of any specific task from a centralized control center dashboard. And team leaders can quickly intervene before the situation becomes problematic. The
The innovative development of the hospitality industry is directly related to a number of key factors (Table 1).

**Table 1.** Key factors of innovative development of the hospitality industry

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Financial</td>
<td>Availability of capital, investment and lending for the implementation of innovative projects</td>
</tr>
<tr>
<td>Scientific, technical and technological</td>
<td>Availability of advanced technologies, research centers and qualified specialists in the development of new products and services</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Modern transport system, stable energy supply, telecommunications and other infrastructure facilities that support innovation</td>
</tr>
<tr>
<td>Specialists</td>
<td>Qualified employees, engineers, designers, technologists and other specialists with knowledge and skills in the field of innovative technologies and solutions</td>
</tr>
<tr>
<td>Entrepreneurs</td>
<td>Creative and enterprising people who strive to create new businesses and implement innovative business models</td>
</tr>
<tr>
<td>Managers</td>
<td>Leaders and managers capable of creating and maintaining an innovative culture in an organization</td>
</tr>
<tr>
<td>Scientists</td>
<td>Researchers and theorists generating new ideas and knowledge for the development and implementation of innovative solutions</td>
</tr>
<tr>
<td>Market conditions</td>
<td>Dynamics of demand for innovative services and products, level of competition and market trends</td>
</tr>
<tr>
<td>External environment</td>
<td></td>
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<td>-------------------------------</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td>Domestic market</td>
<td>The size and potential of the domestic market for the implementation of innovative solutions, the presence of effective demand</td>
</tr>
<tr>
<td>Foreign market</td>
<td>Opportunities for entering foreign markets with innovative offers, level of global competition</td>
</tr>
<tr>
<td>Legislative and legal framework</td>
<td>Stability and transparency of legislation that protects intellectual property and stimulates innovation</td>
</tr>
<tr>
<td>Political and economic stability</td>
<td>Favorable political and economic climate that promotes investment in innovation and reduces business risks</td>
</tr>
<tr>
<td>Level of development of science and technology</td>
<td>Achievements in the field of fundamental and applied science, opening up new opportunities for innovative developments</td>
</tr>
</tbody>
</table>

In addition to the factors listed above, the innovative development of the hospitality industry is also influenced by a number of additional factors:

- culture of innovation: values and beliefs in the organization that encourage creativity, experimentation and the introduction of new ideas;
- partnership: cooperation between enterprises, scientific institutions and government bodies for the joint development and implementation of innovations;
- innovation ecosystems: the presence of a favorable environment for the development of innovation, including accelerators, incubators and venture funds;
- education and training: quality of training of specialists in the field of hospitality, capable of generating and implementing innovative solutions;
- digital technologies: the rapid development of digital technologies and their implementation in the hospitality industry, opening up new opportunities for innovation in customer service, process management and decision making.

The hospitality industry can not only surprise, but also shock with unusual ideas. The market's biggest players are investing in innovation and competing to develop products that could revolutionize the industry.

Processes related to innovation are aimed at establishing in full the results of research on a commercial basis to expand the list of products or services, improve their consumer characteristics, and develop innovative production technologies in order to strengthen the position of products in the market.

In Russia, at present, according to market experts, there is an innovative passivity of domestic enterprises - only 5-7% of enterprises are engaged in innovation, while the share of such enterprises in the USA and Japan is 75-80%. Domestic hotel enterprises are experiencing difficulties in introducing innovative technologies; the majority refuse to implement technologies altogether due to the high price.

The Rostov region is the very hospitable south of Russia, which will give you a lot of warmth, local color, gastronomic pleasures and a feeling of free wind on the big water. Cossack villages and wineries, merchant architecture and farmsteads, restaurants with farm products and authentic bazaars, landscape reserves and modern creative spaces coexist here. The Don region is rich in events and impressions. In the Rostov region, 416 classified collective accommodation facilities operate, including winners of the international awards World Luxury Hotel Awards, World Spa & Wellness Awards and representatives of international hotel brands Carlson Hospitality Worldwide, Accor Group, Hyatt International, Marriott International, Wyndham Worldwide, Ginza Project. The total capacity of the hotel fund is 10,826 rooms for 21,972 people.

Hotel enterprises operating in the “no stars” category account for 22.8% of the total structure of the hotel market. During peak season, the occupancy rate of accommodation
facilities in this category ranges from 85% to 90%, at other times it is 50-55%. The share of one-star hotels accounts for only 2%. During the season, the occupancy of two- and three-star hotels (accounting for 16.8% and 32.9% of the total volume, respectively) reaches 75-80% (in the off-season - 40-45%). Four-star hotels are 65-40% occupied during the season. 70%, and in the passive period – 35%. They occupy 21.5% of the total structure of the hotel market. Among the guests from Moscow and St. Petersburg in 2021-2022. The luxury segment was especially popular. Five-star hotels (Utkino, OldHouse) were filled with them from the moment it became possible to travel around the country until September. In addition to these complexes, such tourists are interested in chain hotels in the city (for example, Radisson) or those managed by a well-known company (like the GinzaProject Arka hotel). The occupancy of five-star hotels (4% of the total) in the season is about 65%, in the off-season period - 30-35%.

An innovative approach in the hotel business can be reduced to the use of not only progressive information technologies, but also a whole complex of innovations affecting all areas and areas of management (quality management, finance, personnel, etc.), and the most effective innovation policy of the enterprise will be in the case simultaneous introduction of various types of innovations.

Hotels in the city of Rostov-on-Don today are not just a means of accommodation, but modern enterprises with unique methods and technically advanced devices to provide a wide range of services. The enterprises themselves, of course, do not engage in innovative developments, but they are constantly improving through the use of the latest technologies and trends. The innovation policy of hotels is aimed at choosing from a variety of ideas, technologies and scientific achievements the highest priority for their commercialization, is focused on the development of the scientific and technical complex as a unique dynamic system with pronounced features, and is also aimed at the economic use of scientific and technical reserves, at strengthening internal connections in the scientific and technical complex, creating favorable conditions for an innovative climate, stimulating the attraction of funds from enterprises for the implementation of innovations. In addition, in conditions of competition for each guest, accommodation facilities are required to be active in the direction of technological improvement. Today, hotels use a sufficient number of the latest innovative computer technologies: global computer reservation systems, integrated communication networks, multimedia systems, contactless cards, QR codes and special applications, management information systems, etc. Assessing the innovative activities of hotels will determine the effectiveness of investments in innovations and innovative technologies necessary to create competitive advantages.

The list of innovations and innovative technologies used in hotel activities is presented in Table 2.

An assessment of innovation activity showed that in hotels most innovations are aimed at improving the quality of services provided, as well as expanding the methods of booking services through the introduction of technological innovations.

**Table 2. List of innovations and innovative technologies of hotels**

<table>
<thead>
<tr>
<th>№</th>
<th>Contents of innovation</th>
<th>Type of innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Installation of cable television. All-Russian, entertainment, sports, children's, etc. facilities are available to guests around the clock.</td>
<td>Technological</td>
</tr>
<tr>
<td>2</td>
<td>Installation of motion sensors on fire escapes and elevator halls for personnel.</td>
<td>Technological</td>
</tr>
<tr>
<td>3</td>
<td>Using key cards to control the opening and closing of the room.</td>
<td>Technological</td>
</tr>
<tr>
<td>4</td>
<td>Installation of modern vending machines. Now all guests can enjoy the taste of various types of natural bean coffee, hot chocolate, tea, snacks, etc. at any convenient time.</td>
<td>Technological</td>
</tr>
</tbody>
</table>
Automation and simplification of booking and accommodation of guests.

Installation of infomats in hotel lobbies - a touch-sensitive, customizable terminal, with which you can perform many daily tasks in the hotel: information kiosks with interactive control; advertising of additional services - restaurants, excursions, entertainment programs; allow you to receive feedback from visitors in the form of reviews, surveys, and votes.

Implementation of an electronic customer accounting program.

Introduction of new equipment designed for simultaneous interpretation during conferences with international participants.

Installation of a webcam in hotel lobbies and public places, broadcast to the Internet, in order to attract consumers.

Possibility of printing text from the room via a WI-FI printer.

Online booking. The hotel website allows guests to independently book a room in a few clicks. Using this service, the guest will be able to choose a room at his discretion based on price, service and additional wishes.

Using a QR code for quick and contactless guest check-in, you can also use QR codes to share hotel information digitally through guests' phones.

Installation of smart thermostats that allow guests to independently set the desired, comfortable temperature in the room.

In this case, modern information and communication capabilities are used most fully and effectively.

An assessment of the innovative activities of hotels revealed that the main share of innovative technologies falls on technological innovations (93 %), while marketing innovations account for only 7 %.

Enterprises are actively pursuing the process of simplifying the provision of both basic and additional hotel services and automating consumer registration. It is worth noting that the share of directly innovative services is extremely small. Enterprises themselves initiate little innovation. The main factors hindering the development and implementation of technological innovations are the high cost of innovation, lack of government support, as well as general economic risks. It is impossible not to note the lack of proper government policy in the field of stimulating the development and implementation of innovations.

4 Discussion

The hospitality industry contributes to creating conditions for sustainable economic growth, improving the quality of life of the population, ensuring balanced socio-economic development of regions and the country, as well as increasing human potential through expanding the range of hotel services, increasing jobs and income of the population.

Having caught on to new trends and traveler preferences, many hotels around the world have begun to introduce innovative technologies into their service processes. In a digital world where social distancing is increasingly emphasized, guests are looking for a fast, personalized and contactless experience.

The modern world of the hospitality industry is a mobile and constantly changing system, adopting innovations from all spheres of society. The trends that have been developing in the industry in recent years indicate that its further development will be carried out through the widespread introduction of innovative technologies. This process is significantly influenced by technological progress, the emergence and implementation of basic innovations (nanotechnology, information technology, etc.), and the widespread use of knowledge. The hotel market is actively moving into an online future; the industry has begun to actively use artificial intelligence to personalize the service for existing customers, as well as to interest...
a new young audience who are increasingly spending their lives online, with great pleasure resorting to the help of virtual assistants.

The hotel industry continues to develop rapidly, offering a wide range of innovative services and solutions. Every hotel has the potential to implement cutting-edge technology, but the key is to accurately identify the needs of the target audience. When introducing innovations, it is important not just to strive to increase profits, but to focus on meeting the needs of guests and creating the best conditions for their stay. Subject to these conditions, the introduction of innovations can attract new consumers, ensure the financial stability of the hotel industry and increase its competitiveness.

Assessing innovative activity makes it possible to formulate the growth capabilities of an enterprise in quantitative terms and provides the opportunity to manage its future formation, i.e. select the best directions based on resources and existing abilities.

Innovation in the hospitality industry plays an important role in the development of this area. They are aimed at creating new and improved hotel products, as well as developing new approaches to marketing and management using IT technologies. However, for the successful implementation of innovative ideas and the formation of an innovation strategy in the hotel industry, an effective innovation management system is required. Such a system must be flexible and adaptive to take into account the requirements and characteristics of the industry and market. It must ensure constant monitoring of changes in the industry and analysis of customer needs. Only in this way can key areas for innovation be identified and appropriate strategies developed.

5 Conclusions

To summarize, it should be noted that the hospitality industry can not only surprise, but also shock with unusual ideas. The market's biggest players are investing in innovation and competing to develop products that could revolutionize the industry. In the hospitality industry, innovation, innovation and new technologies are consistent with the industry and are very close in spirit. In the hospitality industry, one can observe trends in the active implementation of new technologies: digitalization, streaming, virtual reality, etc. The use of innovations and innovative technologies in the tourism and hospitality industry helps to improve the quality of services provided and improve service processes. Quality services attract the attention of consumers and make them want to use them again and again. In the current situation, innovation becomes the key to successful activity in any field.

Assessing the effectiveness of innovations in the hospitality industry is a complex process, since enterprises are faced with the problem of allocating limited resources, choosing optimal development options, coordinating ongoing internal processes, motivating staff, etc. When assessing the effectiveness of an innovation, it is necessary to pay attention first of all to the feasibility capital investment in innovation.

Hotels in the Rostov region today are not just accommodation facilities, but modern enterprises with unique methods and technically advanced devices to provide a wide range of services. The company itself does not engage in innovative developments, but they are constantly improving through the use of the latest technologies and trends. The innovation policy of hotels is aimed at choosing from a variety of ideas, technologies and scientific achievements that are the highest priority for their commercialization, creating favorable conditions for an innovative climate, and attracting funds for the implementation of innovations.

An increase in the number of accommodation facilities that use innovative technologies in their activities will contribute to the development of small businesses, which will affect the solution of important socio-economic problems of the Don region.
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