

DIGITAL TECHNOLOGIES AS A DRIVER OF CAPITALIZATION GROWTH IN SHOPPING AND ENTERTAINMENT CENTERS

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Abstract

The relevance of the chosen topic is confirmed by the increased competition among the participants of the commercial real estate market, which is connected with the market saturation. The study aims to assess the impact of modern digital technologies on the performance of a shopping and entertainment center. Research was conducted using the example of a retail and entertainment center in Saint-Petersburg. The work proposes a "smart" approach to management, where additional investments are taken into account when the digital infrastructure is being created. The research shows that the transition from a traditional business management to a "smart" variant of property object's development, based on the active use of digital technologies, leads to a significant increase in its capitalization, traffic, average bill and occupancy by tenants. The novelty of the following work is to justify the economic efficiency of the application of digital technologies` in retail based on the calculation of the retail and entertainment center`s capitalization value change under the influence of the implementation of automated accounting. The presented research can be used to develop a methodology for assessing the impact of the introduction of digital technologies on the efficiency of shopping and entertainment facilities.

Key words: *real property, digital technologies, "smart" approach to management, capitalization.*

JEL Classification: *R33, L85.*

Citation: Pupentsova, S., Alekseeva, N., Antoshkova, N., &Pshebel'skaya, L. (2022). Digital technologies as a driver of capitalization growth in shopping and entertainment centers. *Real Estate Management and Valuation*, 30(2), 47-60.

DOI: <https://doi.org/10.2478/remav-2022-0013>

1. Introduction

Digital transformation is the use of modern digital technologies (Reis et al., 2018) to drastically

increase the performance and value of the enterprises (Halik, 2019). Digital transformation is a modern trend of economic development throughout the world and a type of innovative development. Many types of economic activities are subject to digitalization, i.e.: industry, agriculture, transportation, construction, education, health care, the commercial sector and others. The implementation of digital technologies` in business activities can improve the quality of the offered goods and services, attract new customers, hasten business processes and procedures and raise companies' work efficiency.

In a competitive environment, companies specializing in various kinds of activities, including trading, are interested in such development. Analysis of the global experience of the digitalization of business processes in the retail real estate management sector (Voronova, 2020; Krasnyuk et al., 2020; Pirogova et al., 2020) allowed to identify the following technologies being introduced:

- infrared and ultrasonic counters are based on the principle of interrupting the infrared beam and the ultrasonic signal, respectively;
- thermal imaging counters identify visitors by heat radiation emanating from their bodies;
- laser counters use the principle of beam reflection from the human body);
- video surveillance systems with a built-in software module for counting visitors;
- an automated system for collecting tenants` sales (Sales Flow), based on connecting to tenants' cash registers and transmitting purchase data to the shopping center server through a cloud cash register;
- System Shopster, based on big data processing systems, Wi-Fi analytics and work with customer loyalty cards;
- innovative systems of face recognition and fixation of gender, age, frequency of visits, combined with the CRM (Customer Relationship Management) system of the retail outlet.

The retail point's CRM system helps operators control the work with the client and collect information about the client, as well as organizing and planning it. There are two types of CRM systems based on different technologies:

- The SaaS service of a service provider that provides online access to the system through a browser, client program or mobile application.
- Standalone - a licensed software product with the ability to be installed on its server and customized to its requirements.

The introduction of the presented digital technologies in the retail real estate management sector will allow companies to use the accumulated information about their clients to promote an object on the market, increase competitiveness, and, consequently, increase the object value. In this work, under the increase in the value of an enterprise, which, in our opinion, is the main criterion for the effectiveness of any investment, we mean the relative change in the value of the invested capital (object capitalization). The authors in (Shirokova et al., 2020) draw attention to the fact that the effectiveness of the introduction of digital technologies is achieved mainly by reducing the consumption of resources and increasing the volume of production. An additional effect of introducing digital technologies is the following qualitative indicators: time reduction of labor-intensive manual processes, increase of the level of customer satisfaction, provision of the availability of information for more efficient process management. The listed indicators will undoubtedly affect the value of the invested capital. Thus, we propose to consider the increase in invested capital value (an object capitalization) as the main criterion for the effectiveness of the implementation of digital technologies assessment. Based on the above-mentioned, we dare to assert that the digital technologies introduction in the rental business will lead to an increase in the occupancy rate of the facility by buyers and tenants which, in turn, will have an impact on an the capitalization increase of the retail and entertainment center.

The study aims to assess the impact of modern digital technologies on the performance of a shopping and entertainment center. The study is conducted on the example of a retail and shopping center. Within the context of the desired purpose, the introduction of the digital technologies into the management of the retail and entertainment center is shown. The forecast of attendance, the occupied areas and the average check of the property under consideration, taking into account the introduction of digital technologies in its business processes, are built.

2. Literature review

In his study (Forte, 2019), he points out the current challenges of the digital transformation that affect the need to change traditional retail real estate. Changes in consumer behavior under the influence of digitalization affect the need for the digitalization of the retail and entertainment centers in order to make them, as noted (Forte, 2019), more attractive for tenants and owners. Earlier, researchers (Lukiyanchuket al., 2020) had already drawn attention to the fact that, in the context of the digitalization of the economy, including retail, not only technological adaptation is required, but also the business processes of enterprise reorganization, which we have identified on the example of the retail and entertainment center the effectiveness of its activities.

Retail trade in consumer goods, a substantial part of which is located in the retail and entertainment centers, expects the participation of management companies of the following centers in the digital transformation of their business in regards to the identification and personalization of the customer base (Ozerov et al., 2018; Ullah et al., 2021). The identification and personalization of the a retailer's customers' base can become the basis for building optimal customer service models (Pupentsova & Livintsova, 2018), which, in turn, will increase the average check, the number of customers and the revenue growth, since the use of digital technologies can lead to the transformation of customers' experience with regards to their preferences (Mednikov et al., 2017). This will provoke an increase in customer traffic of retail and entertainment centers, a decrease in underoccupancy and, in turn, an increase in the capitalization of the real estate item (Babkin et al., 2017).

Our allegation of the possibility to increase the efficiency of retail center management by introducing digital technologies in its operation is based on previous studies by other authors. For example, research was conducted on Malaysian real estate (Low et al., 2020) which included a survey covering 279 properties. The results of the study revealed the need to promote the introduction of digital technologies in the real estate sector for its sustainable development.

The authors (Colicevet al., 2018) draw attention to the importance of using social networks in retail because of the intense competition for consumer attention among retailers, and the help that social networks provide in increasing sales. In our study, we will show that Hotspot social profile analytics, used as one of the measures to digitize the business processes of the shopping and entertainment complex in question, has improved the performance indicators of the property.

The authors (Gustafsson et al., 2019) point out that digital identification of customer needs can improve assortment planning, product development, and customer relationships. The studies carried out (Gustafsson et al., 2019) are of a conceptual nature which we develop, offering to evaluate the cost resulting from the introduction of digital technologies in the management of real estate.

The research (Barann et al., 2020) indicates consumer preference for digital technologies in their shopping, while (Lewis & Loker, 2017) show that retail store personnel sees great potential in the use of digital technology to improve the volume of sales. We develop and prove these studies about the revealed desire of both consumers and sellers by example, using quantitative indicators that affect the efficiency of the retail and entertainment center.

Construction and use of the optimal customer service models based on the digital technologies (Silkina & Dubgorn, 2017), along with the operation of energy-efficient real estate items (Alekseeva et al., 2019), are not a traditional approach to the management of retail and entertainment centers in Russia, and is currently referred to as the "smart management approach" (Ullahet et al., 2021). The relevance of the chosen study is confirmed by increased competition among the participants in the commercial real estate market in the post-crisis period.

3. Data and Methods

The analysis of the digital solutions used was carried out with the help of an integrated approach. In this case, we analyzed the effect of having applied several digital solutions that serve a common goal of offering the best consumer experience to the property visitors on a shopping and entertainment center. A separately implemented digital solution does not have sufficient practical value. It produces results only in conjunction with the other digital solutions to satisfy a common single goal. In this case, a synergistic effect arises from a complex application that gives the best results for real estate management. Due to the presence of the synergistic effect from the implementation of a combination of digital solutions in the shopping and entertainment center, the realization of a complex approach is justified. In this paper, we use a value-based approach to assess the effectiveness of the

implementation of digital technology in a shopping and entertainment center. The use of a cost approach for assessing efficiency is justified and informative when it comes to real estate (Ataguba, 2021; Florêncio & de Alencar, 2020). This study sees digital technologies that affect the revenue side of the budget of a property and do not affect its operation costs. The available data and the impact of the implemented technologies on cash flows determined the use of the income approach for analysis.

As indicators characterizing the income change from the introduction of digital technologies, the level of vacancies of space, the average bill of visitors, and the attendance of a shopping and entertainment center are used. The vacancy rate directly affects the effective gross income. The average bill of visitors and the attendance of a shopping and entertainment center will influence the rental rate size. The higher the flow of buyers, the more purchases will be made in the shopping and entertainment center and the greater the demand for retail space in the center among tenants will be. Therefore, the owner of the property will have the opportunity to raise the rent and increase its value. Thus, this set of indicators comprehensively characterizes the changes from the considered digital technologies introduced into the activities of the real estate object.

The listed indicators are obtained according to the data collected based on the analysis of 60 shopping and entertainment centers in Saint Petersburg. This value varies slightly from year to year, and is associated with the commission of new objects and the withdrawal of existing ones for reconstruction. By 2021 the number of shopping and entertainment centers in Saint Petersburg was 78, which makes the market data used very representative. There is no reliable data on digital technologies applied to increase revenues in the sample of the shopping and entertainment centers. Some of these properties are likely to use similar digital services. Some properties included will have a significant influence on minimizing the impact of such properties on the overall result.

The object of the study is a shopping and entertainment center located in St. Petersburg. The main characteristics of the real estate object required for analysis have been presented in Table 1.

Table 1

Technical and economic indicators of a shopping and entertainment center before and after the introduction of digital technologies

Indicator	Value
Total surface area, square meters	64 000
Rentable surface area, square meters	46 000
Tenant type	Anchor tenants: food, clothing and footwear, cosmetics, children's sporting goods shops. Entertainment: quests, simulations, sports arena Food & beverage: restaurants, cafes, food court
Distribution of occupied space by type of tenant:	
Anchor tenants	30%
Entertainment	20%
Food & beverage	6%
other	44%
Opening year	2014 year
Change of strategy	2017 year
Costs of realizing the digitalization	\$9 mln.
An average bill, \$	
Before the implementation of digital technologies	
2014	10.1
2015	12.9
2016	13.0
2017	13.2
An average check, \$	
After the implementation of digital technologies	
2018	14.0
2019	14.8
2020	15.4
Vacancies level	

Before the implementation of digital technologies	
2014	40%
2015	30%
2016	10%
2017	20%
Vacancies level	
After the implementation of digital technologies	
2018	11%
2019	1%
2020	0%
Attendance, thousands of people per year	
Before the implementation of digital technologies	
2014	1500
2015	3000
2016	4990
2017	5060
Attendance, thousands of people per year	
After the implementation of digital technologies	
2018	5570
2019	6250
2020	6950

Source: according to the managing company.

The advanced experience of the implementation of digital technologies for the development of business processes in the analyzed shopping and entertainment center is realized with the help of the unified customer data collection system. This system is used for informed decision-making in the field of management and marketing and consists of:

- An automated visitor counting system based on the principle of interrupting the infrared beam.
- An automated system for tenants sales collection (Sales Flow), based on connecting to tenants' cash registers and transmitting purchase data to the shopping center server. The Sales Flow system is compatible with software packages available on the Russian market: 1C, Shtrikh-M, UKM2, UKM4, Frontol, VERSIA-T, TP.NET, TradeX / POSX, UCS: GameKeeper, etc.
- Shopster systems based on big data processing systems, Wi-Fi analytics and work with customer loyalty cards.

The visitor counting system (Lukashevich et al., 2018) is a software and hardware complex, consisting of sensors, network equipment and software, that provides data on the number of people passing through a certain passage over a certain period of time. The Sales Flow system is an automated collection, uploading and sales processing of each tenant. Sales Flow system allows to collect the information on the average check, time and date of the transaction, a number of items in the sales check, an amount of sales checks and a sum of the transactions automatically. Shopster is the tracking of visitors with the help of Wi-Fi in their mobile phones, on-line communication with customers and analytics of social profiles. Hotspot is indoor navigation. Hotspot allows for the use online and offline marketing tools simultaneously, linking the customers' visits to the stores with their social media profiles. Customers' flows are studied in accordance with the collected data: routes, frequency of visits, time spent in the store. Moreover, the portrait of a typical customer is determined.

An element of the system is a single loyalty card issued to all customers. The loyalty cards are issued to tenants in the form of agency agreements. The loyalty cards of regular customers can be easily integrated into modern mobile applications and payment systems. Moreover, loyalty cards, whether physical or electronic, allow retailers to obtain information about a customer, his purchasing behavior, preferences and shopping repertoire.

Data processing takes place in the following areas:

- 1) Characteristics of the shopping and entertainment center visitors according to the following attributes:
 - sex;

- age;
 - marital status;
 - level of education;
 - an indicative level of income;
 - place of residence;
 - average time visitors spend in stores,
 - average bill,
 - the number of items in the bill,
 - the type of payment: cash or non-cash.
- 2) Characteristics of the shopping and entertainment center tenants according to the following attributes:
- revenue for the working period,
 - the number of visitors,
 - the number of bill,
 - the time and date of transactions,
 - the amount of the transaction,
 - offline and online sales,
 - additional indicators.
- 3) Analysis of ways of information dissemination. Machine learning systems also make it possible to describe how information is disseminated. Roles in the dissemination of information:
- a primary source;
 - a distributor;
 - a reader;
 - a leader of opinions.

Based on such unique customer knowledge, it is possible to conduct a quantitative and next - qualitative analysis of the customer profile as well as form targeted offers for each customer segment. Choosing the target buyer and target audience for the entire business is a classic characteristic of category management, but targeting customers within the target audience is a new word in loyalty programs, which allows for making unique personal offers to customers, increasing the value of the offers of the trading platform as a whole for them. Relevant customer segmentation lets marketplaces increase the share of loyal customers and prevent a drop in traffic among buyers who are at risk of switching.

Thus, the digital technologies considered in the paper influence the visitors' loyalty. An increase in the petitioners' loyalty leads to greater shopping and entertainment facility attendance, the demand for its premises by tenants and an increase in rental income due to the increased demand from tenants.

The formulas presented below allow us to assess the impact of the digital technologies used at the level of the capitalization of the investigated real estate object. For a comprehensive assessment of the effectiveness of the introduction digital technologies in a shopping and entertainment center, we suggest using the following indicators:

1) *An increase in the size of the real estate object's capitalization under the influence of changes in the level of vacancies*

The impact change on the vacancy index on the object's capitalization value is determined on the basis of the following formula:

$$\Delta V_v = \frac{A(1 - K_v)(1 - K_{oe}) / R_o}{A(1 - K_{v0})(1 - K_{oe}) / R_o} - 1 = \frac{(1 - K_v)}{(1 - K_{v0})} - 1, \quad (1)$$

where:

- ΔV_v - a change in the shopping and entertainment property capitalization size under the influence of a change in the level of vacancy size of the estate property object's capitalization;
- A - rent for an object (or potential gross income);
- K_v - a vacancy rate when implementing digital technologies;
- K_{oe} - an average market ratio of operating expenses;
- R_o - an average market capitalization ratio;

K_{v0} – a vacancy rate without the introduction of digital technologies.

The resulting increase in the size of the capitalization of a real estate object under the influence of changes in the level of vacancies is proposed to be used to justify the minimum level of capitalization, since the amount of capitalization will be significantly affected by the amount of rent received by the management company.

It is proposed that the increase in the capitalization of a real estate object be calculated based on equations (2) and (3) obtained by Colliers specialists (Colliers, 2021) as a result of the statistical processing of facts on 10 analyzed shopping and entertainment centers in Saint Petersburg presented in the company's report prepared by order of the owner of the shopping and entertainment center under study:

$$Vc = 44 \times C + 656 \quad (2)$$

Vc – size of the estate property object's capitalization influenced by the average bill;

C – value of the average bill for a retail and entertainment property.

$$Va = 438 \times \ln(A) - 2558 \quad (3)$$

Va – size of the estate property object's capitalization influenced by the attendance;

A – attendance at a retail and entertainment property.

The assessment of the effectiveness of the introduction of modern digital technologies with additional parameters of the cost approach will be expanded:

2) *The increase in real estate object capitalization under the influence of an increase in the average check is determined by the formula:*

$$\Delta Vc = \frac{44 \times (C - C_0)}{44 \times C_0 + 656} \quad (4)$$

ΔVc – a change in the size of a retail and entertainment property capitalization under the influence of an increase in the average check;

C – a value of the average bill with the introduction of in digital technologies;

C_0 – a value of the average bill without the introduction of digital technologies.

3) *The increase in the real estate object capitalization under the influence of an increase in traffic to a real estate object is determined by the formula:*

$$\Delta Vt = \frac{438 \times (\ln(T) - \ln(T_0))}{438 \times \ln(T_0) - 2558} \quad (5)$$

ΔVa – a change in the size of the real estate object capitalization under the influence of an increase in attendance of the real estate object;

A – attendance of a real estate object attendance after the implementation of digital technologies;

A_0 – real estate object attendance without the introduction of digital technologies

The effectiveness of the implementation of digital technologies (E) is determined by the formula:

$$E = \frac{V - V_0}{Inv} - 1 \quad (6)$$

V – the size of the real estate object capitalization with the introduction of digital technologies;

V_0 – real estate object capitalization without the introduction of digital technologies;

Inv – investment amount in the implementation of digital technologies.

Retrospective indicators of retail and entertainment center's work are shown in the following study. Retrospective data on the object under study were obtained based on interviews with representatives of the managing company. Forecast indicators were obtained with the help of induction and deduction methods, as well as using the mathematical apparatus described above.

4. Empirical results

The shopping and entertainment center was opened in 2014. Its attendance had been increasing annually for three years. In 2017, the managing company noticed the stabilization of the attendance indicator. The attendance value achieved at the end of 2016 did not suit the property owner. Therefore, in 2017, after receiving signs of stagnation in attendance, a decision was made to change the strategy. The strategy change was successful, as evidenced by the growth in traffic in 2018, and especially in 2019 and 2020

The retail and entertainment center`s attendance, after its opening, is presented in Figure 1.

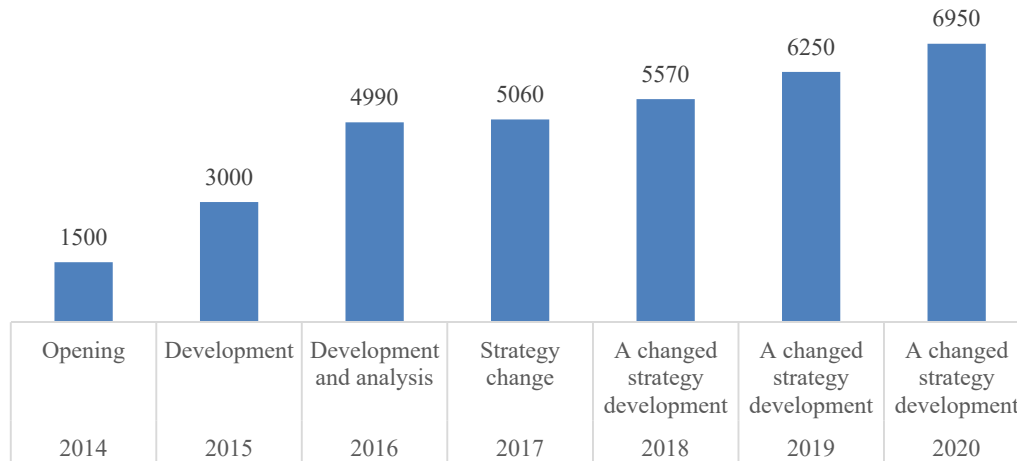


Fig. 1. Retail and entertainment center`s attendance, number of people per year. *Source:* information from the managing company and own study.

In the first year of opening the shopping and entertainment centers, the level of vacancies for tenants was sufficient when compared to the normal level for newly commissioned facilities. In 2015 and 2016, the vacancy rate decreased, but never reached the city average. The tenants began to react to the stagnation of site attendance and began to terminate leases. Because of this, the vacancy rate increased in 2017. The consequences of the change in the development strategy of the shopping and entertainment center were reflected only in 2018. It was in this year that the level of vacancies in space decreased. And, since 2019, the occupancy rate of the property by tenants has become higher than the market average.

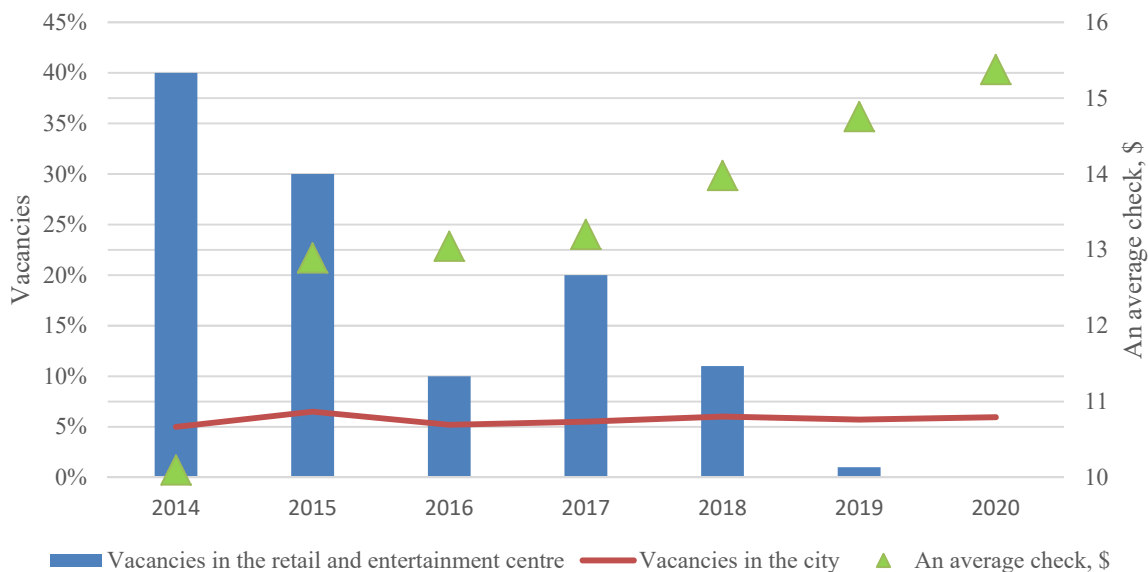


Fig. 2. Retrospective indicators of a retail and entertainment centre`s work. *Source:* information from the management company and own study.

The average check for one purchase in 2014, according to the managing company, was \$ 10.1 and increased by 28% in 2015. A significant increase in indicators that determine the income of a property is typical for the stage of development of a shopping and entertainment center. Therefore, we regard this growth as normal. Over the next two years, the average check tended to grow slightly, most likely due to inflation in the consumer goods market. However, after the change in the development strategy of the real estate object, the average check once again showed a significant increase in its value.

Retrospective retail and entertainment center's occupancy indicators as well as the average bill are presented in Figure 2.

In our study, the period from 2014 to 2020 is taken as a retrospective. In this period, we operate with actual data on the indicators that affect the income from the property object. The study aims to build a forecast for the next three years, i.e. 2021-2023.

Taking into account the retrospective data, the forecast indicators of the retail and entertainment center's development were built by using digital technologies and without using them. The results of the following forecasts are presented in Figures 3 and 4.

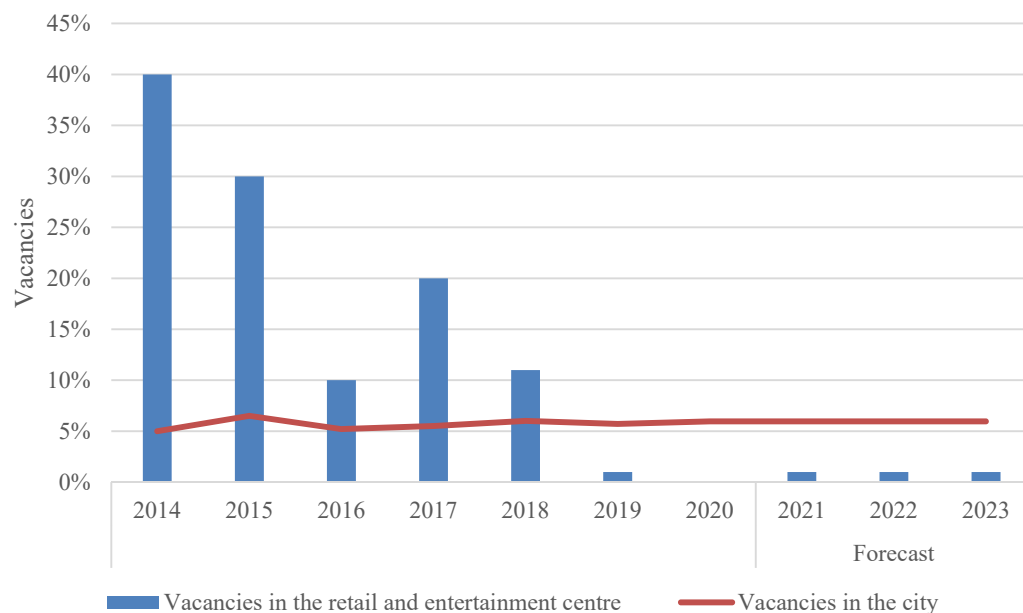


Fig. 3. Forecast indicators of the premises' vacancy of the retail and entertainment center. *Source:* information from the management company and own study.

In 2019 the level of vacancies in the object under study was 0%, and, in 2020, it was 1%. For further forecasting, we consider it necessary to take into account the minimum rotation of tenants associated with the conduct of their business and determine if the value of the level of vacancies equals 1%.

The non-digitized job rate forecast was based on the city's vacancy rates for stable shopping and entertainment centers. This indicator is quite stable and equals 6%.

The level of attendance at the investigated shopping and entertainment center experienced stagnation in 2016-2017. The increase in this indicator was achieved through the introduction of digital technologies. In this regard, the forecast of the attendance of the object under study without the use of digital technologies is predicted at the level of the average value of the levels of 2016 and 2017.

During the digitalization period of the object, the attendance growth was about 10% per year. Based on the presented data, a forecast was made for attendance growth in 2021-2023 at a rate of 10% per year. The maximum amount of the retail and entertainment center's attendance is determined on the grounds of the project information on the real estate property object and amounts to 8,400,000 people per year. According to the forecasts, the object will reach the maximum possible attendance rates in 2022, on which basis the forecast period will be completed in 2023.

The forecast for the average bill growth under the traditional management of the property object is determined by the food price index. The forecast for the average ticket growth with a smart approach is determined based on the analysis of the average ticket growth rate during the period of

digitalization. In doing so, we proceeded from the assumption that the growth rate would gradually decrease.

The results of the following forecasts are presented in Figure 4.

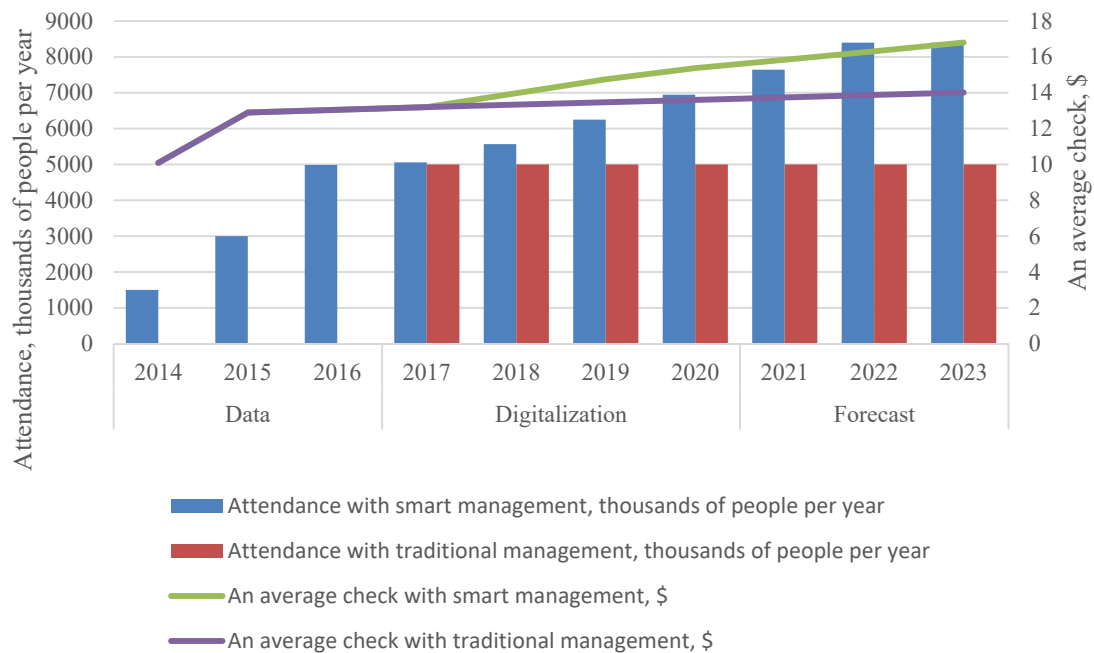


Fig. 4. Forecast indicators of retail and entertainment center's attendance and its average check.

Source: own study.

On the basis of the compiled forecasts, it can be noted that digitalization increases the financial performance of the retail and entertainment center's management (Table 2).

Table 2

Key performance indicators of the shopping and entertainment center in 2023

Indicator	Traditional management approach	«Smart» management approach	Impact on object's capitalization	Calculation of impact on object's capitalization by the formula
Vacancy rate	6%	1%	5%	(1)
Size of the estate property object's capitalization under the average bill impact, \$/m ²	1 276	1 400	10%	(2)
Size of the estate property object's capitalization under the attendance impact, \$/m ²	1 175	1 403	19%	(3)
Average check, \$	14.0	16.8	10%	(4)
Attendance, thousands of people	5000	8400	19%	(5)
Average value of the real estate object capitalization, \$/m ²	1 226	1 402	14%	average by (2) and (3)

Source: own study.

The required investments in the implementation of digitalization are estimated at \$ 9 million (\$ 141 per sq. m.). The size of the real estate object's capitalization with the introduction of digital technologies is \$ 1402 per sq. m. If the indicators presented in Table 2, are reached in 2023, the capitalization of the retail and entertainment center may increase by 14%. The efficiency from the introduction of digital technologies will be 25% $((1420-1226)/141 - 1)$.

To assess the effectiveness of the concentrated marketing component in the use of digital technologies, it is useful to compare the planned indicators without taking into account the influence of the impact with the achieved numbers (according to the selected criterion). For the object under study in 2023:

- the vacancy rate for the introduction of digital technologies was 1%, which is 5% lower than the indicator determined without taking into account the influence of the impact;
- the average check for the introduction of digital technologies was \$16.8, which is 20% higher than the indicator determined without taking into account the influence of the impact.
- the facility attendance with the introduction of digital technologies was 8,400,000 people per year, which is 68% higher than the indicator determined without taking into account the influence of the impact.

The amount of space vacancy, its attendance and the average check are the key indicators that affect the value of the object's capitalization. The calculation was made according to the Formula 1, showing that a change in the level of vacancies from 6% to 1% would have a 5% impact on the value of the property object. It was determined that an increase in the average check from \$14.0 to \$16.8 would increase the cost of the object by 10% (Formula 4). Calculations made on the basis of Formula 5 showed that the retail facility's increase in attendance from 5,000,000 people per year to 8,400,000 people per year would lead to an increase in the object's capitalization by 19%. Considering the necessary investments into the visitors counting systems, Sales Flow and shopster installation, the object's capitalization can be increased by 14%.

5. Discussion and conclusions

Figure 1 shows the stages of the management's life cycle of the retail and entertainment center since its opening in 2014. The growth of the visitor attendance rate (Figure 1), as well as the decrease in the vacancy indicator of the proposed rental space, is typical for the reopened retail facility. However, by the end of 2016-2017, an analysis of the key performance indicators had shown that, taking into account the retail market saturation in Saint-Petersburg, as well as the low purchasing power of the population, the real estate object could not bring the expected income to its owner without making strategic decisions about its future management and development. Therefore, a number of measures were proposed by a management company to digitalize the business processes of the retail and entertainment center (Borremans et al., 2019).

In 2017, the management company initiated the implementation of the described tools, which resulted in a loss of the object's attendance rate (Figure 1) and an increase in space vacancy (Figure 2). Furthermore, investments in the deployment of new systems amounted to about \$9 million.

Nevertheless, the attendance and the average check have been growing since 2018, and the space vacancy rate has been decreasing (Fejling et al., 2019). In 2020, the space vacancy amounted to 0%, with an average of 6% throughout the city (Figure 2). The average check has been growing by 10-12% a year (Figure 2), which is ahead of the consumer price indices of non-food products in Saint-Petersburg. The object's attendance began to grow (Figure 1), which was impossible to achieve without a change in the retail and entertainment center's management strategy.

With reference to the indicators achieved by the management company over the period of 2018-2020, a forecast of the key indicators of the retail and entertainment center's development was prepared up to the year 2023, represented in Figure 3 and Figure 4.

It is shown in the work that the transition to automated digital construction, managed by intelligent systems in real time, is a modern trend in the development of not only production enterprises, but also service enterprises. The implementation of digital technologies described in the work, in the retail and entertainment center's management, allows to manage the process in constant interaction with the external environment that goes beyond the boundaries of a single enterprise. Herewith, the profitability of retail and entertainment center tenants increases due to the growth in the number of customers and the average bill. The capitalization of the property is growing due to a

decreased level of vacancies in the premises, as well as increased attendance and average bill value). Using the example of a retail and entertainment center operating in Saint-Petersburg, it is shown that the capitalization growth of the property object can be up to 14%.

The authors understand that the indicators for assessing the effectiveness of the implementation of modern digital technologies (Formulas 1, 4, 5) proposed in the work do not fully take into account spatial analysis, and the additional effect of concentrated marketing is a qualitative change in the flows of the shopping center (including a reduction in the time of labor-intensive manual processes, increase in the level of customer loyalty, impact on the motivation of potential customers, formation of stable associations, and the ability to attract attention and ensure the availability of information for more effective process management). To assess the effectiveness of such tasks: interview methods, questionnaires, observations, experiments (in a focus group) and testing are used, which is one of the areas of further research.

It should be noted that the obtained indicators are applicable only for the considered object. Their value will be influenced by the quality of implementation of the considered digital technologies and their management. However, the presented results show that use of the digital technologies in the management of shopping and entertainment centers can increase work efficiency. From the performed literature review, it can be concluded that there is still no practical and universal methodology to assess the economic efficiency of digital technologies. In addition, there are no simple and explicit models that are suitable for assessing the effectiveness of using each technology separately. In connection with this, the presented study is relevant and can be used to develop a methodology to assess the impact of the introduction of digital technologies on the efficiency of shopping and entertainment facilities. The study may be interesting for practicing professionals in the field of real estate management.

Further development of the presented study consists of building a simulation model for assessing the effectiveness of innovative face recognition systems the share of different genders and age groups and frequency of visits combined with the retail outlet's CRM system.

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