Comparative analysis of digital services and their impact on the trade segment development

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Abstract. Modern technologies have penetrated into all spheres of human life. At the same time, digital technologies continue to develop at a rapid pace, some areas of activity have achieved high rates in the introduction and application of modern technologies. Digital platforms can be used by all participants in the real estate market. Services are actively used and developed that simplify the interaction between the developer, the buyer and banks, constructors to strengthen developers' websites, technologies for construction and real estate management, services for appraising an apartment, obtaining a mortgage, legal support, checking debts, encumbrances and history of an apartment, tools for remote demonstration of objects .The ability to use, compare, choose the most appropriate service for a specific request is relevant in modern conditions. The aim of the work is to compare digital services in the field of real estate and make a forecast for the development of the retail segment. The work used the method of comparing the characteristics of the objects of study, correlation and regression analysis. As a result of the study, a sales price forecast for the retail segment was determined and the most informative digital platform in the real estate industry was identified. Keywords: digital platforms, commercial real estate, advantages of digital platforms, correlation and regression analysis, modern technologies

1 Introduction

Digital services have firmly entered the lives of both real estate market professionals and ordinary people interested in real estate. There are highly specialized services such as Getlooky, a platform for renting commercial real estate in Moscow and St. Petersburg, and there are well-known ones like Avito. Next, we will consider two well-known real estate selection services in Russia, Cyan and DomClick.

CIAN is a professional high-tech real estate service in Russia. The company contributes to the development of the real estate market and provides professionals with a set of tools and services:
– to find clients;
– for advertising objects;
– to assess the liquidity of objects and predict the timing of exposure;

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– to automate the promotion of ads;

– to analyze the effectiveness of advertising.

Position of Cyan among real estate services:

– No. 1 in terms of efficiency in terms of the share of targeted requests.

– No. 1 in recognition.

– No. 1 in the number of ads.

– Included in the TOP-10 real estate services in the world by the number of users in the SimilarGroup rating as of September 1, 2021.

– Leader in the number of actual ads in Russia according to the MASMI Russia study, March-April 2022

– 13th place in the ranking of the most valuable companies of Runet for 2022 according to Forbes.

Cyan's audience is 19.2 million unique visitors per month. 1.7 million ads for the sale and rental of real estate. The service operates in 85 regions of Russia. Cian's audience has increased 7.7 times since 2015.

According to Bojole Research's monthly tracking data for January 2022, 8 out of 10 people in St. Petersburg use Cyan when looking for housing.

Cyan service filters for commercial real estate are represented by the following objects: office, retail space, warehouse, free-use premises, public catering, production, ready-made business, building, personal services, commercial land. It should be noted that the Cyan service does not have a filter for the "hotel" or "hotel" segment.

DomClick is an electronic service created by Sberbank Real Estate Center LLC to simplify the procedure for obtaining a mortgage loan.

Online it is possible to apply for a mortgage, refinancing and reducing the percentage of an existing loan; it is possible to pre-calculate the cost of the loan using a mortgage calculator. You can also choose an apartment in the primary and secondary markets, order an extract from the USRN, apply for electronic registration of the transaction. These functions are available to persons from the personal account. Since the service was developed by Sberbank, customers of this bank can log into their personal account on DomClick using SberID. DomClick service filters for commercial real estate are represented by the following objects: office, retail space, warehouse, free-use premises, catering premises, production, commercial land, hotel. A comparison of these services is presented in Table 1.

Due to the fact that Cian has a slight advantage in points, and also ranks first in the number of listings and is the most popular service for finding real estate in Russia, further analysis of the commercial real estate market will be based on the data of this portal

Table 1. A comparison of digital services.

Functions provided by digital services	Availability of an existing function on the site (+/-)	
	Cyan	DomClick
Information on buying and selling residential real estate	+	+
Information on buying and selling commercial real estate	+	+
Availability of a catalog of new buildings	+	+
Residential real estate appraisal	+	+
Availability of realtor selection	+	+
Mortgage calculator	+	+
Real Estate Verification	+	+
Market analytics, statistical data	+	+
Information on overseas property	-	-
Magazines, articles	+	+
Updates on new property types	+	-
Total (+):	10	9

2 Materials and Methods

We will analyze the commercial segment based on digital services

Table 2 presents the results of a study of the supply volumes of the services under consideration. As you can see, most often the largest values in terms of the volume of offers were provided by the Cyan service. This service can be called the most informative, but there is still a segment where other digital platforms are needed.

Table 2. The analysis results of the digital services information content comparison on the example of the commercial segment.

Commercial real estate	Highest ad value by market, sale	The service that showed the highest value by the number of ads	Highest ad value by market, rent	The service that showed the highest value by the number of ads
Offices	1544	Cyan	8022	Cyan
Retail space	5445	Cyan	2098	Cyan
Warehouses	294	Cyan	1206	Domofond.ru
Production	234	Cyan	526	Cyan
Free-use premises	6794	Cyan	2557	Cyan
Hotel	115	Domofond.ru	31	Domofond.ru

As for the commercial real estate market as a whole, it can be seen that rents over sales by segments: offices, warehouses and manufacturing. In the segments of hotels, PSN and retail space, the situation is reversed. The largest volume of proposals for sale is characteristic of free-use real estate, followed by retail space, and the smallest number of proposals for hotels. In terms of rent, the highest value of offers is typical for office premises, the lowest for hotels.

Let's analyze the structure of the rental market and the sale of offers by segments of commercial real estate according to the digital services Cyan (Figures 1 and 2) and Domofond.ru (Figures 3 and 4).

In the structure of the commercial real estate rental market, according to Cian, offices (46.4%) predominate, followed by vacant premises (19.3%) and retail space (16.0%), the least supply of commercial land (0.8%). The structure of the commercial real estate market

is dominated by PSN (31.9%), retail space (25%) and ready-made business (19.5%), the smallest number of offers is for commercial land (0.9%).

According to Domofond.ru, the structure of the commercial real estate rental market is dominated by offices (52.1%), followed by shops (25.2%) and warehouses (14.9%), with the least number of offers for hotels (0.4%). Shops (43.6%), offices (34.1%) and hotels (8.0%) prevail in the structure of the commercial real estate market, the least of all proposals for production (3.5%).
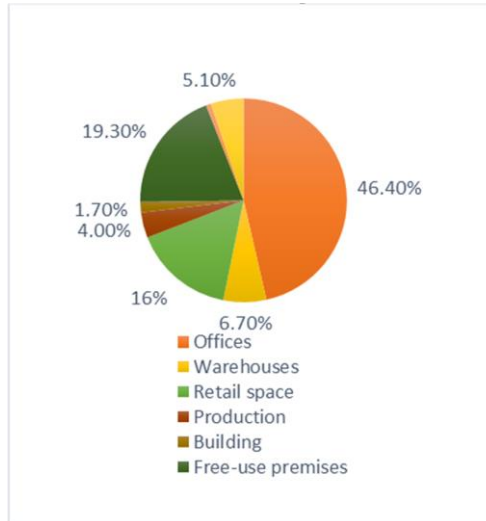
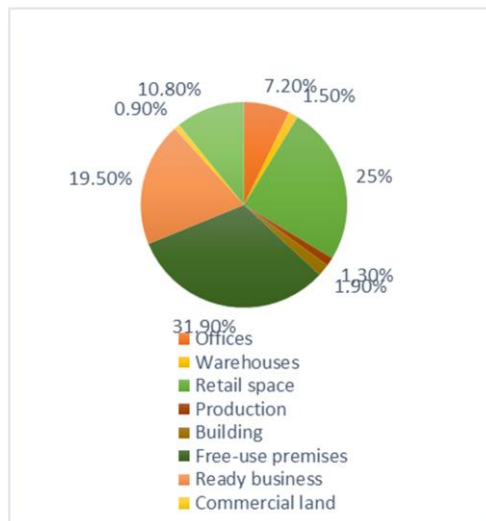**Fig. 1.** Cyan rental market structure.
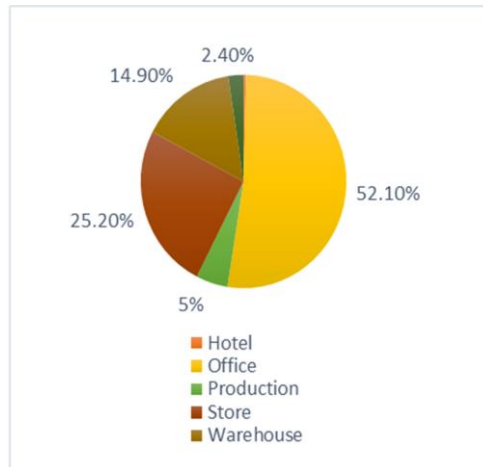

Fig. 2. Cyan sale market structure.

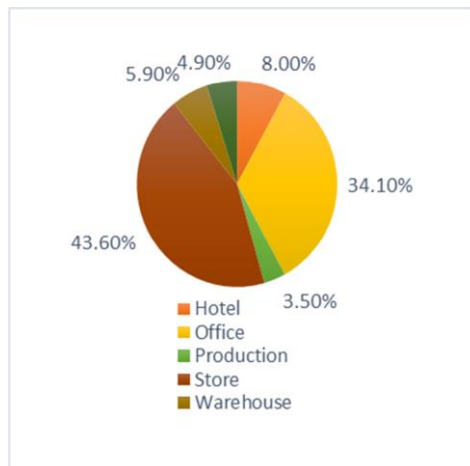**Fig. 3.** Domofond.ru rental market structure.

Fig. 4. Domofond.ru sale market structure.

Let us determine the average market prices for the sale and lease of the main types of commercial real estate according to the digital services Cyan and Domofond.ru (Figures 5 and 6).

According to Cyan, the highest average market value of commercial real estate is in factories (23.8 million rubles), followed by offices (21.3 million rubles) and warehouses (18 million rubles), free-use premises cost the least (4 .8 million rubles). According to Domofond.ru, hotels have the highest average market value (43.5 million rubles), followed by warehouses (18 million rubles) and production (17.9 million rubles), retail space costs the least (15.5 million rubles)

According to Cyan, the highest average rental rate for commercial real estate is in production (225.302 rubles per month), followed by retail space (199.733 rubles per month), and warehouses (170.917 rubles per month), the lowest office rental rate (146.918 rubles per month). According to Domofond.ru, the highest average rental rate in the market is for factories (234.836 rubles per month), followed by warehouses (190.263 rubles per month) and retail space (176.265 rubles per month), the lowest rental rate for hotels (69.386 per month).
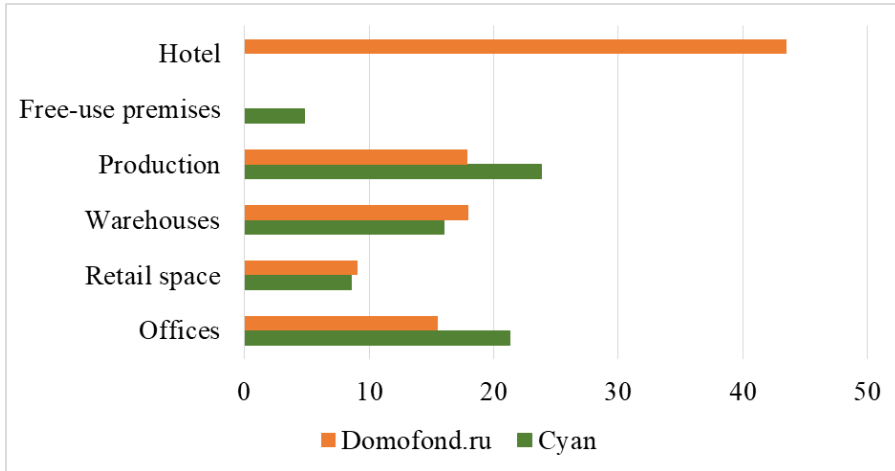
Fig. 5. Average market value of objects for sale according to digital services Cyan and Domofond.ru (in million rubles).
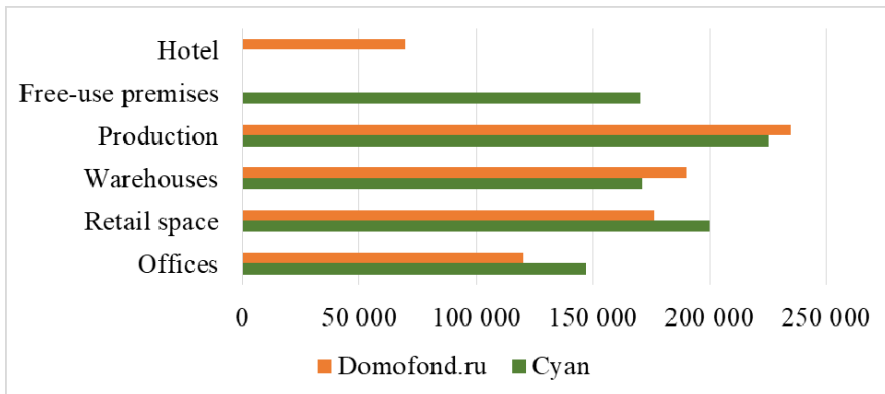

Fig. 6. Average market value of rental objects according to digital services Cyan and Domofond.ru (rubles per month).

Let's consider the data of digital services Cyan and Domofond.ru for the districts of St. Petersburg for the main types of commercial real estate (Table 3)

Further, an analysis was carried out of the announcements presented on Tsian in the context of the districts of St. Petersburg. Figure 7 shows the structure of the offer for the lease of commercial real estate. The largest number of advertisements for the lease of premises in this real estate segment is located in the Central, Primorsky and Vyborgsky districts.

Table 3. Consider the data of digital services Cyan and Domofond.ru by districts of St. Petersburg.

District	Dominant type of commercial property			
	Cyan		Domofond.ru	
	Rent	**Sale**	**Rent**	**Sale**
Admiralteisky	Retail space	Offices	Retail space	Retail space
Vasileostrovskiy	Offices	Offices	Offices	Hotel
Vyborgsky	Free-use premises	Retail space	Offices	Retail space
Kalininsky	Retail space	Free-use premises	Warehouses	Retail space
Kirovsky	Free-use premises	Warehouses	Warehouses	Production
Kolpinsky	Warehouses	Warehouses	Production	Warehouses
Krasnogvardeisky	Warehouses	Free-use premises	Retail space	Warehouses
Krasnoselsky	Free-use premises	Retail space	Warehouses	Warehouses
Kronstadt	Free-use premises	Offices	Offices	Production
Kurortniy	Warehouses	Free-use premises	Warehouses	Production
Moscovsky	Warehouses	Free-use premises	Warehouses	Warehouses
Nevsky	Retail space	Offices	Hotel	Retail space
Petrogradsky	Offices	Retail space	Retail space	Offices
Petrodvorets	Production	Retail space	Production	Warehouses
Primorsky	Offices	Free-use premises	Retail space	Retail space
Pushkinsky	Warehouses	Production	Warehouses	Production
Frunzensky	Free-use premises	Warehouses	Retail space	Offices
Central	Offices	Retail space	Retail space	Offices

It can be seen from the figure that the largest distribution of retail real estate is observed in the central districts of the city.
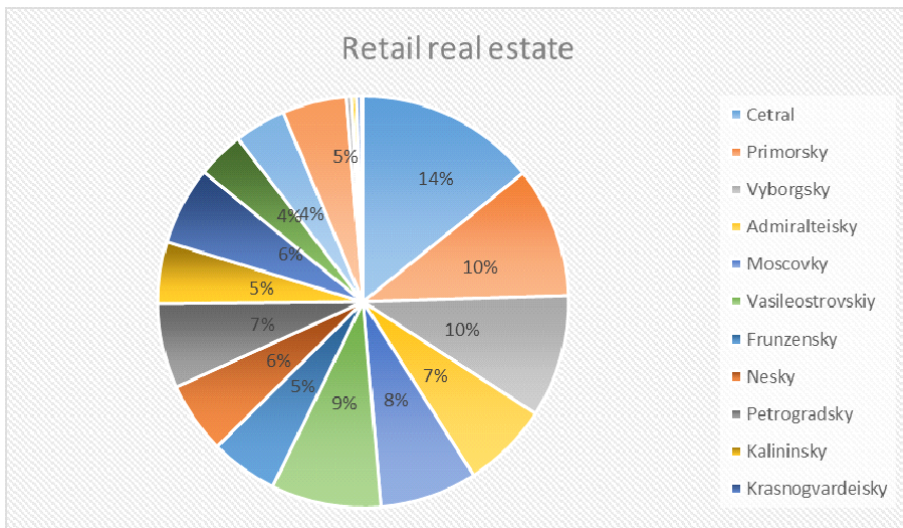

Fig. 7. Supply in the retail real estate rental market by district.

3 Results and Discussion

Based on a comparative analysis of digital platforms, we will conduct a correlation-regression analysis.

Using correlation-regression analysis, we predict the average selling price of 1 sq. m. m. of the retail segment in the context of commercial real estate. We take the graph of its dynamics as a basis (Figure 8). Calculations are presented in table 4. Figure 9 shows the dynamics of the average sale price of 1 sq. m. m. for the retail segment of commercial real estate, taking into account the forecast for the 2nd half of 2022, 2023 and 2024.
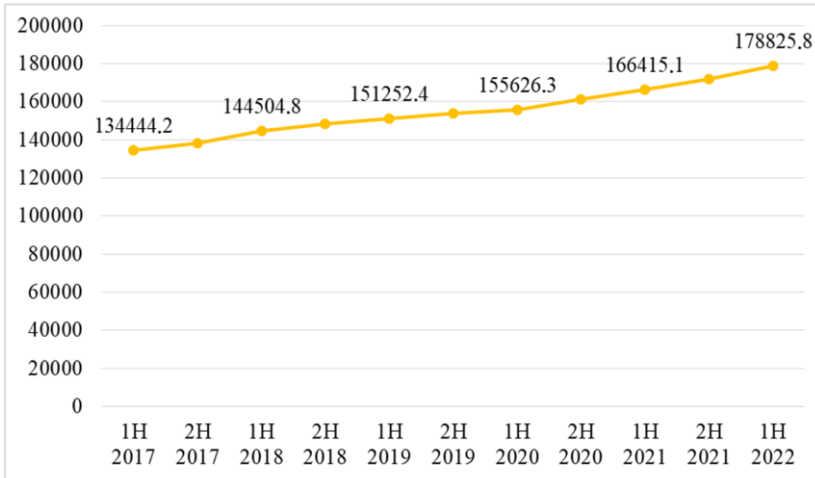

Fig. 8. Dynamics of the average sale price of 1 sq. m. m. by trade segment.

Table 4. Calculation table of the regression equation (trade, rub.).

Period	n	x	y	xy	x^2	y^2
1H 2017	1	-5	134444.2	-672221.0	25	18075242913.6
2H 2017	2	-4	138042.6	-552170.4	16	19055759414.8
1H 2018	3	-3	144504.8	-433514.4	9	20881637223.0
2H 2018	4	-2	148501.1	-297002.2	4	22052576701.2
1H 2019	5	-1	151252.4	-151252.4	1	22877288505.8
2H 2019	6	0	153747.3	0.0	0	23638232257.3
1H 2020	7	1	155626.3	155626.3	1	24219545251.7
2H 2020	8	2	161143.2	322286.4	4	25967130906.2
1H 2021	9	3	166415.1	499245.3	9	27693985508.0
2H 2021	10	4	171849.2	687396.8	16	29532147540.6
1H 2022	11	5	178825.8	894129.0	25	31978666745.6
Total	66	0	1704352.0	452523.4	110,0	265972212967.9

Solving the system of normal equations, we have the coefficients a = 15823.5; b = 4113.8, from which follows the regression equation:

$$y=15823.5*x+4113.8. \qquad (1)$$

The coefficient of determination is R = 62.54%. Average sales price forecast for 1 sq.m. m of retail property for 2H 2022, 2023 and 2024 presented below:

2H 2022 = 15823.5 * 12 + 4113.8 = 193995.8 rub per sq.m.
1H 2023 = 15823.5 * 13 + 4113.8 = 209819.3 rub per sq.m.
2H 2023 = 15823.5 * 14+ 4113.8 = 225642.8 rub per sq.m.
1H 2024 = 15823.5 * 15 + 4113.8 = 241466.3 rub per sq.m.
2H 2024 = 15823.5 * 16 + 4113.8 = 257289.8 rub per sq.m.
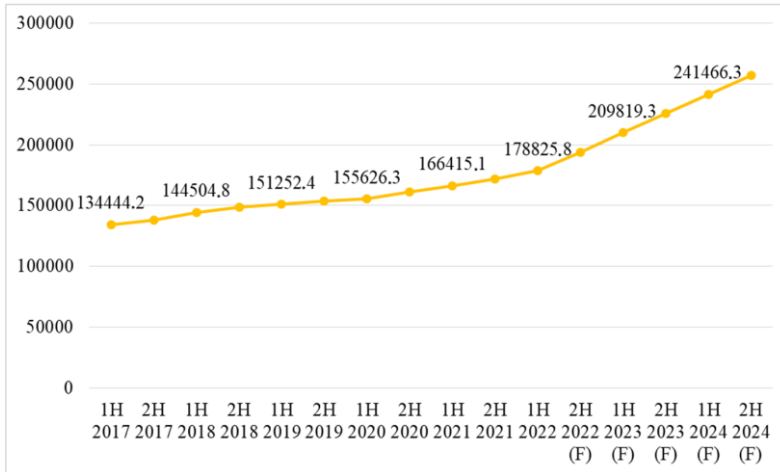

Fig. 9. Dynamics of the average sale price of 1 sq. m. m. for the retail segment, taking into account the forecast for the 2nd half of 2022, 2023 and 2024.

Forecasted using a correlation-regression model, the average selling price of 1 sq. m. for the retail segment of commercial real estate will be: for the 2nd half of 2022 193995.8 rubles. per sq. m., in the 1st and 2nd half of 2023 – 209819.3 and 225642.8 rubles per sq. m., respectively, in the 1st and 2nd half of 2024 – 241466.3 and 257289.8 rubles per sq. m., respectively

4 Conclusion

Thus, digital platforms are actively used by many real estate market participants for various purposes. Cyan is a professional high-tech real estate service in Russia. The company contributes to the development of the real estate market and provides professionals with a set of tools and services: to find clients; for advertising objects; to assess the liquidity of objects and predict the timing of exposure; to automate the promotion of ads; to analyze the effectiveness of advertising. Commercial real estate service filters are represented by the following objects: office, retail space, warehouse, free-use premises, public catering, production, car service, ready-made business, building, personal services, commercial land. It should be noted that the Cyan service does not have a filter for the "hotel" or "hotel" segment. Domofond.ru - a simple platform for finding real estate in Russia is easier. Platform priorities: fast and convenient search; continuous technological development; quality, completeness and relevance of the database; real estate price analysis; wide geographical coverage throughout Russia; a large selection of new buildings and secondary housing. Commercial real estate service filters are represented by the following objects: hotel, office, production, shop, warehouse, public catering. It should be noted that the Domofond.ru service does not have a filter for the "free-use objects" segment.

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