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AN EVALUATION OF THE REAL ESTATE MARKET DEVELOPMENT WITH A SPECIAL CONSIDERATION OF THE BUILDING PROCESS STAGE

OCENA POTENCJAŁU ROZWOJU RYNKU MIESZKANIOWEGO ZE SZCZEGÓLNYM UWZGLĘDNIENIEM ETAPÓW PROCESU BUDOWLANEGO

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Summary: In this article the author attempts to define, parameterize, evaluate and conduct a synthetic analysis of development potential in the area of the regional real estate market. The scope of analysis was defined according to the methodology of real estate quantification accepted by the Central Statistical Office. The Central Statistical Office in defining the process of the real estate market distinguished four research areas. These are the following: planning permissions which were issued, apartments which are under construction, apartments put into use and sales of building-assembly production executed by construction companies. The conducted research enables to evaluate the development of particular provinces in the area of the real estate market. The above mentioned evaluation, which depicts the potential of the regional residential market, is the starting point for the synthetic analysis of the obtained results. Simultaneously it enables to indicate changes in the development potential of local real estate markets.

Keywords: real estate market, development potential, building process, multivariate comparative analysis.

Streszczenie: W artykule podjęto próbę zdefiniowania, parametryzacji, oceny oraz syntetycznej analizy potencjałów rozwoju w obszarze regionalnych rynków nieruchomości mieszkaniowych. Zakres dokonanych analiz został określony zgodnie z metodologią kwantyfikacji rynku mieszkaniowego przyjętą przez Główny Urząd Statystyczny, który identyfikując rynek mieszkaniowy, wyszczególnia cztery obszary badawcze (pozwolenia wydane na budowę; mieszkania, których budowę rozpoczęto; mieszkania oddane do użytkowania oraz sprzedaż produkcji budowlano-montażowej zrealizowanej przez przedsiębiorstwa budowlane). Przeprowadzone badania pozwoliły na ocenę rozwoju poszczególnych województw w obszarze nieruchomości mieszkaniowych. Ocena ta, pokazująca potencjał regionalnych rynków mieszkaniowych, stanowiła punkt wyjścia do syntetycznej analizy otrzymanych wyników,

jednocześnie umożliwiając wskazanie zmian zachodzących w potencjale rozwoju lokalnych rynków nieruchomości mieszkaniowych.

Słowa kluczowe: rynek nieruchomości mieszkaniowych, potencjał rozwoju, proces budowlany, wielowymiarowa analiza porównawcza.

1. Introduction

The real estate market performs a vital function in the economy and it is one of the components which influences its development. While specifying the influence of the real estate market on the economy, it is worth emphasizing that this market influences the creation of GDP (Gross Domestic Product), creates a vast number of employees, generates local taxes and allows to liquidate capital engaged in estate through credit [Kucharska-Stasiak 2006]. The research of this influence can be looked at in a few market phases[1]. In the phase of formation, the real estate market is identified with the building market. In the phase of exchange, with the market of real estate deposits. Finally in the phase of consumption, with the market of real estate deposits and the rental market. The above mentioned multifaceted real estate market influences the fact that this market as an economic category is placed in the area of the financial market, especially in the area of the capital market. The real estate market as a part of the capital market interacts with the stock market, credit market and the market of production factors. The specified markets reveal a high level of competitiveness, which results in competition using the attributes of profitability level and risk level. The precise parameterization of the development potential of the real estate market can have a significant influence on the correct definition of its profitability and risk investment.

Investment decisions made on the real estate market influence directly its development which results in the number of building permissions, apartments which are under construction, apartment which were put into use and sales in the building-assembly production area executed by construction companies. Another vital research problem is the definition and research of changes in the prices of apartments. This facet is widely described in the literature (compare theses of [Foryś 2013; Hozer 2006; Kubus 2016; Mach 2015]). Defining real estate development potentials and research of price changes mechanisms are important elements in this market parameterization process.

Taking into consideration the above deliberations, the aim of the research is the evaluation of the local real estate markets' development potential. The evaluation of local (provincial) real estate markets was conducted with the use of multivariate comparative analysis. The above mentioned analysis allows to create multivariate comparative rankings depicting the development potential of the researched markets.

[1] For the leads of this article, according to the division by Kucharska-Stasiak [2006], market phases were divided into: chase of formation, the phase of exchanging and the phases of consumption.

2. Research assumptions and computational engineering

Conducting the research of the real estate market, attempted to define, parameterize, evaluate and conduct a synthetic analysis of the development potential in the area of regional markets. The assumption that in the presented research the local real estate market will be territorially equated with the provincial market, was made. Analyses was based on secondary data from the period 2008-2014. Additionally, in order to obtain as precise analysis as possible, the periods were divided for the following four time segments: 2008-2010, 2010-2012, 2012-2014 and the time segment including the whole range of data for 2008-2014. Data collection for the purpose of analysis represents data which identifies stages of the building process in the following range[2]: building permissions, apartments which are under construction, apartments which were put into use, and sales in the construction section including building-assembly production executed by construction companies.

The basic research tool is the linear ordering method based on the aggregate measurement. Aggregate measurement classifies a complex phenomenon using singular numerical value. The use of WAP[3] tools enables conducting comparative analyses and helps to systemize partial images. In this article, stages of the construction process were defined according to the methodology of collecting existing data by the Central Statistical Office in the area of construction. This area includes the following stages: building permissions, apartments which are under construction, apartments put into use and sales of building-assembly production executed by construction companies. Linear ordering method enables using in one formula rules of standardization, weighting and aggregation of variables [compare [Panek 2009; Suchecki 2010]). In this research the standardization process of variables was conducted in accordance with formula 1 and formula 2 [Strahl (red.) 2006]. Stimuli[4] enable standardization process in formula1, de-stimuli[5] enable the standardization process in formula 2.

$$z_{kj} = \frac{x_{kj}}{\max_k\{x_{kj}\}}, \tag{1}$$

$$z_{kj} = \frac{\min_k\{x_{kj}\}}{x_{kj}}, \tag{2}$$

[2] In this article, stages of the construction process were defined according to the methodology of collecting existing data from the Central Statistical Office in the area of construction. This includes the following stages: building permissions, apartments which are under construction, apartments put into use and sales of building-assembly production executed by construction companies.

[3] WAP – multivariate comparative analysis.

[4] Stimulus – without the so called veto threshold with values classified into R.

[5] De-stimulus – without the so called veto threshold with values classified into R.

where: $z_{kj} \in \left[\frac{\min_k\{x_{kj}\}}{\max_k\{x_{kj}\}}; 1\right]$, x_{kj} – value of j-variable in i-given region, z_{kj} – standardized value j-variable in i-given region.

Conducting the aggregation of standardized variables, formula 3 was used

$$s_k = \frac{1}{m}\sum_{j=1}^{m} z_{kj} \,. \tag{3}$$

Additionally the analysis of dynamics of changes was used in the calculation process. In order to compare the level of occurrence phenomenon in time, relative increases were used. These occurrences were computed according to formula 4 [Ostasiewicz, Rusnak, Siedlecka 2011].

$$d_{t^*/t} = \frac{x_{t^*} - x_t}{x_{t^*}}, \tag{4}$$

where: x_{t^*} – level of the observed phenomenon in the base period, x_t – level of the observed phenomenon in the researched period.

Building-assembly production was researched first in order to expand the scope of conducted analyses. The recognition of this category was aimed at specifying more precisely the scope of detailed research. Sales of building-assembly production according to GUS (the Central Statistical Office) methodology identified the following areas: sales of buildings, civil and marine engineering construction and performing specialized constructions. Due to the fact that in the following article

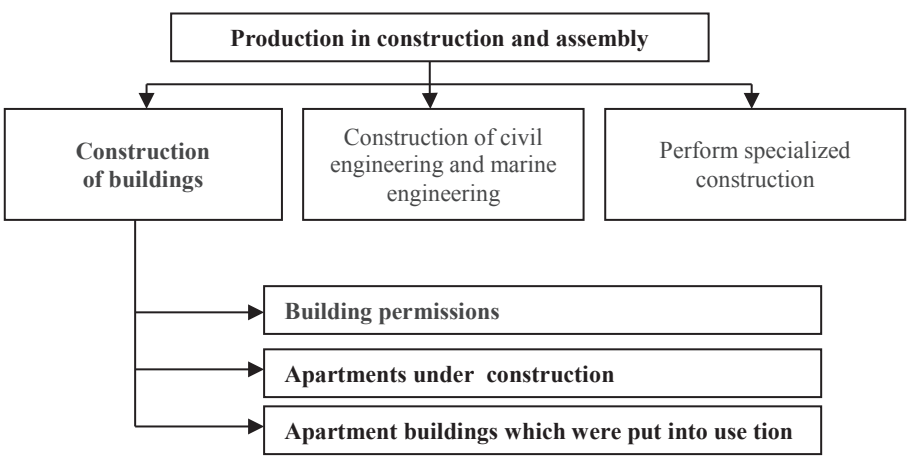

Fig. 1. Diagram of the researched areas aimed at the identification and evaluation of development potential

Source: own study.

analysis is restricted only to the residential real estate market, elements which describe the building process of residential property, were identified, evaluated and analyzed synthetically in the main part of research (see Figure 1).

3. Research stages and results discourse

The first stage of the conducted research is the systematization of changes occurring in building-assembly production. Analysis of the above mentioned changes enables to indicate the strong and weak points of the researched components. In researching building-assembling production the following three components were analyzed: enterprises whose main scope of activity is residential building, enterprises whose main activity deals with the construction of civil and water buildings and enterprises whose main activity centers on specialist construction works. Table 1 shows the average rate of sales' changes in building-assembly production. It is worth noting that despite the economic crisis, which commenced in 2008, in the period of 2008-2014 the sales of building-assembly production increased by 6.4%. In indicating the more precise analysis of the researched phenomenon, the average rate of changes in the sales of building-assembly production in sectors was computed (Table 2). In two of the three analyzed sectors, i.e. construction of civil and water engineering objects and in specialist construction works, an increase of the average change rate was recorded.

Table 1. Average rate of changes in the country

Periods of analysis	Average growth rate in the country
2008-2010	7.70
2010-2012	12.12
2012-2014	–12.00
2008-2014	6.40

Source: own calculations.

Table 2. Average rate of changes in sectors

Periods of analysis	Construction of buildings	Construction of civil engineering and marine	Perform specialized construction
2008-2014	–29	27	20
2008-2010	–8	10	2
2010-2012	–16	12	11
2012-2014	–7	3	6

Source: own calculations.

These changes, on average, were for the years 2008-2014 at the level of 27% and 20% respectively. Taking into account the economic crisis which commenced

in 2008, the positive rate of changes can be surprising. It is worth noting that the Polish economy in this period was characterized by increased activity due to the preparation of the country's infrastructure for the European Football Championships (construction of stadiums, highways, tourist infrastructure, inter alia). In the third sector (construction of buildings), a negative rate of changes can be noticed. During the period 2008-2014, the average decrease was recorded at the level of 29%.

3.1. Number of building permissions

Conducting research in the area of the number of building permissions, the average rate of changes in the sectors was calculated. The sectors were defined as follows: planning permissions issued for single-family buildings, planning permissions issued for buildings with two apartments and planning permissions issued for buildings with three or more apartments.

Analyzing the average changes in the rate of the number of planning permissions issued for construction, we can notice that the period from 2008 to 2014 was characterized by a significant growth in the sector of buildings with two apartments[6] (increased by 42.6%). Therefore we can advance a thesis that during the economic crisis, potential developer investments expressed in the number of building permissions issued, were the most popular in this category. Also the situation when individual investors combined their investment decisions and invested in the construction of buildings with two apartments, the so called semi-detached house was possible. However in the single-family building category, in the period 2008--2014, a decrease of –3.75% was recorded. Taking into account the economic crisis, individual developers in the researched period were characterized by investment restraint (see Table 3).

Table 3. Average rate of changes in the sector: issued planning permissions

Periods of analysis	Single-family building	Buildings with two apartments	Buildings with three or more apartments
2008-2014	–3.75	42.62	1.12
2008-2010	12	19	–12
2010-2012	–9	15	11
2012-2014	–9	11	9

Source: own calculations.

In Table 4, the structure of building permissions is presented. The structure in all Poland is as follows: 51.9% of planning permissions issued for construction in 2014 concerned multi-family building whereas 43.6% of planning permissions issued for

[6] Indicator for the population of 10,000.

construction related to the construction of single-family buildings. Analyzing the values calculated in Table 4, we can see that the following provinces: świętokrzyskie (81.0%), śląskie (74.3%) and opolskie (66.5%) are characterized by a significant number of planning permissions issued for the construction of single-family buildings, whereas the following provinces: mazowieckie (69.0%), pomorskie (62.4%) and dolnośląskie (61.5%), are characterized by major investments in multifamily buildings.

Table 4. Structure of planning permissions issued for particular provinces

Provinces	Single-family buildings	Buildings with two apartments	Buildings with three or more apartments
Łódzkie	59.3	1.9	38.8
Mazowieckie	27.8	3.2	69.0
Małopolskie	55.0	2.4	42.5
Śląskie	74.3	2.8	22.9
Lubelskie	62.3	1.9	35.9
Podkarpackie	62.1	1.6	36.2
Podlaskie	49.7	0.2	50.1
Świętokrzyskie	81.0	0.5	18.5
Lubuskie	42.4	3.4	54.2
Wielkopolskie	40.6	11.2	48.1
Zachodniopomorskie	40.6	4.3	55.1
Dolnośląskie	31.1	7.4	61.5
Opolskie	66.5	2.7	30.8
Kujawsko-pomorskie	46.3	2.6	51.1
Pomorskie	30.1	7.5	62.4
Warmińsko-mazurskie	44.3	2.0	53.8
Polska	43.6	4.4	51.9

Source: own calculations.

In Table 5, the analysis which enables to value the development potential in the area of building permissions is presented. The sum of the obtained ranking points is presented for the following years: 2008 and 2014. The assumption that the number of the obtained ranking points determines the development potential of one province against the other was made. In 2008, the greatest potential was for mazowieckie province (97 points). Second was pomorskie with 85 points. Świętokrzyskie province was characterized by the lowest potential (32 points). Comparing the growth potential of mazowieckie province and świętokrzyskie province, we can calculate that the difference in potential for the above mentioned provinces equals 65 points. Moreover, in Table 5 the dynamics of the changes was calculated for the particular

provinces. The dynamics of changes in potential will enable to depict provinces not only with an increasing or decreasing potential rate but a strengthening or weakening development potential. Analyzing the years 2008-2014, we can notice that in this period, development potential in the area of the number of the issued planning permissions was recorded in wielkopolskie province (increased by 13 points), dolnośląskie (increased by 11 points) and podkarpackie (increased by 9 points). Whereas a drop of potential was recorded in 10 provinces, i.e. zachodniopomorskie (–23 points), mazowieckie (–22 points), małopolskie (–18 points), opolskie (–10 points), łódzkie (–8 points),warmińsko-mazurskie (–7 points), śląskie (–6 points), pomorskie (–5 points), podlaskie (–2 points) and lubelskie (–1 points).

Table 5. Ranking – multidimensional comparative analysis

Provinces	Total ranking		Dynamics of changes in potential
	2008	2014	
Wielkopolskie	68	80	13
Dolnośląskie	56	67	11
Podkarpackie	37	46	9
Kujawsko-pomorskie	39	44	5
Lubuskie	44	49	4
Świętokrzyskie	32	32	1
Lubelskie	35	34	–1
Podlaskie	38	36	–2
Pomorskie	85	80	–5
Śląskie	37	31	–6
Warmińsko-mazurskie	40	34	–7
Łódzkie	46	38	–8
Opolskie	33	23	–10
Małopolskie	69	52	–18
Mazowieckie	97	75	–22
Zachodniopomorskie	66	43	–23

Source: own calculations.

3.2. Apartments under construction

In the category of apartments under construction, similarly as for the previous component of the construction process (compare Chapter 2.1), the average rate of change (see Table 6) was calculated. The average rate of change was calculated for the three sectors, i.e. for individual building, for apartments built for sale or rent, and for other housing. Variables used in the calculation were expressed in the relative unit (absolute values were converted to 10.000 population). Analyzing the

data thoroughly, we can notice that for the following period 2008-2014, the only sector with a positive rate of change at the level of 19.24% are apartments under construction in the category of buildings for sale or rent. The biggest decrease was recorded in the category of the collective, council, rental and company collective. It is worth noting that in the sector of individual apartments under construction, on average, a decrease by 7.6 % was recorded. The above mentioned decrease has its source in the unstable market economy after the economic crisis in 2008. The structure of apartments under construction is shown in Table 7.

Table 6. The average rate of changes in the sector of apartments which are under construction

Periods of analysis	Individual buildings	Apartments built for sale or rent	Other (cooperative, municipal, cooperative rental, company)
2008-2014	–7.60	19.24	–49.19
2008-2010	–1	4	–15
2010-2012	2	1	–35
2012-2014	–11	17	–19

Source: own calculations.

Table 7. Structure of issued planning permissions for particular provinces

Province	Individual buildings	Apartments built for sale or rent	Other (cooperative, municipal, cooperative rental, company)
Łódzkie	63.8	34.8	1.3
Mazowieckie	31.9	67.3	0.9
Małopolskie	51.1	48.2	0.7
Śląskie	78.6	20.2	1.3
Lubelskie	68.9	25.2	5.9
Podkarpackie	73.2	17.1	9.7
Podlaskie	41.9	56.0	2.1
Świętokrzyskie	82.2	13.3	4.5
Lubuskie	47.9	49.0	3.1
Wielkopolskie	50.7	48.0	1.3
Zachodniopomorskie	53.0	36.3	10.8
Dolnośląskie	40.4	56.6	3.0
Opolskie	75.2	24.3	0.5
Kujawsko-pomorskie	55.7	38.2	6.1
Pomorskie	41.3	55.9	2.8
Warmińsko-mazurskie	53.9	43.4	2.7
Polska	50.2	47.1	2.7

Source: own calculations.

Analyzing Poland's nationwide structure we can notice that nearly the whole residential market of apartments under construction was divided in two components, i.e. individual building (50.2%) and flats built for sales or rent (47.1%). Only 2.7% of apartments which were under construction referred to other buildings. Analyzing the values of structures calculated for single provinces, it is possible to indicate provinces with a significant majority of individual apartments (świętokrzyskie, śląskie, opolskie) and provinces with a significant majority of apartments built for sale or rent (mazowieckie, dolnośląskie, podlaskie, pomorskie). Analyzing the development potential of the residential market in the category of apartments under construction (compare Table 8), we can notice that in 2008 the biggest potential was in mazowieckie province (81 points), whereas in 2014 podkarpackie province (71 points). Moreover, in Table 8 the dynamics of changes in potential were calculated.

Analyzing the period 2008-2014, we can notice that in the following provinces: podkarpackie, świętokrzyskie, lubuskie, wielkopolskie, zachodniopomorskie, małopolskie, śląskie, growth of development potential was recorded. Noteworthy is the significant growth of potential in podkarpackie province, where the development potential in the category of apartments under construction increased by 37 points. However, in the eight provinces a decrease of development potential was recorded (see Table 8).

Table 8. Ranking – multidimensional comparative analysis

Provinces	Total ranking		Dynamics of changes in potential
	2008	2014	
Podkarpackie	34	71	37
Świętokrzyskie	27	41	14
Lubelskie	38	48	10
Wielkopolskie	42	52	10
Zachodniopomorskie	53	60	6
Małopolskie	52	57	5
Śląskie	24	26	1
Lubuskie	41	41	0
Dolnośląskie	54	53	–1
Łódzkie	34	32	–2
Kujawsko-pomorskie	52	49	–3
Opolskie	26	20	–7
Pomorskie	74	62	–12
Mazowieckie	81	63	–18
Podlaskie	64	45	–19
Warmińsko-mazurskie	53	33	–20

Source: own calculations.

3.3. Apartment buildings which were put into use

Table 9 depicts the average rate of changes referring to apartments which were put into use. The average rate of changes was calculated for three sectors, i.e. individual apartments, apartments built for sale or rent and other apartments. Variables used in calculations were expressed in relative units (absolute values were converted into 10.000 of population).

Table 9. The average rate of changes in sector: apartments put into use

Periods of analysis	Individual buildings	Apartments built for sale or rent	Other (cooperative, municipal, cooperative rental, company)
2008-2014	1.1	5.8	–34.0
2008-2010	3.3	–2.6	–3.7
2010-2012	–3.8	12.8	–43.0
2012-2014	0.7	–0.9	2.8

Source: own calculations.

While conducting the detailed analysis we noticed that for the period 2008-2014 the sector with the negative rate of changes at the level of – 34 % was the sector of flats in housing cooperatives, communal, cooperative rental and company. The period of analysis from the period 2010-2012 (decrease by –43%) was decisive and resulted in the negative value of the average rate of change. Whereas in the category of apartments put into use allotted for sale or rental, and in the category of apartments put into use allotted for the purpose of individual residence, a positive average rate of change, 5.8% and 1.1% respectively, was recorded.

In Table 10 the structure of apartments put into use is shown. Analyzing the values of the structures calculated for the provinces, we can indicate the provinces where the majority of apartments are individual apartments and the provinces where the majority of the apartments is built for sale or rent. It is worth noting that świętokrzyskie province recorded a value of 17.9 % of contribution in the market of other housing put into use.

Analyzing the development potential of apartments put into use, we can notice that both in 2008 and 2014 mazowieckie province had the highest potential with 86 points and 89 points, respectively. In Table 11 the dynamics of changes in potential were calculated. Analyzing the period 2008-2014, we can notice an increase of 41 points in świętokrzyskie province. Dolnośląskie province with 19 points is in second place of the ranking. The most significant decrease of potential in the above mentioned category was recorded in warmińsko-mazurskie province (–28 points) and podlaskie (–20 points).

Table 10. Structure of issued planning permissions for particular provinces

Province	Individual buildings	Apartments built for sale or rent	Other (cooperative, municipal, cooperative rental, company)
Łódzkie	64.8	29.8	5.4
Mazowieckie	31.9	60.8	7.3
Małopolskie	47.5	52.1	0.4
Śląskie	65.7	31.5	2.8
Lubelskie	64.1	29.8	6.1
Podkarpackie	71.6	18.5	9.8
Podlaskie	48.5	48.6	3.0
Świętokrzyskie	60.6	21.6	17.9
Lubuskie	46.6	42.1	11.3
Wielkopolskie	47.7	49.7	2.6
Zachodniopomorskie	42.4	50.9	6.8
Dolnośląskie	33.5	59.7	6.8
Opolskie	65.3	27.5	7.2
Kujawsko-pomorskie	55.0	39.8	5.3
Pomorskie	35.2	59.6	5.2
Warmińsko-mazurskie	45.5	50.0	4.6
Polska	46.3	48.1	5.6

Source: own calculations.

Table 11. Ranking – multidimensional comparative analysis

Provinces	Total ranking		Dynamics of changes in potential
	2008	2014	
Świętokrzyskie	24	65	41
Dolnośląskie	54	73	19
Podkarpackie	42	58	16
Lubuskie	51	61	10
Opolskie	26	33	7
Mazowieckie	86	89	3
Małopolskie	54	58	3
Łódzkie	40	42	2
Lubelskie	43	44	1
Pomorskie	71	69	–3
Śląskie	34	31	–3
Wielkopolskie	61	58	–3
Zachodniopomorskie	56	50	–6
Kujawsko-pomorskie	55	47	–9
Podlaskie	69	49	–20
Warmińsko-mazurskie	72	44	–28

Source: own calculations.

4. Conclusions

In evaluating the development potential of residential market we conducted an analysis of four research areas: building permissions, apartments under construction, apartments put into use and sales of building-assembly production executed by construction companies. In the computational process mainly a multivariate comparative analysis was taken into consideration. Moreover, the calculations and analysis of average dynamics of changes were made. To summarize the category sales of building-assembly production it is worth stressing that despite the economic crisis which started in 2008, this area was characterized by an average growth rate at the level of 6.4%. It is also worth noting that the activity of construction companies (especially these whose main activity is civil and marine engineering or specialized construction) had an influence on the positive value of the average growth rate. Whereas a downward trend was observed for construction companies whose main activity was the construction of buildings (in the period 2008-2014 a drop of the average growth rate was recorded at the level of 29%). Analyzing the researched areas which are directly connected with construction of buildings (i.e. issued planning permissions, apartments under construction, apartments put into use) the average rate of changes identified in particular sectors was calculated. Moreover, structural characteristics were researched, development potential was defined and the dynamics of development potential were measured. The analysis of changes in the dynamics of the calculated potentials will allow to evaluate the researched provinces from the point of view of the considered dimensions.

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