International Journal of Economics, Commerce and Management
United Kingdom ISSN 2348 0386 Vol. 11, Issue 11, Nov 2023

https://ijecm.co.uk/

THE INFLUENCE OF HOUSE DEMAND ON VOLATILITY OF HOUSING PRICES IN NAKURU AND KIAMBU COUNTIES, KENYA

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Abstract

The housing market in Nakuru and Kiambu counties has experienced fluctuations in property prices over recent years, creating uncertainty for homeowners, prospective buyers, and real estate investors therefore the study sought to assess the influence of house demand on volatility of housing prices in Nakuru and Kiambu counties. The study was anchored on perfect competitive theory. The study adopted a descriptive research design. The population of this study was 600 managers from 26 Kenya property developer association members who have developed properties in both Nakuru and Kiambu counties, Kenya. The study adopted a simple random sampling and Nassiuma's formula to determine a sample size of 164 managers. The research data collected primary data using questionnaires. Piloting was done in Nairobi City County where 17 questionnaires were administered to managers of Kenya property developer association. The reliability was determined using Cronbach's alpha test whereby the alpha value of all the study variables were in the range of 0.7 to 0.9 implying that the instrument was reliable. Both descriptive and inferential statistics was adopted. Descriptive statistics was employed in the study using percentages, frequencies, measures of central tendencies and measures of dispersion. Inferential statistics comprised correlation and regression analysis. The

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study found that there has been a gradual increase in the demand of houses for the last five years. The study also found that the demand for houses depend on its proximity to basic infrastructure such as tarmac road. The study concluded that demand of house has significant influence on volatility of housing prices in Nakuru and Kiambu Counties. In addition, the study concluded that economic growth has a significant influence on volatility of housing prices in Nakuru and Kiambu counties.

Keywords: Housing Demand, Volatility, Housing Prices, Kenya

INTRODUCTION

House demand refers to the desire or need for housing among potential buyers in a specific market. It is a measure of the number of people who are looking to purchase a house or rent a property, and is influenced by a range of factors such as population growth, economic conditions, employment, and interest rates. According to Glaeser and Gyourko, (2019), housing demand refers to the desire or need for housing among potential buyers or renters within a specific real estate market or geographic area. Housing demand is one of the key factors that drives the volatility of housing prices. The higher the demand the lower the supply and thus the increase in prices. In the short run aggregate supply leads to higher demand by bringing in more inputs in the production process, however in the long run aggregate supply is not affected level but by improvement of the product and efficiency. Increasing number of households, rapid urbanization, growing middle class and rapid increase in population has forced government and realtors to rethink the ways to fulfill real estate demand (Otwoma, 2017).

According to a report by Federal Reserve Bank of St. Louis, (2021), as demand for housing increases, prices tend to rise, while a decrease in demand can lead to a decline in prices. According to a study by the Federal Reserve Bank of St. Louis, changes in housing demand are closely linked to changes in employment and income levels, with higher levels of employment and income leading to increased housing demand. Housing demand is one of the primary drivers of housing prices (Glaeser, Gyourko & Saiz, 2019). When there is a high demand for housing in a particular area, it generally leads to an increase in prices due to the scarcity of available properties. Conversely, a decrease in demand can result in price declines. This demand-supply imbalance can significantly impact the volatility of housing prices. A stable and consistent demand for housing often leads to more predictable and less volatile price movements (Haurin & Gill, 2022). In contrast, erratic and unpredictable shifts in housing demand can result in price instability and fluctuations, making it challenging for both buyers and sellers to make informed decisions. Housing demand is closely tied to economic factors such as

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employment and income levels. In periods of economic growth with higher employment rates and rising incomes, housing demand tends to increase, potentially leading to price appreciation. Conversely, during economic downturns, reduced demand can contribute to price declines.

House price volatility refers to the fluctuations in the value of residential real estate over a certain period of time. This can be measured by changes in the average price of houses in a particular region or by changes in the value of individual properties. House price volatility can have a significant impact on the overall economy, as well as on the financial well-being of individuals and families (Fan, Yang, & Yavas, 2019). There are several factors that contribute to house price volatility, including changes in the economy, changes in interest rates, changes in housing supply and demand, and changes in consumer confidence (Wang., Zeng., Yao, & Zhang, 2020).

House price volatility varies significantly across the world. House prices in advanced economies grew almost at the same pace as economic activity but the growth rate of house prices has accelerated over recent decades, (Filatova & Parker, 2018). The growth of house prices differs significantly across countries (ranging from less than ½ percent per year in Germany, Japan, and Switzerland to over 3 percent per year in Spain and the United Kingdom) and over time. House prices are volatile with an average standard deviation of almost 7½ percent per year. The volatility of house prices has fallen slightly over time, partly reflecting the widespread reduction in the volatility of inflation and output in advanced countries prior to the crisis, (Curry, 2018).

In Kenya, the housing prices have more than tripled between the year 2000 and 2015. Over this period, average prices for 1 to 3 bedrooms rose by a factor of 5 from just below Ksh 2 million to Ksh 10 million. Prices for units with 4 to 6 bedrooms rose from about Ksh 10 million in the year 2000 to Ksh 31 million in the year 2015 (Hassconsult, 2018). Housing is an important asset and it has made a significant contribution to the total asset of many households. Almost 55% of the total of Kenyan household assets is in the housing form (Abelson, 2019). Kenya is also being one of the countries with high home ownership rate in Eastern Africa. Therefore, the study sought to determine the influence of house demand on volatility of housing prices in Nakuru and Kiambu counties.

Statement of the Problem

The affordability of a decent housing has remained an elusive dream for majority of Kenyans who cannot even afford rent in formal housing systems (Vuluku & Gachanja, 2019). Approximately 55 percent of the urban population in Kenya lives in informal settlements (Homeless International, 2020). This has been attributed to the surging prices of housing in

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Kenya. According to the Homeless international Report (2022) over the last decade, the real estate sector in Kenya has experienced an upsurge in prices raising concerns about the sustainability of this upward spiral. Since the year 2000 to date the housing prices in Kenya has increased by over 300 percent especially in the urban centers. As a result of the growth, housing ownership is way above the reach of majority of people consequently; over 60 per cent of the country's urban population lived in slums with no permanent houses, water, electricity, social amenities nor security (World Bank, 2022). With a growing middle-class population in Kenya, the demand for housing has been steadily increasing and this has increased pressure on the housing sector. Production of housing units is planned based on forecast demand. Demand itself is driven by population growth and the ability to purchase. This ability to purchase is dependent on the level of prices. Understanding what drives housing prices therefore is important in forecasting demand (KNBS, 2022). This underscores the importance of a clear understanding of the drivers of the real estate prices. Hence the study sought to assess the influence of economic determinants on volatility of housing prices in Nakuru and Kiambu Counties therefore the study sought to assess the influence of house demand on volatility of housing prices in Nakuru and Kiambu counties

LITERATURE REVIEW

Theoretical Review

The study was anchored on the, perfect competitive theory of housing market. Perfect Competitive Theory was developed by Kenneth Arrow and Gérard Debreu in 1956. The theory of perfect competition states that a perfectly competitive market is one in which all participants (buyers and sellers) have full and symmetrical information about the prices and qualities of the goods being traded, and there are no barriers to entry or exit for any of the participants. In such a market, the market price is determined by supply and demand, and each participant acts as a price-taker, meaning that they cannot influence the market price by their individual actions (Himayatullah, 2013). The theory of perfect competition assumes that there are a large number of small participants in the market, each of which is too small to influence the market price. As a result, each participant makes decisions based solely on the market price, and they have no market power to affect the price.

While the theory of perfect competition, as proposed by Kenneth Arrow and Gérard Debreu, provides a useful benchmark for understanding the behavior of competitive markets, it is subject to criticism on several grounds. One of the main criticisms of the theory of perfect competition is that it is not a realistic representation of most real-world markets. For example, the assumptions of full and symmetrical information and the absence of barriers to entry or exit

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are often not met in real-world markets (Arrow, 2000). Another criticism of the theory of perfect competition is that it does not take into account the existence of market power. In reality, some firms have the ability to influence market prices, and the theory of perfect competition does not address this issue.

The determinants of housing prices therefore are said to be the interaction between the demand and supply of housing. But the assumption that housing stock is a capital good that is related and adjustable to the demand and supply may not hold in the real housing market. Housing market like some other markets is subject to market imperfections, (Headay, 2015). In addition, as much as the theory gives direction in the consideration of demand and supply as determining housing prices, it does not give the specific variables affecting the demand and supply, which are then to be handled by policy makers in management of housing prices. The theory helps in explaining the influence of housing demand on volatility of housing prices in Nakuru and Kiambu Counties.

Housing Demand on Volatility of Housing Prices

Asroun, Aliasak and Bakar, (2020) did a literature review on housing demand price elasticity for Kuala Lumpur Apartments/Condominiums. The aim of the paper was to review the determinants of housing demand used in the past studies and to recommend suitable determinants for Kuala Lumpur apartments/condominiums. The review highlighted the coefficient size and the significant level of determinants to show their suitability. The paper found that house price, financing costs, construction costs and government regulation are suitable and recommended to be used for the new empirical study. However, the government regulation determinant should be represented by a measurable proxy to ease the regression analysis. The findings provide a better understanding of the influence of each determinant to housing demand before the new study could be started.

Wagura, (2019) conducted a study on the determinants of housing demand in Kenya. The study analyzed the factors influencing the housing demand of housing. The study utilized regression analysis to analyze the relationship between stock of houses and the price of houses, income per capita, inflation and interest rate. The study found out that the price of housing is the most positive significant factor in determining the number of houses delivered in a period. As prices become favorable for the producers, the number increases. However, this has to be met by equal demand for the houses constructed. The study indicated that increased per capita income does not result into an increase in houses and therefore the ability to build may limit the willingness to do so.

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Kader, Zayed, Alam and Nitsenko (2019) conducted a study on the factors affecting demand and demand in the housing market: A study on three major cities in Turkey. The study used monthly data ranges from January 2010 to December 2020 because of the limited housing price data from each city. For smooth measurement, the logarithm of all data except measurements of nominal interest rate, real interest rate and inflation was used. This research used the Co-integration Analysis and Vector Error Correction Model (VECM) to investigate the macroeconomic variables' effects on the demand and demand. Mortgage credit volume, as a dependent variable, was influenced by real per capita GDP, real house prices, projected inflation, and nominal interest rates. In the VECM model, the mortgage credit volume and constriction cost were dominated by error correction variables, showing the adjustment of disequilibrium towards an equilibrium point. In the case of Ankara, demand -side variables have a long-term relationship. Both housing demand and demand -related factors have a long-term impact on the housing market in Istanbul and Izmir. Given a significant p-value, the coefficient of C1 derived from system equations was negative.

Akelola (2016) focused on the factors influencing housing demand in Nairobi County. Using data for a period between 1984 and 2014, significant pre and post-estimation regression tests were done to try and establish the joint relationship between population in Nairobi County, mortgage cost, income per capita, per unit construction cost and the unit price of land as independent variables and the dependent variable which is housing demand in Nairobi County. The results showed that construction costs and mortgage interest rates were negatively correlated to the housing demand while price of land was found to be positively correlated with the levels of housing demand in Nairobi County.

Conceptual Framework

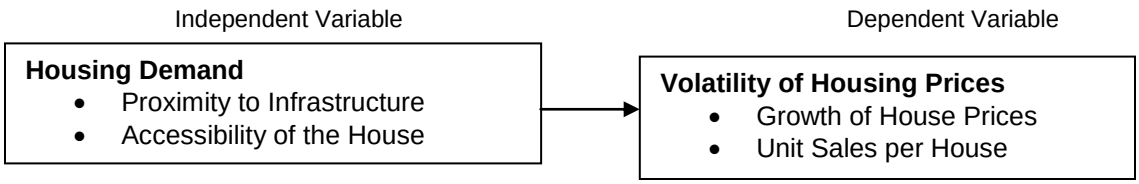

Figure 1: Conceptual Framework

METHODOLOGY

The study employed a descriptive research design. The target population of this study was 600 managers from 26 Kenya property developer association members who have developed properties in both Nakuru and Kiambu counties. Nakuru and Kiambu counties were

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chosen because they are second and third contributors to the country's GDP respectively s and in Kenya. Nakuru and Kiambu counties were also chosen because it made the scope sufficient for the study allowing effective data collection against the set of time. The study adopted Nassiuma's formula to determine the study sample size from the target population of 600 managers. The managers were from the 26 Kenya property developer association members that have developed both Nakuru and Kiambu counties for the last 10 years. The study used Nassiuma's formulae to get a sample of 164 managers from Kenya property developer association.

The research data collected primary data using a questionnaire as it provides more correct data that is obtained directly from the respondents. The questionnaires were structured in a Likert scale of 5 options so that the respondents can freely rate the items as per their agreement level. In this regard, 17 managers of Kenya property developer association In Nairobi County participated in the pilot study. The piloted questionnaires were not included in the study. Face validity was assessed through supervisor expert. The reliability was determined using Cronbach's alpha test whereby an alpha value closer to 1 was sought as recommended by Morse (2012) who observe that an instrument has a higher reliability when it achieves a correlation coefficient of greater than 0.7.

The researcher first sought permission from Kabarak University to go out and collect data in form of introduction letter. After getting approval from the Kabarak University Research Ethics Committee (KUREC). The researcher proceeded to apply for authorization from National Commission for Science, Technology and Innovations (NACOSTI) to collect data from the managers of Kenya Property Development Association Nakuru and Kiambu Counties. Both the introduction letter from KUREC and research permit from NACOSTI clearly outlined the name of the researcher and the purpose for the study. With both the letter, the researcher proceeded Kenya Property Development Association Nakuru and Kiambu Counties for introduction. The researcher then issued the questionnaires to the study respondents which was collected after two weeks. This time frame allocated for the respondents to fill in the questionnaires was meant to improve the response rate which was desired in this study since the sample size was large. This method of questionnaire distribution and collection is called Drop-Off and Pick-Up.

The data that was gathered in this study was quantitative in nature. The study used both descriptive and inferential statistics. SPSS was used to aid in generating both descriptive and inferential results. Descriptive statistics involved the use of percentages, frequencies, measures of central tendencies (mean) and measures of dispersion (standard deviation). The inferential statistics comprised correlation and regression analysis. The analyzed data were presented in form of tables. Pearson correlation was used to determine the relationship between various

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independent variables on the dependent variable while regression analysis was used to establish the effect of the independent variables on the dependent variable. The following multiple linear regressions model was used.

RESULTS

Response Rate

The study targeted 164 respondents out of which 124 filled and returned the questionnaires giving a response rate of 76%. Thus, the study had a considerable response adequate for the research. According to Barbie (2014), a high response rate is advantageous since it greatly reduces non-response bias as compared to a low response rate.

Demand of House on Volatility of Housing Prices

Table 1: Demand of House on Volatility of Housing Prices

Demand of House	SA (%)	A (%)	U (%)	D (%)	SD (%)	Mean	Std. Dev.
There has been a gradual increase in the demand of houses for the last five years	58	24	8	4	6	4.177	0.912
The demand for houses depends on its proximity to basic infrastructure such as tarmac road	40	48	4	8	0	3.984	1.032
The demand of houses closes to basic social amenities such as good road network is usually high which make the prices of houses along these facilities to go high	50	34	8	4	4	4.145	0.921
High demand of houses results to reduced competition and consequently result to an increase in the prices of houses	54	36	2	5	3	4.563	.608
High demand for a particular type of houses result to an increase in the prices of that category of house	48	40	3	5	4	4.181	.513

Key: SA=Strongly Agree, A=Agree, N=Neutral, D=Disagree, SD=Strongly Disagree

From the findings, 58% of the respondents strongly agreed that there has been a gradual increase in the demand of houses for the last five years, 24% of the respondents agreed, 8% were neutral, 4% disagreed while 6% strongly disagreed. Further 40% of the respondents strongly agreed that the demand for houses depend on their proximity to basic

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infrastructure such as tarmac road, 48% of the respondents agreed, 4% were neutral while 8% disagreed. In addition, 50% of the respondents strongly agreed that the demand of houses close to basic socio amenities such as good road network is usually high which make the prices of houses along these facilities to go high, 34% of the respondents agreed, 8% were neutral, 4% disagreed while 4% strongly disagreed. The study findings conquer with those of Mendeley, (2021) who found that transport accessibility to the house lead to an increase in house rent and demand for housing in the area. Moreover, due to availability of transport, in the form of a diverse choice of frequent and affordable public transport, increases the travel demand as the commuting cost will be significantly reduced.

The findings further indicate that 54% of the respondents strongly agreed that high demand of houses result to reduced competition and consequently result to an increase in the prices of houses, 36% of the respondents agreed, 2% were neutral, 5% disagreed while 3% strongly disagreed. In addition, 48% of the respondents strongly agreed that high demand for a particular type of houses result to an increase in the prices of that category of house, 40% of the respondents agreed, 3% were neutral, 5% disagreed while 4% strongly disagreed. The results are consistent with Stroebel, & Vavra, 2019). who argue that an increase in demand for housing will typically lead to an increase in prices. When there are more buyers than sellers, competition for available homes can drive up prices. This can occur when there is a strong economy, population growth, or an influx of new residents to an area.

Volatility of Housing Prices

Table 21: Volatility of housing prices

Volatility of housing prices	SA (%)	A (%)	U (%)	D (%)	SD (%)	Mean	Std. Dev.
There has been a constant growth in the prices of houses	52	43	0	3	2	4.177	0.912
There has been a gradual growth of unit of sales of houses	49	41	3	4	3	4.563	0.608
The prices of houses are highly predictable	56	32	3	5	4	4.145	0.921
The prices of house are rarely affected by both external and internal factors	70	30	0	0	0	4.563	0.608
The number of investors venturing into housing business has grown due to gradual rise in the prices of houses	63	32	0	3	2	3.984	1.032

Key: SA=Strongly Agree, A=Agree, N=Neutral, D=Disagree, SD=Strongly Disagree

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From the findings, 52% of the respondents strongly agreed that there has been a constant growth in the prices of houses, 43% of the respondents agreed, 3% disagreed while 2% strongly disagreed. Further, 49% of the respondents strongly agreed that there has been a gradual growth of unit of sales of houses, 41% of the respondents agreed, 3% were neutral, 4% disagreed while 3% strongly disagreed. In addition, 56% of the respondents strongly agreed that the prices of houses are highly predictable, 32% of the respondents agreed, 3% were neutral 5% disagreed while 4% strongly disagreed.

The findings further indicate that 70% of the respondents strongly agreed that the prices of house are rarely affected by both external and internal factors while 30% of the respondents agreed. In addition, 63% of the respondents strongly agreed that the number of investors venturing into housing business has grown due to gradual rise in the prices of houses, 32% of the respondents agreed, 3% disagreed while 2% strongly disagreed. The findings agrees with those of Majtenyi, (2019) who argued that the prices of real estate property in Kenya have more than doubled and even tripled in some instances in the past decade. The property market in Kenya has flourished vigorously as a result of the increase in project financing and mortgages financing. The fact that supply of real estate property is relatively inelastic and that these assets are fixed and not easily tradable show the uniqueness of the real estate market

Regression Model

The study conducted a regression analysis to examine the influence between a house demand and volatility of Housing Prices.

Demand of Houses on Volatility of Housing Prices

The study conducted simple regression on the influence of demand on volatility of housing prices in Nakuru and Kiambu counties and findings is shown in table 3.

Table 3: Model Summary on Demand of Houses as Predictor

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.443[a]	.196	.183	.370

a. Predictors: (Constant), Demand of Houses

b. Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties

The study used R-squared value to measure the percentage influence of the demand of houses on volatility of housing prices in Nakuru and Kiambu Counties. The R-squared in this

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study was 0.197 which shows that demand of houses explains 19.6 % variation on Volatility of housing prices in Nakuru and Kiambu Counties in Kenya. The findings are in line with Kuriakose and Seetharaman (2018) who found out that housing demand has a significant positive impact on price volatility, indicating that an increase in demand leads to greater volatility in housing prices.

The study also conducted an analysis of variance (ANOVA) test to assess the statistical significance of the simple regression model between demand of houses and volatility of housing prices in Nakuru and Kiambu Counties. The finding is indicated in Table 4.

Table 4: ANOVA for Demand of Houses

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.236	1	9.236	29.698	.000[b]
	Residual	37.886	122	0.311		
	Total	47.122	123			

a. Predictors: (Constant), Demand of Houses

b. Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties

From the findings, the F-Value of (29.698) was found to be significant at (0.000) which shows that the model was fit in predicting the influence of demand of houses on volatility of housing prices in Nakuru and Kiambu Counties in Kenya.

The study further conducted regression coefficient analysis to generate a simple regression model on the influence of demand of houses on volatility of housing prices in Nakuru and Kiambu Counties. The findings are indicated in Table 5.

Table 5: Regression Coefficients for Effect of Demand of Houses

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
	(Constant)	2.026	.420		4.824	.000
	Demand of Houses	.596	.107	.548	5.570	.013

Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties.

The findings indicated a unit change in demand of houses would result to 0.596 times change in volatility of housing prices in Nakuru and Kiambu Counties in Kenya. The t-value was 5.570 while the p-value was less than 0.05 which implies the model was statistically significant

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in explaining the influence of demand of houses on volatility of housing prices in Nakuru and Kiambu Counties. The findings agree with a study by Xu et al. (2021) who found out that there is a bidirectional causality between the two, indicating that changes in housing demand and price volatility can influence each other over time. From the output the simple regression model for the influence of demand of houses on volatility of housing prices in Nakuru and Kiambu Counties was

$Y = 2.026 + 0.596X_1$

DISCUSSION

From the analysis, the study found that there has been a gradual increase in the demand of houses for the last five years. The study also found that the demand for houses depend on its proximity to basic infrastructure such as tarmac road. Moreover, the study found that the demand of houses closes to basic socio amenities such as good road network is usually high which make the prices of houses along this facility to go high. The study further found out that high demand of houses results to reduced competition and consequently result to an increase in the prices of houses. High demand for a particular type of houses results to an increase in the prices of that category of house. The findings indicated that the p-value was 0.013 which was less than 0.05 significant level therefore the study rejected the first null hypothesis and the concluded that demand of house has significant influence on volatility of housing prices in Nakuru and Kiambu Counties.

CONCLUSION AND RECOMMENDATIONS

The study concluded that high demand of houses results to reduced competition and consequently result to an increase in the prices of houses. The study further concluded that high demand for a particular type of houses result to an increase in the prices of that category of house. The results concluded that demand of house has significant influence on volatility of housing prices in Nakuru and Kiambu Counties. Since the housing market is complex. Prices are driven by a wide variety of factors that are local, regional, national and global. While basic concepts like supply and demand come into play, other things like mortgage rates, inflation and even economic conditions influence the housing market.

Achieving a balance between house demand and the volatility of housing prices can be a complex and challenging task, but there are several strategies and policies that can help promote stability in the housing market. To achieve this balance the government should Implement and enforce regulations that promote responsible lending and borrowing practices, such as mortgage lending standards. In addition the government should introduce policies that

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address speculation and excessive investment in the housing market, like property taxes on vacant homes or capital gains taxes on real estate transactions.

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