SMART CITIES AND AFFORDABLE HOUSING: A COMPREHENSIVE ANALYSIS OF URBAN DEVELOPMENT IN VIKSIT BHARAT

Prof. Varsha Vaswani, Prof. Grishma Shah, Prof. Juhi Shastri Soham

vaswanivarsha2@gmail.com, Department of Commerce, Sydenham College of Commerce And Economics, Mumbai.

Shahgrishma2712@gmail.com Sydenham College of Commerce and Economics, Mumbai.

juhiashar30@gmail.com,Sydenham College of Commerce And Economics, Mumbai.

Abstract

"Smart Cities"—cities that employ technology to provide effective services—and "Affordable Housing"—homes that are reasonably priced—are the two primary components highlighted in the study. The subject of analysis is urban areas in a region known as "Viksit Bharat." It seeks to give a complete picture of how these factors support the expansion of the city.

Background: *Viksit Bharat's rapid urban development and population growth are driving up demand for transparent and ecologically friendly urban planning. This paper investigates the connection between smart cities and affordable housing as a means of addressing the issues raised by urbanization, highlighting the need for a comprehensive strategy to promote balanced development.*

The overall goals of this study are to evaluate Viksit Bharat's urban development, suggest policies for inclusive living, and identify

Objectives: *The study aims to evaluate Viksit Bharat's urban development, identify policy gaps for inclusive living, assess the efficacy of current initiatives, and make recommendations for policy.*

Findings: *The study examines the urban development pattern of Viksit Bharat, highlighting areas that require attention for affordable housing, inclusivity, and various housing needs. In-depth interviews and semi-structured questionnaires with Mumbai region residents were employed in the research. Chi Square techniques and statistics for secondary data sources were used to test hypotheses.*

Novelty: *The Smart City framework offers policy recommendations and practical guidance for developing nations facing comparable challenges, emphasizing affordable housing as a crucial component of sustainable urban development. In order to address the issues caused by urbanization, the study looks at the interactions between smart cities and affordable housing in Viksit Bharat.*

Keywords: *affordable housing society, estate realtors, smart cities, and Viksit Bharat*

INTRODUCTION

"The strength of a nation derives from the integrity of the home."

The goal of India's Smart Cities Mission, which was introduced in 2015, is to establish 100 Smart Cities in five years with an emphasis on enhancing urban quality of life and quickening economic growth. With the private sector playing a crucial role in innovation and development, the mission has allotted nearly Rs.18, 000 Crore to affordable housing projects.

Due to a shortage of available housing, the Indian housing market has not declined considerably despite rising mortgage rates, high rents, and house prices. In 2024, there will be a greater demand for rental properties due to the high consumer price index (CPI) and rising rents. Because of fluctuating input costs and uncertain economic conditions, roughly 58% of builders predicted higher housing prices in 2023.

In the second quarter of 2023, real house prices around the world decreased by a moderate 2.4% year over year, while in emerging market economies (EMEs), real house prices barely changed. By 2040, the real estate market in India is expected to have grown from ₹12,000 Crore to ₹65,000 Crore. A middle-class affordable housing program is highlighted in the government's Budget 2024, with the Pradhan Mantri Awas Yojna (PMAY) receiving an approximate allocation of Rs 80,000 Crore for FY 2025. But worries persist that this definition might not hold up in large cities where costs have increased, and that the ₹45 lakh cap might only apply in outlying areas and smaller cities.

CONCEPTUAL FRAMEWORK

Viksit Bharat: India's Smart Cities Mission aims to transform the nation into a developed entity by 2047, leveraging technology and innovation to improve urbanization and affordable housing, fostering community engagement and policy coordination.

Affordable Housing: India's PMAY and Smart Cities Mission are initiatives aimed at providing affordable housing to low- and middle-income households. PMAY aims to provide housing by 2022, while the Smart Cities Mission focuses on creating sustainable urban environments using technology. However, alignment challenges persist, necessitating collaboration between stakeholders for sustainable urban development.

Smart Cities: The Government of India is focusing on smart urban environments, aiming for economic growth through advanced technology applications. The government plans to construct 100 smart cities by 2022, enhancing urban planning, transportation, energy management, and public services.

REVIEW OF LITERATURE

(**Dwivedi**, **2021**) The thesis examines affordable housing in India, identifying barriers and proposing Public-Private Partnership approaches. It advocates for transparency in documenting private projects and highlights co-housing as a sustainable solution. The government's role in supporting these initiatives and promoting professional development is emphasized for equitable housing outcomes.

(**Najihah Azmi, 2021**) The Study aims to understand the difference between housing affordability and an affordable house. The review identifies 28 factors that influence the gap between the two and uses a descriptive method to analyze them. The study highlights the complexity of measuring affordability and the need for multiple indicators to assess the nature and degree of housing affordability problems. The review also explores the challenges facing the provision of affordable housing for low-income earners.

(**Prajapati, 2023**) The study suggests where rapid urban growth in India poses unique challenges, the development of smart cities has emerged as a promising solution to the country. With its increasing population and expanding middle class, India faces the urgent need for sustainable and efficient urban infrastructure. The government's ambitious Smart Cities Mission aims to transform existing cities into technologically advanced hubs that enhance the quality of life for residents. It also states that the integration of public-private partnerships and innovative financing models will ensure the successful implementation of these projects making the transition smooth and help to utilize its resources efficiently

STATEMENT OF PROBLEM

India's urban areas have difficulty implementing affordable housing laws and smart city initiatives into practice, which eventually results in differences in accessibility, standard of living, and livelihood. A thorough analysis of these opportunities and challenges is necessary to provide stakeholders in shaping the future of cities with actionable insights, even in the face of substantial investments and strategies.

OBJECTIVES OF STUDY

1) Investigating the relationship in Viksit Bharat between urbanization, smart city characteristics, and affordable housing.
2) To compare the factors contributing to general affordability and impact on housing affordability of urban development in viksit bharat.
3) To assess real estate from the buyer's perspective along with different factors that have caused a rise in housing costs.
4) To study the challenges and opportunities of realtors to make affordable houses and various possible suggestions and alternative government schemes for infrastructure development with reasonable prices.

HYPOTHESIS OF STUDY

(H0): There is no significant relationship between the level of urbanization and smart city in Viksit Bharat and the affordability of housing. (Based on 1st objective)
(H1): There is a significant relationship between the level of urbanization and smart city in Viksit Bharat and the affordability of housing
(H0): There is no significant relationship to assess real estate from the buyer's Perspective along with different factors that have caused a rise in housing costs.
(H2): There is a significant relationship to assess real estate from the buyer's Perspective along with different factors that have caused a rise in housing costs.

RESEARCH METHODOLOGY

A mixed research design was used in this study.

Face-to-face interviews with Realtors, builders, and regular people were conducted; the talks were transcribed, and a sample population of 100 people was selected. Furthermore, information from eighty average homebuyers is obtained through non-probability purposive sampling

(a structured questionnaire) in order to evaluate the affordability of housing in the current context and to find out what the respondents think about urbanization and smart cities in relation to Viksit Bharat, as well as how affordability will affect future developments.

Chi square and basic average techniques, along with a bar diagram, pie diagram were employed to analyze the data.

INTERPRETATION OF DATA ANALYSIS AND RESULTS

**Descriptive and inferential Research Analysis:**

1st Objective & inferential Analysis: *To understand the Relationship between Urbanization, Smart City, and Affordable Housing*

(H0): *No significant relationship exists between urbanization and housing Affordability in Viksit Bharat.*

4)To what extent do you believe urbanization has influenced housing affordability in Viksit Bharat?(the growth of cities in Viksit Bharat has h...d for houses has gone up, making prices go higher.) 99 responses

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree
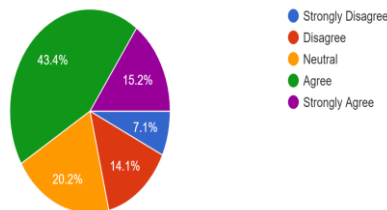
5)How would you rate the impact of smart City initiative on housing affordability in Viksit Bharat? 100 responses

- Very Low
- Low
- Moderate
- High
- Very High
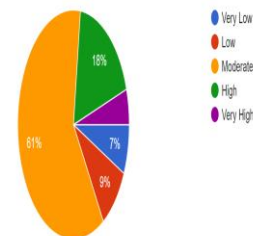
To perform the chi-square test, we need to create a contingency table with the observed frequencies for each response option for both questions. Individual questions analysis was done shown in the table below such as:

Calculation of chi parameters, Formula: Chi-square = Σ (Observed Frequency - Expected Frequency)^2 / Expected Frequency	Observed Value To what extent do you believe urbanization has influenced housing affordability in Viksit Bharat? (Question 4)	Observed value How would you rate the impact of smart city characteristics on housing affordability in Viksit Bharat? (Question 5)
Strongly Disagree	08	07
Disagree	14	09
Neutral	20	61
Strongly agree	15	18
Agree	43	05

Question 4's parameter we must determine the expected frequencies for each response category in order to run the Chi-square test. The expected frequency for each response category can be determined as follows, assuming that each has an equal chance of being chosen:

Total frequency / Number of categories equals expected frequency.

This formula gives us: Anticipated Frequency is 20 (100 / 5). We can now use the following formula to get the Chi-square statistic:

The chi-square is equal to Σ (Observed - Expected Frequency). / Anticipated Frequency

Chi-square = $[(8-20)^2/20] + [(14-20)^2/20] + [(20-20)^2/20] + [(15-20)^2/20] + [(43-20)^2/20]$ is the result of applying this formula.

We must compare this value to a critical value from the Chi-square distribution table in order to ascertain whether it is statistically significant. (Number of categories - 1) is the degrees of freedom for this test, which in

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this we must compare this value to a critical value from the Chi-square distribution table in order to ascertain whether it is statistically significant. In this instance, there are four degrees of freedom for the test (number of categories - 1). The table's critical value, assuming a significance level of 0.05, is 9.488.

Since the critical value (9.488) is less than our computed Chi-square value (34.6), the null hypothesis—that there is no correlation between urbanization and housing affordability in Viksit Bharat—can be rejected. As a result, we can draw the statistically significant conclusion that urbanization has had an impact on housing affordability in Viksit Bharat.

Parameter of Question No. 5 Determine the expected frequencies first, assuming equal probability: Anticipated = Total Number of Levels Number of Levels/Total Expected=100/5=20, Expected value = 20Next, divide the observed value by the expected value after calculating the square of the observed-expectedvalues:$\begin{align*}\chi^{(7-20)^2+(9-20)^2+(61-20)^2+(18-20)^2+(5-20)^2}{20}\} &= 1.4 + 8.1 + 256.1 + 2.1 + 16.7 \&= 278.4\\end{align*}2(0.05,4) = 9.488$ X df = 4 2 = 278.4> critical 2 (0.05,4)=9.488

We reject the null hypothesis that there is no correlation between the attributes of smart cities and housing affordability in Viksit Bharat, as the computed χ^2 is significantly higher than the critical value. Thus, it would seem that Viksit Bharat's smart city attributes and housing affordability are closely related. Be aware that this finding only suggests correlation—not causation. To prove cause-and-effect connections, more investigation would be required.
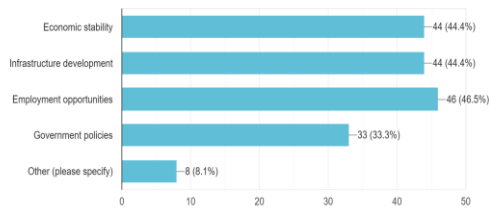
Thus, it is reasonable to say that 20 is the expected value (expected=100/5).

Then, divide the observed value by the expected value after calculating the square of the observed value. Start $\begin{align*}\chi^ {(7-20) ~2+ (9-20) ^2+ (61-2)$

Viksit Bharat's housing affordability is significantly influenced by urbanization, as evidenced by a substantial correlation between respondents' assessments of smart city features and their beliefs about urbanization, as confirmed by a p-value less than 0.05, indicating a significant impact.

Descriptive analysis of our 2nd Objective: This is mixed research based , analyzed through secondary data as well couple of reasons interrogated from respondents and presented in figure given below such as:
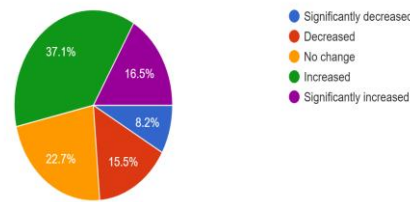

The Annual Consumer Price Index (CPI) has seen a significant decline in the last year, with housing inflation increasing due to supply and demand issues. The Biden Administration has addressed this issue through programs like the Housing Supply Action Plan. However, official housing inflation statistics may not reflect this slowdown, as market rental growth slowdown won't appear in CPI data until late 2023. Housing's monthly CPI contributions are expected to progressively decline, starting in the middle of the year. Despite overall inflation dropping since June, housing inflation remains high, with rental growth declining recently. The Council of Economic Advisers (CEA) will monitor these and other economic indicators as events develop. Earning to make housing affordable is not appropriate due to high costs and common affordability.

Analysis of our 3rd Objective & 2nd Inferential: To assess real estate from the buyer's perspective along with different factors that have caused a rise in housing costs.
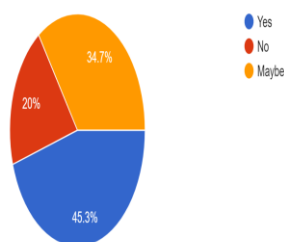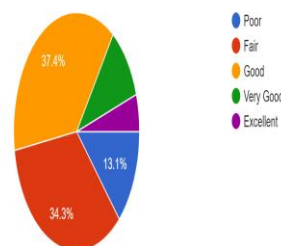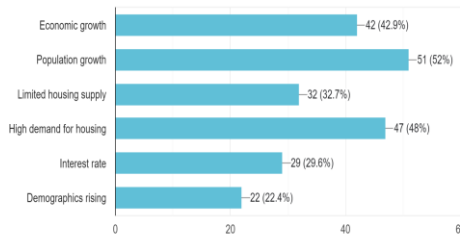
9)What factors do you believe have contributed to the recent rise in housing costs in Viksit Bharat? (Select all that apply)
98 responses

Calculate the chi-square test for the given data, we will first create a contingency table. Then, we can proceed with the chi-square test and determine the critical and table values.

Following Contingency Table:

Housing Market Rating	Observed frequency	Factor Contributing	Observed frequency
Poor	13	Economic Growth	42
Fair	34	Population	51
Good	37	Limited Housing Supply	32
Very Good	10	High demand	29
Excellent	05	other	22

The chi-square test is used to calculate the expected frequency for each factor contributing to housing market rating. The expected frequency for economic growth, population growth, limited housing supply, high demand for housing, and other factors is calculated. The chi-square statistic is calculated using the formula $\chi^2 = \chi$ (13 - 84)^2 / 84 + (34 - 102)^2 / 102 + (37 - 64)^2 / 64 + (10 - 58)^2 / 58 + (5 - 44)^2 / 44. The critical value is determined using the degrees of freedom (df) calculated as (number of rows - 1) * (number of columns - 1).

The critical value is 9.488, which is much higher than the critical value. The null hypothesis is rejected, and the confidence interval is 95%. The fourth objective is to study the challenges and opportunities of realtors in making affordable houses and explore various suggestions and alternative government schemes for infrastructure development with reasonable prices.

10)What challenges do you think realtors face in making houses affordable in Viksit Bharat? (Select all that apply)
97 responses
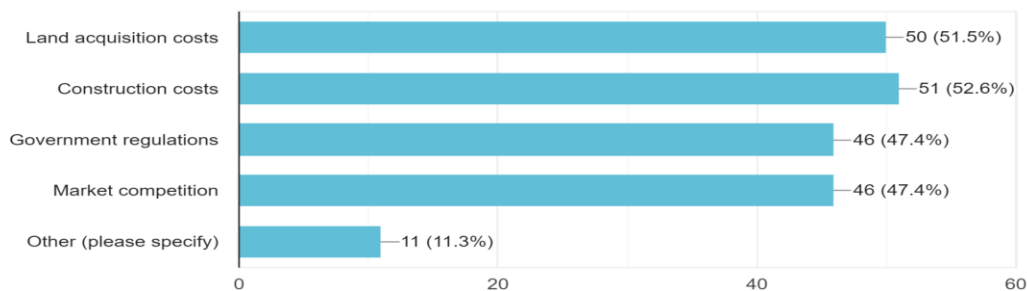
According to the survey results and secondary data, the following are some of the major challenges that Indian realtors encounter when attempting to build affordable housing:

Purchase of land costs (50%) Construction costs (51%).government laws and regulations (47%).

Market rivalry (46%).Less frequently (11 percent) Affordable housing in India faces significant challenges due to government regulations, building costs, and land acquisition. Despite efforts to lower construction costs and improve financing through creative financing models and community-led projects, these regulatory barriers make the process expensive.

CONCLUSION AND RECOMMENDATION

By 2047, the Indian government hopes to have made affordable housing available to everyone through the Viksit Bharat program. This entails decreasing interest rates on home loans, regulating real estate speculation, and generating jobs in rural areas. To accomplish this, proper documentation, strict market regulation, and public

education are essential. ***To achieve this goal, the government should consider implementing the following recommendations provided by respondents, 54/100 sample respondents given recommendation and highlighted their views specifically as:***

a)   Speed up the process for approving new housing projects.
b)   Put money into improving roads, utilities, and public spaces.
c)   Encourage building projects that mix residential and commercial spaces.
d)   Promote housing near public transportation to reduce commuting.
e)   Together with businesses to develop housing solutions.
f)   Use technology to create more sustainable and efficient housing.
g)   Find ways to make it easier to acquire land for development.
h)   Ensure that housing policies benefit everyone, not just the wealthy.
i)   Keep an eye on investors who might drive up prices artificially.
j)   Provide assistance to help people buy homes, like loans or grants.
k)   Make sure people understand the housing situation and their options.
l)   Offer financial benefits for developers to build affordable homes.

LIMITATION OF STUDY

The study's sample includes young homebuyers who will make up the next generation of viksit bharat, as well as builders, real estate agents, and home buyers from a variety of occupational backgrounds in the Mumbai zone. Despite its careful design, the research study has the following limitations:

➢   Because of the study's narrow geographic scope, conclusions cannot be applied to a larger population.
➢   Because of the short time frame, the study is limited to 100 respondents.
➢   A large number of respondents were ignorant of the idea of viksit bharat.
➢   Because this is a primary and secondary study, the data's accuracy and dependability rely on the information respondents provide and the information that is accessible from reliable sources.

FUTURE SCOPE OF STUDY

•   Evaluating how affordable and sustainable housing options are in smart cities in relation to green building regulations and renewable energy sources.
•   Assessing the long-term financial advantages of affordable housing investments, including their role in reducing poverty, generating jobs, and enhancing health outcomes.
•   Comparatively analyzing case studies of prosperous global initiatives for affordable housing and smart cities in order to find lessons that can be applied to India.

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