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The Structural Transformation of Urban Landscapes: Real Estate Business Growth in Mohali, Punjab

From an Agrarian Outskirt to the Premier Commercial and Residential Hub of the Tricity

--Gurrehmat Kaur

Abstract

Historically, the regional economy of Punjab has always been dependent on agriculture, which determined the demographic and financial inflows for years together. Urbanization had remained localized, and investments in Real Estate remained limited to traditional family plots and low-rise buildings. However, saturation of Chandigarh's rigid architecture and limited territory limits led to the rise of another important satellite city called SAS Nagar (Mohali). Although initial expansion involved building conventional peripheral properties, lack of good infrastructure and governance issues limited its capability to attract institutional investments. The structural transformation started only when the Government of Punjab adopted master planning in state and constituted GMADA for focused infrastructure development of SAS Nagar. GMADA started with development of Airport & nearby area as a aviation corridor, Aerocity as a Residential & Commercial hub, IT City Sector 66B, 82A, 83A & 101A to attract IT Business & various Universities, Education City Sector 81 to attract youth of Punjab & neighboring states and various other residential real estate development projects such as Sector 88-89, Ecocity Etc. This research paper attempts to understand the transformation journey of SAS Nagar from a peripheral agro-based area to an institutionalized high-density real estate market. By studying the trends in, modern townships models, points of saturation in the business environment, capital appreciation, changes in buyer demography, this paper will try to understand the macro-economic factors which drove this transformation process.



Introduction

To understand the modern dynamics of urban development in Northern India, one must look closely at the evolution of the market over the past two decades. Historically, property acquisition was characterized by tedious secondary market deals, unorganized brokers, and horizontal development. Buyers had to contend with fragmented land parcels, lack of centralized urban utilities, and highly opaque pricing structures. The onset of structured developer portfolios and private equity inflows mitigated these friction points significantly. Institutional developers introduced comprehensive high-rise societies, modern corporate facilities, and retail centers equipped with central utilities, shifting consumer behavior away from unmanaged standalone residential options.

In the contemporary market, we are in an era where vertically integrated townships and organized retail high-streets are as fundamental to urban living as transport connectivity. Investors will find it relatively easy to make such small-scale institutional acquisitions in properly designed micro markets such as Aerocity, IT City, and New Chandigarh that will give them good rental yields and capital gains. Such an environment is created by means of strong infrastructure policies from the states. Consequently, the whole area becomes an important point of regional economic migration. This paper explores the emergence of SAS Nagar as one of the best places for corporate real estate investments and high-end residential demands

The History and Evolution of Real Estate in the Tricity Region

1.1 The Era of Chandigarh's Saturation

During a considerable time after Chandigarh became the planned capital city, it was the only administrative, economic and education center in the region. Featuring low density, the

horizontal design created by Le Corbusier, Chandigarh provided high standards of living but was limited geographically and in terms of planning. With the expansion of the service sector and the growth of population, Chandigarh became overcrowded. Strict preservation laws, height limitations, and the absence of vacant land commercial tracts drove property values to levels that excluded mid-market residential buyers and expanding corporate entities.

1.2 The Dawn of Mohali (SAS Nagar) as an Institutional Satellite

To cope with the massive demand spillover from Chandigarh, the government of Punjab took the initiative to develop Sahibzada Ajit Singh Nagar (Mohali) in the late 1970s. While originally intended as an industrial extension for local job opportunities, its vicinity to Chandigarh turned out to make it a natural choice as a residential area. Its early stages of development were horizontal, involving Phase-wise development through individual housing boards and cooperative society plots. But the earlier phases of development followed older infrastructure models and did not possess the needed institutional mechanisms that could make it attractive to large commercial realty developers. It was only in the mid-2000s that the focus switched to integrated townships.

1.3 Evolution and growth of Mohali

1) Study of urban development and infrastructure growth.

The urban development and infrastructure growth in the current scenario is a planned process wherein the conversion of a rural suburb into a developed city takes place. In this regard, it can be argued that the infrastructural developments in this region are the outcome of development as contrasted to the ad-hoc developments taking place in the urban setups. The development in this region follows the process of zoning wherein specific areas are earmarked for residential, commercial and industrial purposes so that there is no overlap. The major infrastructural facilities that have taken place are the road development works such as the PR-7 Airport Road, utilities for the smart city and the underground sewerage system for the region. It can be argued that the developments that have taken place have resulted in the value generation and settlement pattern in this region. Through this exercise of urbanization, one can observe the pattern of decentralization.

2) Development of townships and planned infrastructure.

It can be argued that the organized townships are the key developments that have taken place in the chronological history of Mohali as it marks the end to the development of the concept of townships. The hallmark of the integrated townships is the road, green belt, security and the commercial plaza that are present within the township. The integrated township development marks the beginning of the Aero-Tropolis and several private mega townships that are based on the live-work-play concept. The benefits derived from such townships is that the people can lead a luxurious lifestyle wherein they can access corporate offices, recreation facilities without having to travel extra. The electricity grid and water treatment plants that are present in these townships ease the work of the municipal corporation. The luxurious concept of the integrated townships appeal to the NRIs and the buyers resulting in a corporatization of the real estate business and the land comes to be leveraged for development.

3) Growth of IT City and other major urban projects.

The development of IT City, encompassing the sectors 66-B, 82-A, 83-A and 101-A can be regarded as one of the key developments that has taken place on account of the urbanization process. Following the planning of the township based on the model of world-class cities renowned for their IT developments, it can be contended that IT City is an effort to woo foreign software giants, GCCs and technocrats. In the IT City, the level of digitalization is at the highest level as it is equipped with fiber optic Internet connections in addition to the uninterrupted power supply and state-of-the-art office buildings that are being constructed. The growth rate of this sector has also necessitated the development of residential and recreational projects because of the large number of white-collar workers who prefer this area to live in. It must also be stated that

the development of projects such as the Aerotropolis and Eco City in the New Chandigarh have gone through the same processes.

4) Development of IT City through planned urban expansion.

The development of the IT City can be regarded as a case study in terms of the planned urban expansion. Instead of locating the IT firms at the periphery of the city, the planners have opted to develop tech-corrados adjacent to the international airport. Such a plan not only provides the direct access to the business people to the aviation facility but also serves as a good marketing tool. In the development process of the IT City, the concentric circle approach has been adopted wherein in the central circle there would be Grade-A office space wherein would be surrounded by a circle of high-rise residential apartments and the outer circle would comprise of retail and recreational facilities. It must be noted that such a development reduces the traffic congestion as well as the travel time of the people residing in the high-rise apartments. It must also be mentioned that the green building concept and the pedestrian friendly approach are also being adopted by the planners which are at par with the current trends of urban development.

5) Impact of GMADA-led projects on regional growth.

It can be argued that not only Mohali is the one that is witnessing developments on account of the initiatives taken by the GMADA but even Tricity is reaping rich dividends in terms of economic and demographic growth. Through the development of satellite towns such as the Eco City in Mullanpur (New Chandigarh) and the Aerotropolis that is coming up in the Zirakpur-Mohali belt, the GMADA has managed to shift the real estate magnetism away from the Chandigarh belt. In terms of economy, the impact of these projects is in terms of billions of rupees in revenues that have accrued to the government in terms of stamp duty, in addition to the commercial gains that have taken place on account of these developments. It must also be mentioned that the urban development standards set by GMADA have prompted the municipal authorities to take up similar developments wherein the wide roads and developed sectors have forced the municipal bodies to also increase their standards.

6) E-auction of chunk sites and its role in development.

The e-auction of the chunk sites that have been initiated by the GMADA has played a significant role in the development process of Mohali. It can be argued that the land bank distribution used to be a very corrupt process wherein the distribution of plots used to take place on the basis of nexus, however, with the e-auction process, the entire process is transparent wherein the bidders can bid for the land. Furthermore, by auctioning the chunk sites such as the 27.78 acre site in the sector 62 or the chunk sites in the Aerocity, the GMADA has managed to lure the national-level builders that have the expertise to execute mega projects. It can be argued that the e-auction of the chunk sites have helped in utilizing the land for the maximum value wherein the state government earns revenues from the sale of the land and the money is re-invested in the infrastructure development. Thus, the chunk site auction plays a critical role in preventing land speculation and facilitating the use of valuable land for mega-projects.

7) Vertical development trends after e-auction initiatives.

Following the e-auction of the high-value chunk sites, Mohali is experiencing a vertical development trend wherein the development of low-rise buildings or plotted developments is being replaced by the high-rise towers. It can be argued that the reason why the developers are opting for high-rises is because they have acquired high-value plots in the MLU (Mixed Land Use) and commercial plots that are being auctioned at premium levels. Thus, in order to be able to maximize their yields on account of expensive landbanks, the developers are building residential skyscrapers, corporate IT parks and malls wherein the FAR (Floor Area Ratio) is utilized to the maximum. The trend of the vertical development has resulted in an altogether different city-scape wherein one can witness a skyline that is in juxtaposition with the Le

Corbusier's horizontal city concept of Chandigarh. The development of skyscrapers would enable the city to utilize its land to its maximum capacity wherein the green belts at the ground level would be able to carry a huge population at the higher levels.

8) Infrastructure & Connectivity Importance of airport connectivity and its impact on urban growth.

The construction of the Shaheed Bhagat Singh International Airport can be regarded as the prime infrastructure development on account of which the urbanization process is witnessing a spurt. The connectivity to the airport can be considered as the lifeline for the city as it connects the city to the outside world. The airport not only adds an altogether different economic dimension to Mohali, however, it also marks its presence as an international business hub. It can be argued that the first and foremost impact of the airport has been on the real estate wherein the prices of the land within the proximity of 10-KM from the airport have skyrocketed on account of demand-supply mismatch. The demand from the corporate houses for locating their offices near the airport prompted the development of micro-markets such as the Aerocity and the Aerotropolis. The development of good road infrastructure around the airport is also imperative and thus, the developments of luxury hospitality such as hotels and convention centers have also taken place.

9) Development of major infrastructure corridors and connectivity routes.

Infrastructure corridor development is the backbone of the property boom being witnessed in Mohali. Amongst the major infrastructure corridors, the PR-7 Airport Road is a prime example of a commercial corridor wherein a 200-foot wide road has been constructed. It can be argued that apart from serving as a traffic lane, it also acts as a magnet for the luxury retail chain stores, corporate offices and housing. Since the traffic congestion on this road is a matter of concern for the administration, thus, it is expected that certain alternate connectivity routes would be constructed. One amongst them is an 8.5-KM link road that runs from the Bawa White House to the Airport Crossing with Railway Underpasses. The development of such alternate routes would help in connecting Kharar, Zirakpur, New Chandigarh to create a metropolitan city. These corridors when developed before the saturation of the population help in dealing with the commercial and commuter traffic in an effective manner.

10) Relationship between infrastructure projects and real estate/urban expansion.

The relationship between the infrastructure projects and the real estate in Mohali can be said to be symbiotic wherein one cannot exist without the other. In other words, it can be asserted that the real estate expansion in Mohali has taken place on the back of the infrastructure development and the latter has also profited from the former. This is also known as the infrastructure-led-growth wherein whenever the government announces any major infrastructure project, the real estate developers keep a watch on the announcements so that they can grab land-banks before any private real estate company acquires it. It must be mentioned that the infrastructure development not only appreciates the value of the land but also helps in unlocking the latent value of the land that might not have been lucrative otherwise. On the other hand, as the real estate appreciates and the population grows, it lays the foundation for further infrastructure development. In the urban expansion of Mohali, the development of the Airport Road (infrastructure) led to the creation of Aerocity (real-estate) which in turn necessitates the need for better water management and link roads (further infrastructure).

The Genesis of Mohali's Real Estate Boom

1.4 Strategic Infrastructure and Aviation Linkages

The process of change of Mohali from being a regular suburb into becoming an independent business market was fast-tracked by the construction of Chandigarh International Airport situated in Mohali. The creation of PR7 International Airport Road made sure that there

existed a major transportation route connecting Mohali with major highways to Delhi, Himachal Pradesh, and central Punjab. This major route opened up major lands making it possible for agricultural lands to become prime commercial high streets. There was improved efficiency in logistics and increased accessibility both domestically and internationally to bring in major companies both technologically and otherwise thus changing land values.

1.5 Punjab Government constituted GMADA for focused development of SAS Nagar

Real estate growth requires consistent and scalable regulatory structures. The Greater Mohali Area Development Authority (GMADA) executed this by creating comprehensive sectoral master plans that expanded the city's boundaries into organized Sectors ranging beyond the traditional 50s and 60s into Sectors 80 through 125, and creating new developmental pockets like Aerocity and Eco City. The enforcement of the Real Estate (Regulation and Development) Act (RERA) in 2017 provided critical buyer safety, eliminating project delays and bringing transparency to a previously unorganized market. In addition, the favorable policies on industrialization by the Punjab government such as single window clearance facility, stamp duty waiver to ITeS companies, and increased FAR provision for vertical housing groups were big catalysts for investment from private real estate sectors.

Structural Shifts in Commercial and Residential Real Estate

1.6 Corporate Clusters, IT Parks, and Industrial Synergy

Mohali has successfully repositioned itself as a key technology hub in Northern India. The expansion of Quark City, the Mahindra IT Park in Sector 67, and the massive allocation of institutional land in the dedicated 'IT City' complex have altered the local employment landscape. Global software organizations, knowledge process outsourcing firms, and technology startups have established major campuses here. This corporate growth has created substantial demand for Grade-A commercial office buildings, co-working ecosystems, and retail developments. Unlike traditional markets where commercial real estate followed residential developments, in Mohali, institutional corporate clusters have directly driven residential demand.

1.7 Luxury Housing, High-Rise Conglomerates, and Integrated Townships

The demographic profile of property buyers in Mohali has undergone an immense evolution. The market, once dominated by local end-users and retirees seeking plotted layouts, is now characterized by affluent NRIs, corporate professionals, and expanding business families from Punjab and neighboring states. This shift has driven a remarkable surge in luxury group housing projects. The modern township today provides gated tiered security, automated smart home facilities, clubhouses, and recreation areas. The traditional preference for separate bungalows has been replaced by the high-rise luxurious apartment since these provide better maintenance and security facilities and social life as well.

Traditional Property Markets vs. Modern Integrated Townships

The competitive landscape between legacy independent plots and modern institutional projects highlights the ongoing modernization of the market. While standalone plots offer full ownership flexibility, they lack central security, property maintenance, and immediate access to premium retail spaces.

Feature	Traditional Plotted / Independent Market	Modern Integrated Townships & High-Rises
Infrastructure Scale	Individual plot developments, limited green spaces, localized civic amenities.	Large-scale master plans, integrated green reserves, internal wide road grids.

Capital Requirement	High entry barrier; upfront land costs and separate construction outlays.	Flexible payment structures, construction-linked plans, accessible institutional financing.
Security & Utilities	Unorganized, dependent on municipal provisions; separate maintenance.	Multi-tier electronic surveillance, continuous backup systems, centralized facility management.
Amenities & Lifestyle	Minimal; heavily reliant on public civic infrastructure and parks.	Dedicated clubhouses, operational swimming facilities, internal retail spaces, and gymnasiums.
Rental Yield Potential	Lower yields (1.5% - 2.5%); primary focus on slow capital gains.	Enhanced corporate demand leading to superior yields (3.5% - 5.0%) and stable leasing options.

Table 1: Structural comparison between traditional standalone plots and organized modern townships.

Data Analysis: Growth of Real Estate Metrics

Analysis of primary market metrics indicates an unprecedented capital inflow into Mohali's property sectors over the past decade. The average residential asset pricing has maintained a consistent upward trajectory, expanding dramatically post-2020. The institutional volume and market capitalization of these real estate transactions have repositioned Mohali as a regional economic engine, capturing a significant share of capital allocation across Punjab.

Average Residential Real Estate Capital Appreciation in Mohali (2017-2026)
(INR per Sq. Ft.)

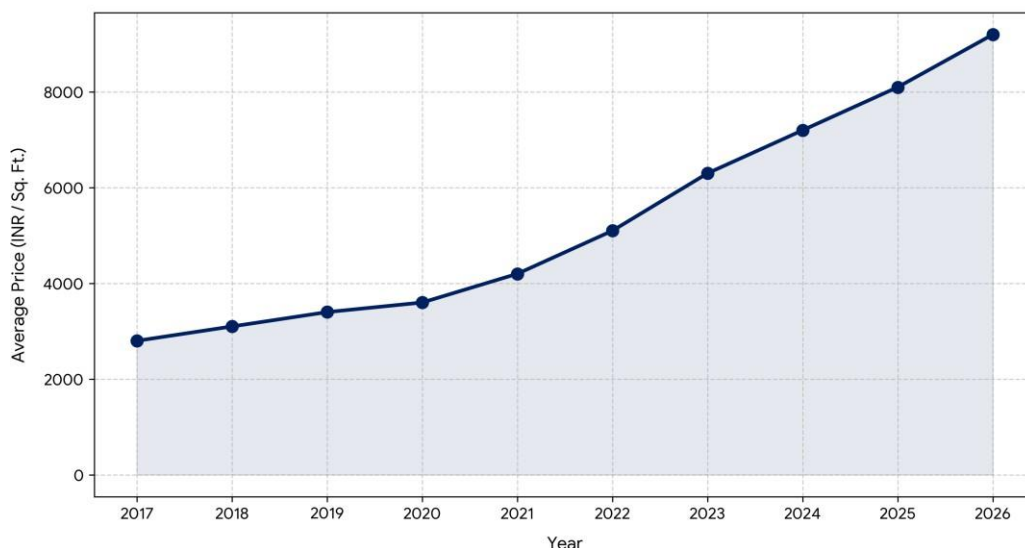
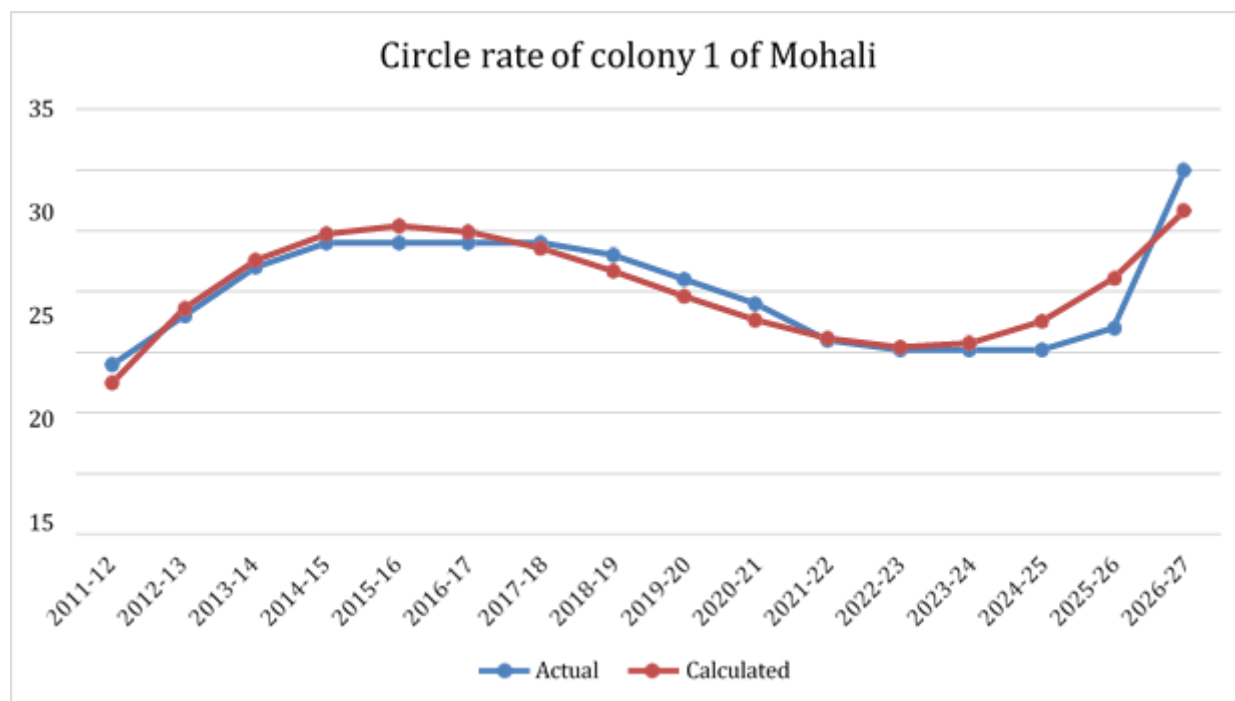


Figure 1: Capital appreciation trajectories for premium residential properties in Mohali (2017-2026).



The segment-wise market share distribution illustrates a highly balanced real estate ecosystem. Residential asset classes continue to command the highest transactional volumes, but commercial office investments and organized retail hubs have secured substantial market shares, validating the city's self-sustaining economic profile.

Market Share of Retail and Institutional Real Estate Segments by Value (2026)

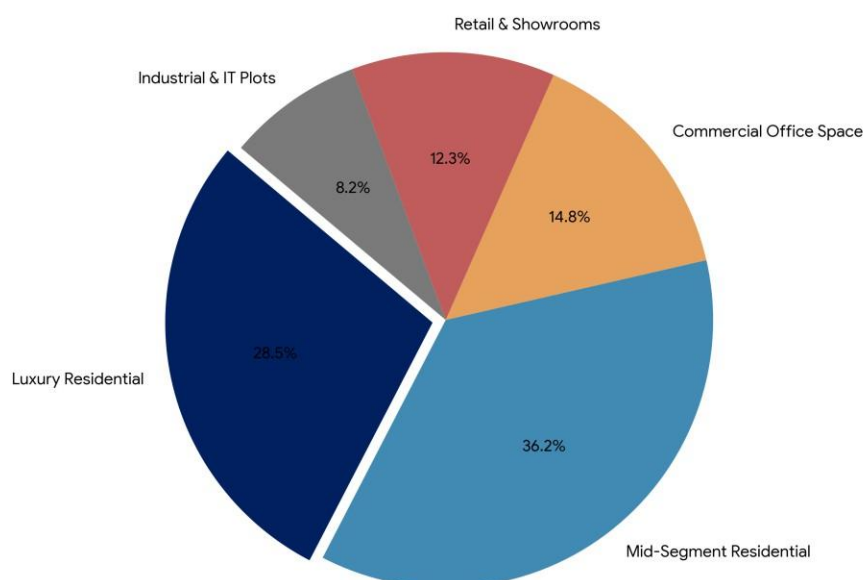


Figure 2: Distribution of total real estate market capitalization in Mohali by asset class (2026).

1.8 Case Studies of Micro-Market Integration

The prominent transformation of the PR7 Aerocity corridor provides an informative case study on strategic infrastructure execution. Before the alignment of the International Airport Road, the region consisted primarily of unpaved land tracts with minimal asset value. The conceptualization of Aerocity as a mixed-use commercial and residential corridor completely

transformed the sector. Through the provision of wide internal road networks, green spaces, and high-powered electric grids, GMADA provided the perfect setting for corporates and hoteliers. There was an inflow of international brands and top-end retail malls and corporate hotels, which demonstrated how state-led infrastructure development could spur economic development.

A parallel case study can be found in the Sector 82-83 IT City master plan. This specialized cluster was engineered to create an independent corporate environment outside traditional metropolitan capitals. By offering competitive industrial-grade land pricing to technology organizations, research institutes, and professional educational entities, the district attracted major employers. To support this expanding corporate workforce, adjacent residential projects were developed rapidly, creating an integrated live-work-play cycle. This micro-market design successfully minimized employee commute times, lowered institutional operational friction, and established steady, long-term rental demand.

Calculations:

- Equation calculation for Circle rate of colony 1 of Mohali:

In graph, x-axis shows years from 2011-12 to 2026-27, and Y-axis will show Circle rate of colony 1 of Mohali (in thousand rupees per sq meter)

After manually drawing graphs and on excel.

We concluded quadratic equation covers maximum number of plots considering

$$y = ax^3 +$$

$$bx^2 + cx + d$$

Figure 3: Actual and Calculated Circle rate for colony 1 of Mohali

Formula: $y = 0.054x^3 - 1.396x^2 + 9.935x + 3.896$

Where “y” represents Circle rate of colony 1 of Mohali (in thousand rupees per sq meter) and “x” represents 2011-12 to 2026-27.

- Equation calculation for Circle rate of colony 2 of Mohali:

In graph, x-axis shows years from 2011-12 to 2026-27, and Y-axis will show Circle rate of colony 2 of Mohali (in thousand rupees per sq meter)

After manually drawing graphs and on excel.

We concluded quadratic equation covers maximum number of plots considering $y =$

$$ax^3 +$$

$$bx^2 + cx + d$$

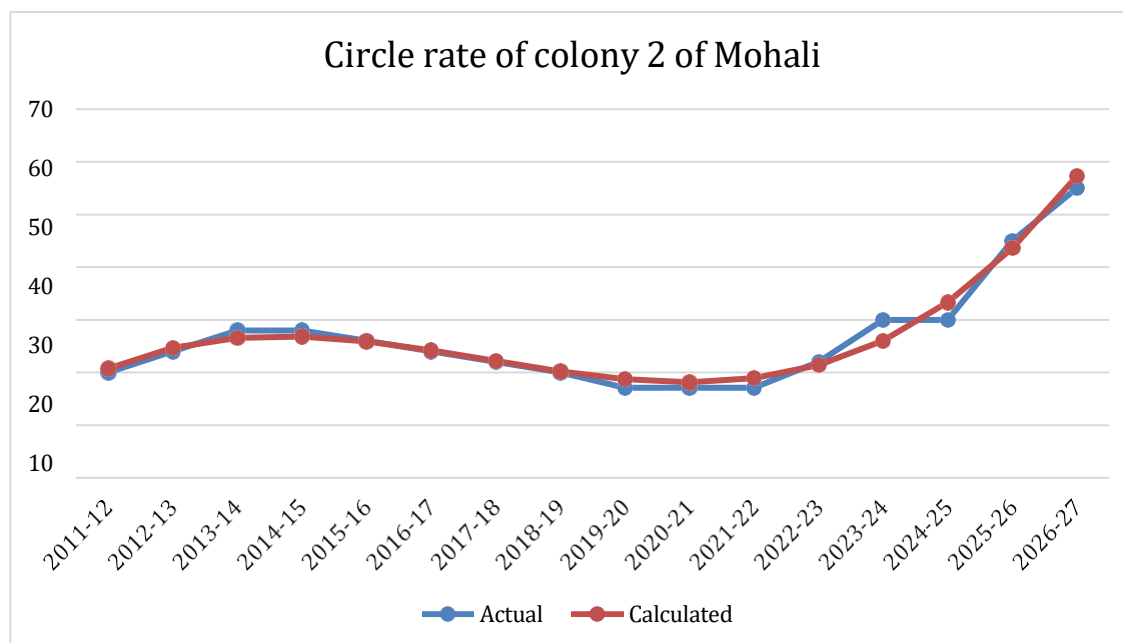


Figure 4: Actual and Calculated Circle rate for colony 2 of Mohali

$$\text{Formula: } y = 0.07x^3 - 1.436x^2 + 7.736x + 14.378$$

Where “y” represents Circle rate of colony 2 of Mohali (in thousand rupees per sq meter) and “x” represents 2011-12 to 2026-27.

- Equation of Housing Price Index in Mohali:

Note: The Housing Price Index measures the change in residential property prices over time

relative to a base period. It's used to track real estate market trends, inflation in housing costs, and affordability.

$$HPI = \frac{\text{Average (or median) Price in Current Period}}{\text{Average (or median) Price in Base Period}} \times 100$$

In graph, x-axis shows years from 2011 to 2026, and Y-axis will show Housing Price Index in Mohali.

After manually drawing graphs and on excel.

We concluded that exponential equation covers maximum number of plots considering $y = a * b^x$

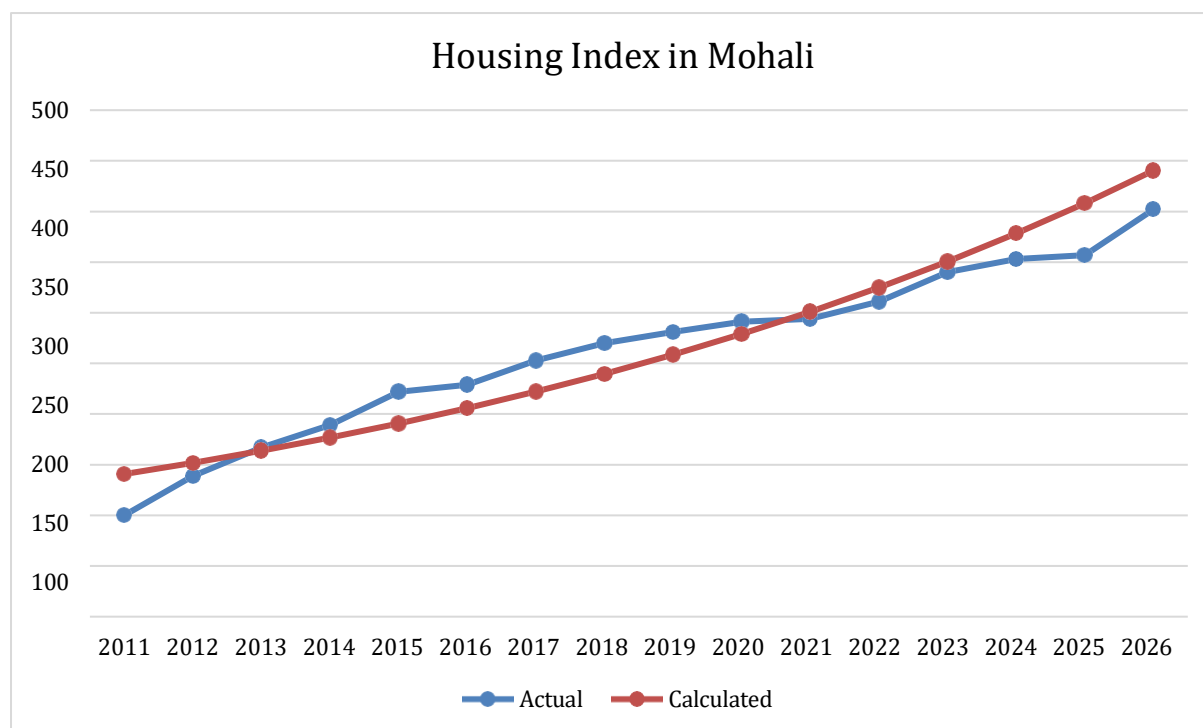


Figure 5: Actual and Calculated Housing index in Mohali

$$\text{Formula: } y = 130.46 * (1.079)^x$$

Where “y” represents Housing Index in Mohali and “x” represents 2011 to 2026.

- Coefficient of Determination for Circle Rate of Colony 1 and Colony 2:

Methodology:

➤ SSE — Sum of Squared Errors (Residual Sum of Squares)

Variation in the data is not explained by the model — the leftover error between actual and predicted values.

$$SSE = \sum_{i=1}^n (y_i - \hat{y}_i)^2$$

where $\hat{y}_i$ = predicted value from the model.

➤ SST — Total Sum of Squares

Total variation in the observed data (how much y values deviate from their mean).

$$SST = \sum_{i=1}^n (y_i - \bar{y})^2$$

where y_i = actual value, $\bar{y}$ = mean of actual values.

➤ R² — Coefficient of Determination

Proportion of total variation in y that is explained by the model. Ranges from 0 to 1 (higher = better fit).

$$r^2 = 1 - \frac{SSE}{SST} = 1 - \frac{\sum_{i=1}^n (y_i - \hat{y}_i)^2}{\sum_{i=1}^n (y_i - \bar{y})^2}$$

Calculation for colonies circle rates:

➤ For Colony 1:

Circle Rate of Colony 1 in Mohali				
x	Observed	Predicted	SSE = (Y _o - Y _p) ²	SST = (Y _{mean} - Y _o) ²
1	14	12.489	2.283121	37.21
2	18	18.614	0.376996	4.41
3	22	22.595	0.354025	3.61
4	24	24.756	0.571536	15.21
5	24	25.421	2.019241	15.21
6	24	24.914	0.835396	15.21
7	24	23.559	0.194481	15.21
8	23	21.68	1.7424	8.41
9	21	19.601	1.957201	0.81
10	19	17.646	1.833316	1.21
11	16	16.139	0.019321	16.81
12	15.2	15.404	0.041616	24.01
13	15.2	15.765	0.319225	24.01
14	15.2	17.546	5.503716	24.01
15	17	21.071	16.573041	9.61
16	30	26.664	11.128896	98.01
	20.1	20.2415	45.753528	114.48
	(Y)		(T1)	(T2)

R ²	0.6003361	(1-T1/T2)
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➤ For Colony 2:

Circle Rate of Colony 2 in Mohali				
x	Observed	Predicted	SSE = (Y _o - Y _p) ²	SST = (Y _{mean} - Y _o) ²
1	20	20.748	0.559504	43.31285156
2	24	24.666	0.443556	6.662851562
3	28	26.552	2.096704	2.012851563
4	28	26.826	1.378276	2.012851563

5	26	25.908	0.008464	0.337851562
6	24	24.218	0.047524	6.662851562
7	22	22.176	0.030976	20.98785156
8	20	20.202	0.040804	43.31285156
9	17.1	18.716	2.611456	89.89410156
10	17.1	18.138	1.077444	89.89410156
11	17.1	18.888	3.196944	89.89410156
12	22	21.386	0.376996	20.98785156
13	30	26.052	15.586704	11.68785156
14	30	33.306	10.929636	11.68785156
15	45	43.568	2.050624	339.2503516
16	55	57.258	5.098564	807.6253516
	26.58125	26.788	45.534176	1586.224375
	(Y)		(T1)	(T2)

R ²	0.97129	(1-T1/T2)
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- Derivative and double derivative for colony 1 and colony 2 circle rate:

➤ Colony 1:

x	Predicted Price(y)	dy/dx	d ² y/dx ²
1	12.489	7.305	-2.468
2	18.614	4.999	-2.144
3	22.595	3.017	-1.820
4	24.756	1.359	-1.496
5	25.421	0.025	-1.172
6	24.914	-0.985	-0.848
7	23.559	-1.671	-0.524
8	21.68	-2.033	-0.200
9	19.601	-2.071	0.124
10	17.646	-1.785	0.448
11	16.139	-1.175	0.772
12	15.404	-0.241	1.096
13	15.765	1.017	1.420
14	17.546	2.599	1.744
15	21.071	4.505	2.068
16	26.664	6.735	2.392

dy/dx — First Derivative (Rate of Change)

- Positive dy/dx** → price is increasing (like rows 1–5)
- Negative dy/dx** → price is decreasing (like rows 6–10)
- dy/dx ≈ 0** → local maximum or minimum (turning point) — this happens around row 5 (x=5), where dy/dx = 0.025, very close to zero, marking the peak.

d^2y/dx^2 — Second Derivative (Curvature / Concavity)

- $d^2y/dx^2 < 0 \rightarrow$ curve is **concave down** (like a hill) — matches rows 1–9 in your table
- $d^2y/dx^2 > 0 \rightarrow$ curve is **concave up** (like a valley) — matches rows 10–16
- $d^2y/dx^2 = 0 \rightarrow$ **inflection point** (where concavity switches) — this happens between rows 9 and 10, since your data flips from negative to positive around there. ☐
 $d^2y/dx^2 < 0 \rightarrow$ curve is **concave down** (like a hill) — matches rows 1–9 in your table
- $d^2y/dx^2 > 0 \rightarrow$ curve is **concave up** (like a valley) — matches rows 10–16
- $d^2y/dx^2 = 0 \rightarrow$ **inflection point** (where concavity switches) — this happens between rows 9 and 10, since your data flips from negative to positive around there.

➤ Colony 2:

x	Predicted Price(y)	dy/dx	d2y/dx2
1	20.748	5.074	-2.452
2	24.666	2.832	-2.032
3	26.552	1.010	-1.612
4	26.826	-0.392	-1.192
5	25.908	-1.374	-0.772
6	24.218	-1.936	-0.352
7	22.176	-2.078	0.068
8	20.202	-1.800	0.488
9	18.716	-1.102	0.908
10	18.138	0.016	1.328
11	18.888	1.554	1.748
12	21.386	3.512	2.168
13	26.052	5.890	2.588
14	33.306	8.688	3.008
15	43.568	11.906	3.428
16	57.258	15.544	3.848

dy/dx — First Derivative (Rate of Change)

- Positive dy/dx** $\rightarrow$ price is increasing (rows 1–3): dy/dx goes from 5.074 down to 1.010, price rising from 20.748 to 26.552.
- dy/dx ≈ 0** $\rightarrow$ local maximum (turning point): between x=3 and x=4, dy/dx flips from 1.010 to -0.392, marking the peak around x $\approx$ 3.7 (price $\approx$ 26.8).
- Negative dy/dx** $\rightarrow$ price is decreasing (rows 4–9): dy/dx stays negative, from -0.392 down to -1.102, price falling from 26.826 to 18.716.
- dy/dx ≈ 0** $\rightarrow$ local minimum (turning point): between x=9 and x=10, dy/dx flips from -1.102 to 0.016 — very close to zero at row 10, marking the trough (price = 18.138, the lowest value).
- Positive dy/dx** $\rightarrow$ price is increasing again (rows 10–16): dy/dx climbs steadily from 0.016 to 15.544, price rising sharply from 18.138 to 57.258.

d^2y/dx^2 — Second Derivative (Curvature / Concavity)

- Negative d^2y/dx^2** $\rightarrow$ **curve is concave down** (rows 1–6): d^2y/dx^2 goes from -2.452 to -0.352, meaning the price is rising then bending over — this matches the hump shape

- as the curve climbs to its peak ($\sim x=3.7$) and starts falling.
- b. $d^2y/dx^2 \approx 0 \rightarrow$ **inflection point**: between $x=6$ and $x=7$, d^2y/dx^2 flips from -0.352 to 0.068 — very close to zero, marking where the curve switches from concave down to concave up, around $x \approx 6.8$ (price ≈ 22).
 - c. **Positive $d^2y/dx^2 \rightarrow$ curve is concave up** (rows 7–16): d^2y/dx^2 stays positive and keeps growing, from 0.068 up to 3.848 — this matches the curve bottoming out at the trough ($\sim x=9.9$) and then curving upward increasingly sharply as the price accelerates toward 57.258 .

Challenges, Risks, and Environmental Bottlenecks

Even then, there are some structural difficulties associated with incorporating huge urban sprawls into the rapidly growing real estate scenario. One of the most significant issues that comes up is the increasing occurrence of resource depletion and ecological imbalance. While existing cities have their own water sources, many of the new sectors in Mohali depend on the local groundwater source, causing a consistent fall in the levels of groundwater. Additionally, the quick construction causes strain on the waste disposal systems and drainage networks of the area, especially during the monsoons.

Additionally, the rapid addition of premium inventory raises concerns regarding potential oversupply within specific residential & commercial sub-sectors. If capital appreciation outpaces actual corporate employment growth, rental yields could experience downward pressure, causing market adjustments. The market also faces a digital and physical divide; while master-planned sectors enjoy advanced facilities, older inner pockets and unorganized city outskirts still face infrastructural challenges, inconsistent utility connections, and varying levels of public service delivery.

Prospects and Macro Trends

Looking ahead toward the end of the decade, the real estate sector in Mohali is positioned for further growth, driven by a combination of digital urban management and advanced transport frameworks. Chandigarh has grown more as compared to mohali, mohali market is stabilising since last 2 years.

The future of the market is characterized by structural convergence. Planners have begun to abandon the idea of zoning and instead adopt TOD principles. The future connectivity through metro corridors and buses rapid transit systems will connect remote zones with the commercial areas in the region. These connections will make it possible for people to reside in low-density zones but easily commute to the commercial zones like Aerocity and IT City without any hassles.

In addition, the expansion towards New Chandigarh (Mullanpur) and PR7 highway network makes for an institutional corridor which will pose a problem to traditional cities. With state support for project clearance, green building norms, and expanding corporate campuses, Mohali will remain a top real estate market in the region.

Conclusion

In conclusion, the evolution of Mohali from an agrarian periphery into a premier institutional real estate hub shows how strategic state planning and private developer cooperation can drive modern urban growth. Traditional plotted formats served as a useful step by introducing modern property assets to the region's expanding middle class. However, high capital requirements and infrastructure limitations restricted their ability to serve as a long-term foundation for scalable commercial growth.

The implementation of modern master plans completely reshaped this paradigm. By leveraging strategic aviation connectivity and creating transparent, RERA-compliant, and well-structured infrastructure corridors, Mohali achieved substantial real estate growth in a short span of time. It turned the modern high-rise and integrated commercial park into a standard property format, empowering everyone from multinational tech firms to premium residential investors.

Moving forward, the most successful real estate strategies will be those that prioritize sustainable resource management, balanced inventory distribution, and seamless integration with expanding regional transport networks. Ultimately, Mohali's real estate market is no longer just a suburban expansion; it has become the economic backbone of the modern Punjab economy.

Both sets of data contain examples of a non-linear, cubic pricing trend line with local maximums/minimums and one inflection point where concavity changes. In Colony 1, the price starts to increase reaching a local maximum around $x = 5$ ($y = 25.42$), denoted by the near-zero value of the first derivative dy/dx . Then comes the period of decrease, which is accompanied by an inflection point lying somewhere between $x=9$ and $x=10$, when the sign of the second derivative dy/dx switches from negative to positive. Reaching its minimum around $x=12$ ($y = 15.40$), the graph goes into a period of recovery towards the end of the time period under consideration ($y = 26.66$). At the same time, Colony 2 shows a quicker and more dramatic cycle with a maximum reached closer to $x = 3.7$ ($y = 26.83$), changing concavity sooner at an inflection point around $x = 6.8$. Having reached the minimum at $x=10$ ($y = 18.14$), Colony 2 demonstrates fast growth. Due to a sharply increasing first derivative and positive second derivative, it rises very fast reaching 57.258 at $x=16$.

Investment	Strength	Risk level
Real estate	Tangible asset, passive rental income, inflation hedge, tax deductions	Very low
Stocks	High growth potential, wealth generation, dividend income	Very high
Mutual funds	Professional management, instant diversification	High
Bonds	Fixed guaranteed interest, lower volatility	Moderate
Metal accounts	Haven, physical store of value against currency devaluation	High

Conservative Allocation

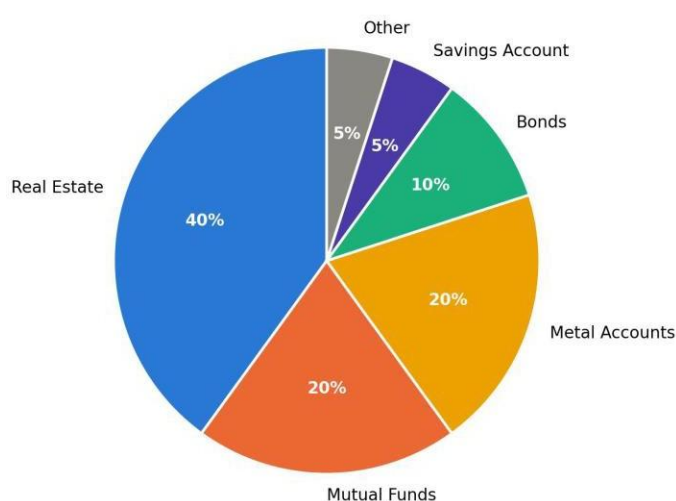


Figure 5: Conservation allocation for investments

Real estate is the anchor of this portfolio — it carries the lowest risk of all five asset types while still generating steady income and growing with inflation. That's why it gets the

biggest allocation (50%), with the remaining assets layered in to add growth, liquidity, and a hedge against currency risk.

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Biographies:

Gurrehmat Kaur

- Learning Paths School, Mohali, India

Achievements:

- 7.5 Band score in IELTS | 2025
- Participant in the Qualification round of International Youth Math Challenge | 2025
- Qualified for the final round of the National Economics Olympiad conducted by The Economics Society, SRCC | 2025
- Course on Financial Markets offered by Yale University through Coursera | July 2025
- Participant in the Franklin Essay Prize in the Psychology category | 2025
- Won the School round of the International Kenken Math Puzzle Olympiad India Edition | 2024
- Certificate of Distinguished Performance for the ASSET test | 2023-24
- Blue Ocean Student Entrepreneurs Mini - Course and Student Ambassador | 2025
- Received the Entrepreneurial Skill Pass from Junior Achievement Network | 2025-26
- CEO and CMO for CinnaBloom (Student led company), in the 2025 India National Final Lead Company of the Year Competition organized by The Global Education and Leadership Foundation JA India | 2025
- Team Leader for Wharton Global High School Competition | 2025
- Investment Banking Job Simulation with Bank of America through Forage | 2025
- First place in Youth Boardroom Challenge in the Business Conclave | October 2025 • Semi-finalist in the BizForHer Case Competition | 2025
- Completed 1Million Founders Bootcamp Program under the Developed India Mission | 2025
- 10 days Entrepreneurship Development Program - Empowering the Entrepreneurial Spirit at IIT Ropar | 2025

Under the guidance of:

Dr. Mamta Jain

- *M.Sc (Mathematics) (Double gold medalist).*
- *M.Phil (Computer Applications) with honours From University of Roorkee (now IIT Roorkee).*
- *PhD (Mathematics).*
- *Various papers published in international journals.*
- *Former Lead Auditor ISO 9001, ISO -22000 School Accreditation Examiner by QCI.*
- *26 years of teaching experience.*

Er. Raunaq Jain

- *B.E Mechanical Engineering graduate from Thapar Institute of Engineering and Technology.*
- *School Physics Topper.*
- *Mechanical Mentor from session 2019-2020.*
- *Technical Data Associate at Deloitte.*
- *Multiple research papers published.*



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