HDFC CAPITAL

BRIGADE REAP
REAL ESTATE ACCELERATOR PROGRAM

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CONCRETE MEETS CODE

3RD EDITION

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INNOVATORS

2024

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Knight Frank

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EXECUTIVE SUMMARY

Affordable housing is a high-impact solution to deliver cost-effective housing for individuals and families with median incomes. Affordable Housing is now a key focus in global discussions owing to rapid urbanization, exacerbating homelessness, deepening social and economic divides, and eroding community cohesion. As a result, it is critical to drive innovative strategies to address the growing demand for sustainable, accessible living spaces. Supply side policy interventions by the government such as the PMAY (U) scheme, are intended to expand affordable housing availability for the Economically Weaker Section (EWS) and Low-Income Group (LIG) population segments. However, rising prices have made housing unaffordable for even the Middle-Income Group (MIG) in micro markets closer to employment hubs. It is of utmost importance to overcome infrastructure bottlenecks through improving accessibility and increase in supply of urban land, to support housing affordability. Various infrastructure improvement projects in Tier I and Tier II cities such as the in-city metro connectivity and regional rapid transport system (RRTS), are welcome steps in the direction of improving regional connectivity and sustainable growth.

India is looking at a remarkable scenario where 67% of the Indian population is in the working age group, with a median age of 27.6 years[1]. This demographic shift offers both immense opportunities and significant challenges as number of young professionals seeking affordable urban housing will rise. Hence, addressing the housing challenge requires a new age strategic approach with attention to infrastructure development, integrating sustainability within construction and design, and leveraging technology as a transformative force.

Technology innovations are reshaping the real estate industry and making a significant impact, not only on how buildings are designed, constructed and maintained, but on how customers are serviced, accelerating a wave of new age PropTech solutions and startups.

PropTech holds a significant potential to improve real estate affordability by improving efficiencies at each stage of the real estate project lifecycle.

With the government support and a unified effort from the industry, India has the opportunity to spearhead a housing revolution that benefits individuals across all income levels, fostering a robust real estate sector in the future.

[1]UN Population Statistics, 2022

1

AFFORDABILITY LANDSCAPE IN HOUSING

1.1 Defining affordable housing

The concept of 'affordability' is a relative term with differing contextual connotations. A single, universally applicable definition of affordability is therefore, hard to find.

❝ Affordable housing is broadly defined as housing which is adequate in quality and location and does not cost so much that it prohibits its occupants meeting other basic living costs or threatens their enjoyment of basic human rights. ❞

– UN Habitat, 2011

To develop effective strategies and policies for affordable housing, governments around the world have established distinct definitions, generally based on income levels and the size of dwelling units.

The United States Department of Housing and Urban Development defines affordability as a situation wherein a household "pays no more than 30 percent of its annual income on housing". When housing expenditure is above 30 per cent of the annual income, families are 'cost-burdened' and must be provided financial support.

Ministry of Housing and Urban Affairs (MoHUA) conceptualize affordable housing as "any housing that meets some form of affordability criterion: this could be the income level of the family, the size of the dwelling unit or affordability in terms of Equated Monthly Instalments or ratio of house price to annual income.

Building on this context, the Ministry of Housing and Urban Affairs (MoHUA) launched the 'Housing for All' scheme in 2015, aimed at benefiting the Economically Weaker Section (EWS), Low Income Groups (LIG), and Middle Income Groups (MIG). The policy categorized households by income levels and aligned them with appropriate housing unit sizes.

Affordable Housing Category	**Dwelling Unit Size**
EWS	Upto 30 sq mt (carpet area)
LIG	Upto 60 sq mt (carpet area)
MIG	Upto 200 sq mt (carpet area)

1.2 Global & Regional Perspectives

55%
Population lives in urban areas as per WHO 2021

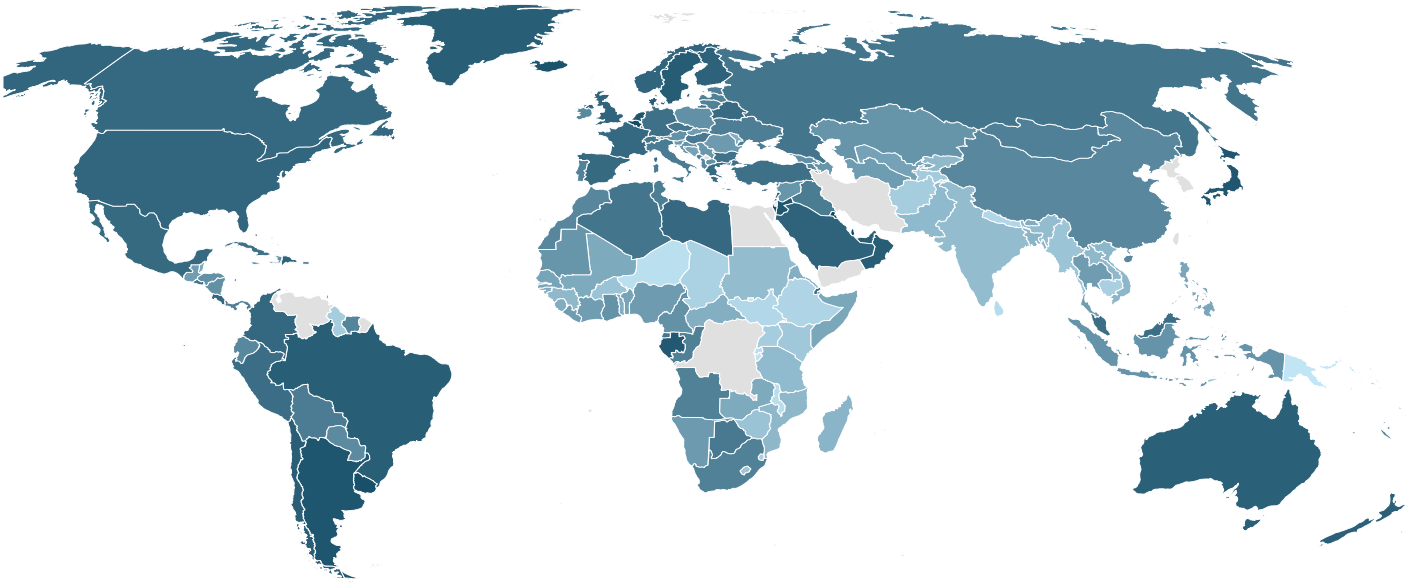
Addition of
1.6 billion
people to urban region by 2030 as per World Bank

3 billion
individuals will require adequate housing by 2030 as per UN Habitat. necessitating 96,000 new housing units daily.

The unprecedented urban expansion and population increase exert significant pressure on the housing markets globally. The incremental demand for housing frequently outpaces the rate of new home construction and pushes the property prices along an upward trajectory.

- Due to rapid urbanization and escalating costs of construction, land, and labour, housing affordability has emerged as a pressing concern worldwide. According to the UN, it is projected that by 2030, 3 billion people will be without adequate housing.
- The U.S. housing deficit rose to 4.5 million homes in 2022. In 2022, the number of families grew by 1.8 million, yet only 1.4 million new housing units were constructed, . This gap underscores a significant mismatch between housing supply and demand, exacerbating affordability challenges and increasing pressure on existing resources.[2]

Share of the total population living in the Urban Areas



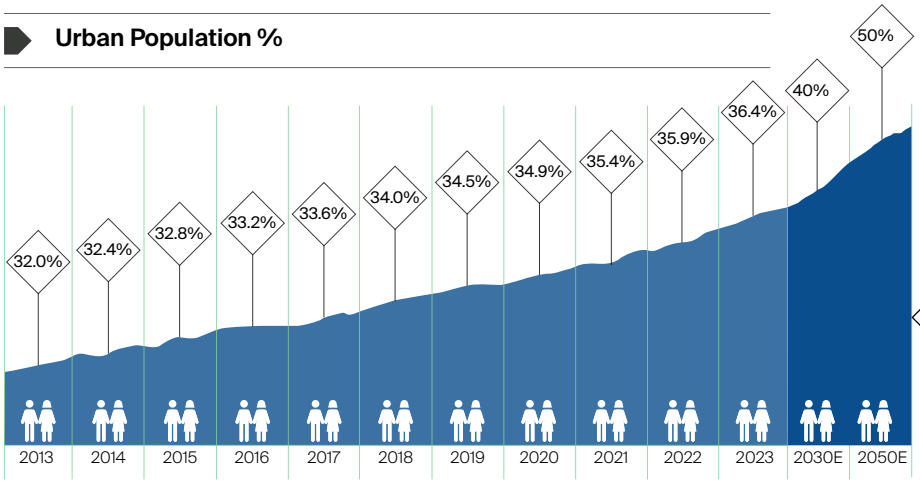
Low High Source – World Bank Group

[2]Zillow Press Release

1.3 Affordable Housing - Indian Scenario

With a population of 1.43 bn, India is at the forefront of global demographics. The population growth has been accompanied by swift urbanization driving economic growth. To sustain and further this prosperity, ensuring the availability of quality housing complemented by essential amenities, will significantly enhance its residents' productivity and overall economic development.

Urban Population %

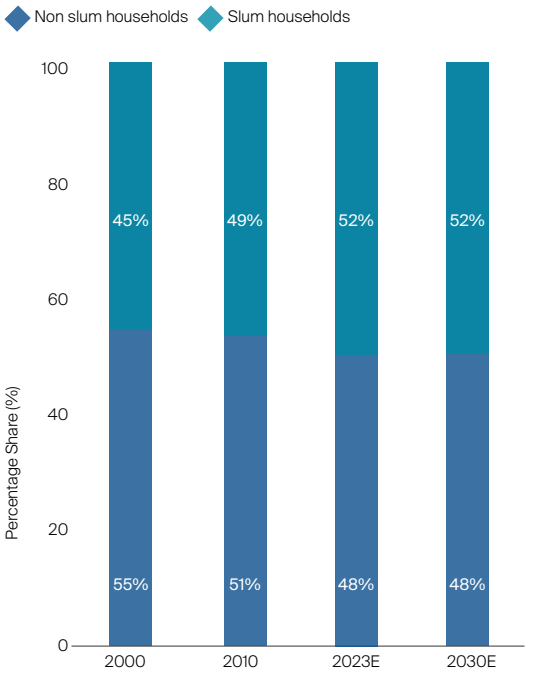


Source: World Bank Group, Press Information Bureau, GoI

As per World Bank data, as of 2023, 36% of India's population resides in urban areas, and this is anticipated to increase to 40% by 2030.

Within this urban population, around 73 mn households are likely to reside in informal housing or slums in India. This underscores the urgent need for affordable housing in urban centres across the country.

Urban slum and non-slum households



Source: World Bank, Knight Frank Research

The accelerating pace of urbanization is well reflected in the increasing number of cities in India with a population exceeding one million. According to various estimates, India had 23 cities with populations of one million or more in 1991, a figure that is projected to have increased to 63 in 2021.

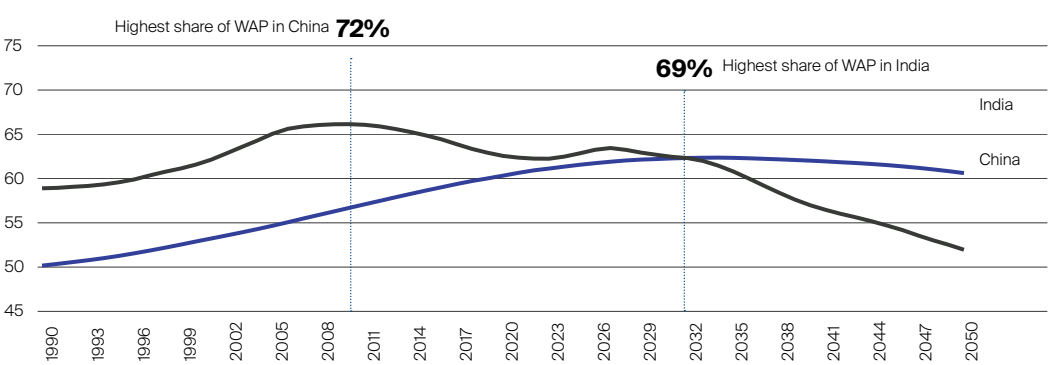
The rapid urbanisation, expansion of urban areas and insufficient housing supply relative to demand are the key factors contributing to the shortage. This shortage exacerbates social inequalities, as lower-income families struggle to find affordable housing options. It also affects overall economic stability, as high housing costs limit disposable income and consumer spending.

To tackle the housing shortage, we need innovative solutions, including increased investment in affordable housing and infrastructure, supportive policies, and the use of technology to enhance efficiency in the housing market. Bridging the gap between supply and demand will require collaboration among governments, private sectors, and communities to develop sustainable solutions to this escalating challenge.

1.4 Demographic Dividend: A Call to Action for Affordable Housing

India's demographic landscape has been evolving rapidly. In 2023, the country officially became the most populous nation, overtaking China. When the working-age population in a country surpasses the proportion of the very young and elderly, the nation enters what is known as the demographic dividend zone. As per International Labor Organization (ILO), India is currently within the demographic sweet spot having a population of more than 1.4 bn with approximately 67% of Indians in the working age group and an median age of 27.6 years.

Share of Working age population to Total Population

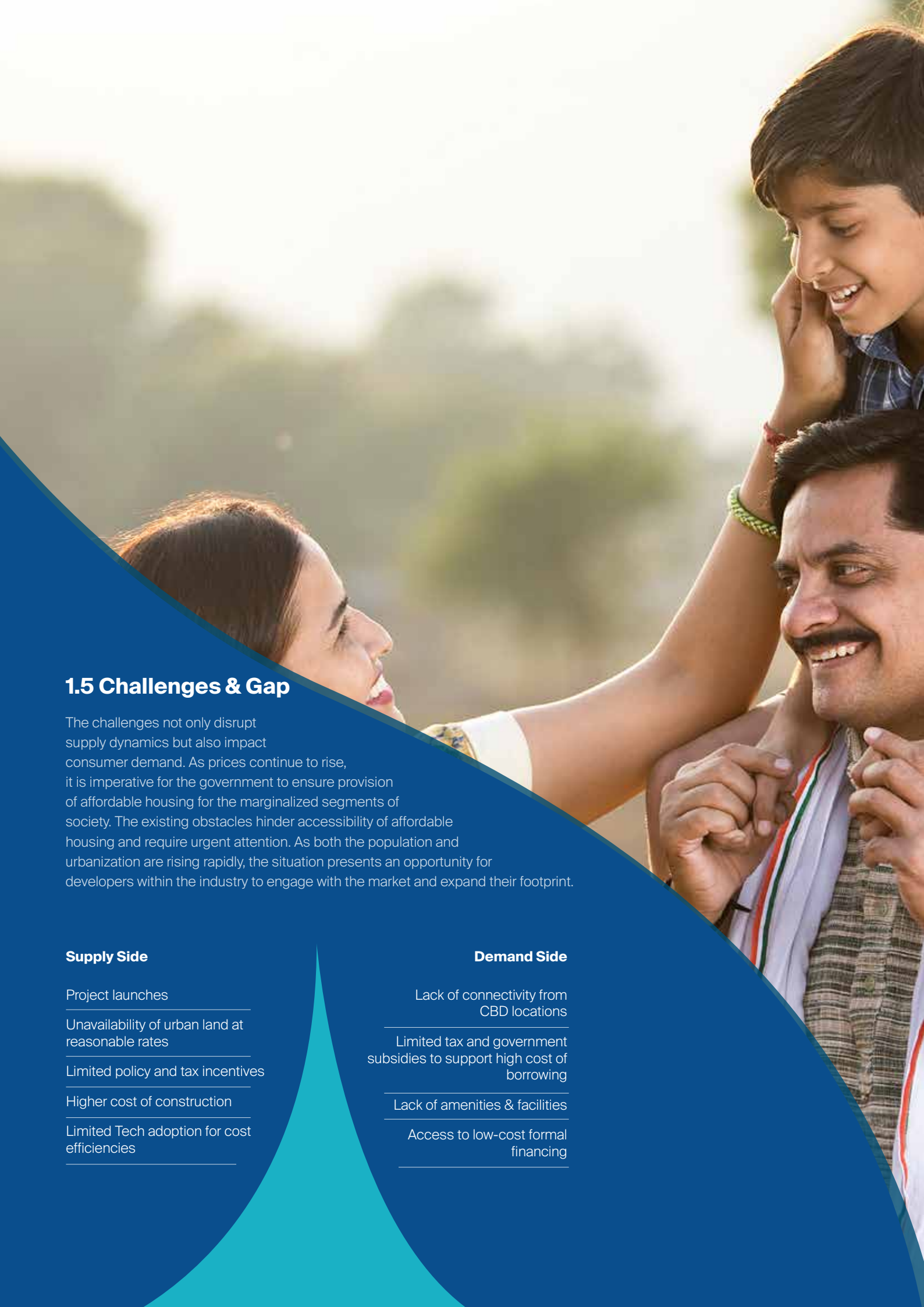


As per United Nations, India is expected to peak its working age population by 2030.

Source (basic data): UN population statistics 2022; WAP stands for working age population

India's demographic shift offers both immense opportunities and significant challenges, particularly in the context of housing. With a significant proportion of the population under 30, India has the potential for economic growth through a large, productive workforce. Rapid urbanization driven by job opportunities is further intensifying this need, with young professionals seeking affordable homes in cities.

While India's demographic dividend offers potential for economic growth, addressing the housing challenge is crucial to ensuring that this growth is inclusive and sustainable. Developing affordable housing through policy support and improving infrastructure will be key to harnessing this opportunity effectively. Moreover, the expansion of skilled workforce in Tier 2 cities, is broadening housing demand beyond major metros.



1.5 Challenges & Gap

The challenges not only disrupt supply dynamics but also impact consumer demand. As prices continue to rise, it is imperative for the government to ensure provision of affordable housing for the marginalized segments of society. The existing obstacles hinder accessibility of affordable housing and require urgent attention. As both the population and urbanization are rising rapidly, the situation presents an opportunity for developers within the industry to engage with the market and expand their footprint.

Supply Side

- Project launches
- Unavailability of urban land at reasonable rates
- Limited policy and tax incentives
- Higher cost of construction
- Limited Tech adoption for cost efficiencies

Demand Side

- Lack of connectivity from CBD locations
- Limited tax and government subsidies to support high cost of borrowing
- Lack of amenities & facilities
- Access to low-cost formal financing

2

KEY FACTORS DRIVING HOUSING AFFORDABILITY

2.1 Current Policy landscape and its impact

To uplift living conditions in India, the Government has implemented various initiatives to create a supportive ecosystem to promote affordable housing for the weaker section of the society.

The Government of India launched affordable housing initiatives aimed at achieving ***'Housing for All'*** by 2022 through collaboration between Central and State Governments which is now extended to 2029. The policies target lower and middle-income groups,
offering subsidies on home loan interest rates. The schemes promote home ownership by easing the financial burden for individuals who qualify. The policies ensure that homes come with essential amenities like water and electricity.

2011

Rajiv Awas Yojana (RAY)

To achieve a slum-free India by providing affordable housing and improving slum conditions

2015

Pradhan Mantri Awas Yojana 1 (PMAY 1)

To mitigate the urban housing shortage for EWS, LIG, MIG, and slum dwellers by providing durable, permanent homes

PMAY (Urban) Progress:

11.86 Mn	8.7 Mn	INR 8,070 Bn
Houses Sanctioned	Houses Completed	Total Investment

Note: Data as on 30th September 2024

2019

GST Rate Reduction

The GST council has reduced the GST rate for affordable housing from 8% to 1%.

2021

National Urban Rental Housing Policy (NURHP)

To promote rental housing as a viable option for urban residents

2024

Pradhan Mantri Awas Yojana 2 (PMAY 2)

Target of 10 mn houses in urban and 20 mn houses in rural areas for urban poor and middle-class families over the next five years, with an investment of INR 10,000 billion and a government subsidy of INR 2,300 billion

Pradhan Mantri Awas Yojana (Urban) 2.0[3]

Aim: To construct 10mn houses for urban poor and middle-income groups over the next five years starting September 2024.

INR 10,000 bn
Total Investment

INR 2,300 bn
Government Subsidy

EWS Household
Annual Income upto INR 0.3 mn

LIG Household
Annual Income from INR 0.3 to 0.6 mn

MIG Household
Annual Income from INR 0.6 to 0.9 mn

Components:

1) Beneficiary Led Construction (BLC): Financial Assistance to eligible EWS families to construct new houses on their own available vacant land. States/UTs may also provide land rights (pattas) to landless beneficiaries.

2) Affordable Housing in Partnership (AHP): Financial assistance to EWS beneficiaries for owning houses constructed in partnership with States/UTs, cities, public, and private agencies. Additional grants, such as the Technology Innovation Grant (TIG) of INR 1,000 per sqm/unit, will be provided for projects using innovative construction technologies.

3) Affordable Rental Housing (ARH): To provide rental housing for working women, industrial workers, urban migrants, and other eligible groups through two approaches: utilising existing vacant government-funded houses and building new units. A TIG of INR 3,000 per sqm from central government and INR 2,000 per sqm from state government will support projects employing innovative technologies.

4) Interest Subsidy Scheme (ISS): Offers a 4% interest subsidy on home loans up to INR 0.25 mn for EWS/LIG and MIG families in five yearly instalments with a maximum subsidy of INR 0.18 mn.

Financial assistance provisioning:

4% for urban for all income groups
Interest Rate Subsidy

AHP: INR 0.25 mn
combined by central and states

BLC: INR 0.25 mn
combined by central and states

ISS: Up to INR 0.18 mn
per unit

[3]Ministry of Housing and Urban Affairs

2.2 Infrastructure investment to boost housing affordability

High returns in conventional real estate assets, primarily in assets build for upper middle to higher income groups, is incentivising developer to prefer those over affordable housing. The high cost of land in prime locations and elevated development expenses have made housing unaffordable. Alternative housing locations, such as the outskirts of cities, often lack the necessary infrastructure and connectivity to city centers. With the increase in migration to Tier-1 cities, soaring real estate prices, and overstretched infrastructure, improvement in regional connectivity is crucial. Infrastructure will integrate suburban areas, improve accessibility, and alleviate pressure on urban centers, and ultimately increase the supply of affordable housing.

Infrastructure development can support affordable housing at various levels:

- ***City level:*** Enhancing city outskirts connectivity to city centers and employment hubs.
- ***Regional level:*** Infrastructure improvements through mass regional transport services shall connect satellite towns to employment centres and reduce housing burden on major cities.
- ***State / central level:*** Policy support and financing initiatives for infrastructure improvement in Tier II and III cities, shall pave the way for sustainable growth and development.

Rapid Infrastructure Development

National Highway

National Highway ('000 Km)	2014	2024	2030E
	91	146	185

India now has the 2nd largest overall road network in the world

Added ~60% to its NH network in 10yrs; To grow to 185k kms by 2030

Airports

Airports (Nos.)	2014	2024	2030E
	74	158	220

India is the fastest growing & 3rd largest aviation market in the world

It has doubled its operational airports over last 10 yrs with passenger count jumping to 152 mn in 2024 vs 67 mn in 2014

Railway Network

Railway Network ('000 Km)	2014	2024	2030E
	66	126	175

India has doubled its total railway network in 10 yrs with 93% of the network electrified vs 32% 5 yrs ago

Reached total Metro Rail Network of 945 kms in 2024 vs 248 in 2014

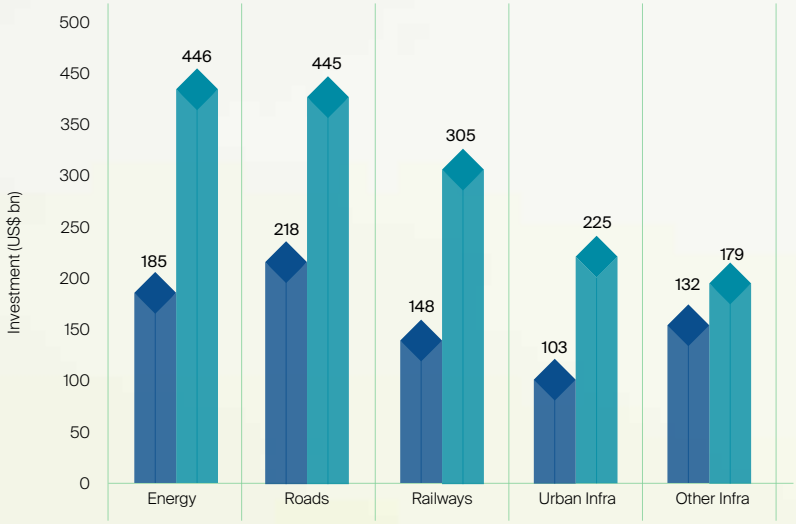
High Speed Rail (Bullet Train) of 508 kms to be operational by 2028

1,318 railway stations identified for redevelopment

India: Investment in Physical Infrastructure (US$ bn)

US$785 bn
Total FY 17-23

US$1,620 bn
Total FY 24-30E



India's investment in physical infrastructure is expected to total ***US$ 1.6 tn*** in FY24-30E vs ***US$ 785 bn*** in FY17-23 (a jump of ***106%***)

Source: Press Information Bureau; Government of India Publications; CRISIL; USD/INR: 83.8

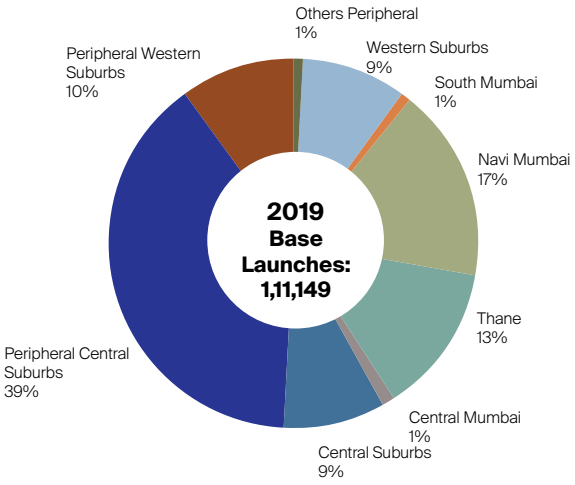
Ongoing infrastructure projects are connecting the outskirts of cities to employment centers by shortening travel times and making these areas more liveable and affordable. To highlight this, a detailed overview of recent projects in the Mumbai Metropolitan Region (MMR), National Capital Region (NCR), and Bangalore is provided:

Mumbai Metropolitan Region (MMR)

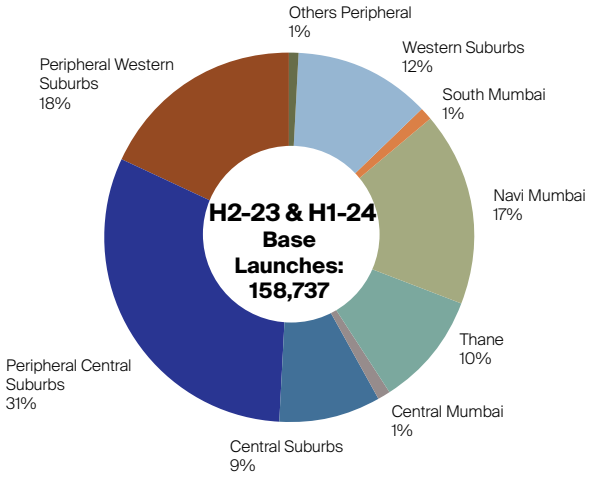
CBD Legend	
1	BKC
2	Lower Parel
3	Nariman Point
4	Andheri Kurla Road
5	Vashi

S.No.	Project Name	Description
1	Mumbai-Vadodara-Delhi Expressway	Approx. 1,350 km, 8 lane access-controlled expressway Expected completion 2025 Reduce travel time from 24 hrs to ~12 hours
2	Mumbai Metro	Partially Operational . This shall decongest existing local rail network, road infrastructure , and reduce travel time between suburbs and CBDs. Total metro length in 337 kms.
3	Coastal Road	29.2 Km long expressway Partially Completed between Marine Drive - Worli; Next Phase: Bandra – Kandivali expected completion 2029). Reduce travel time between Marine Drive and Kandivali from 2 hours to 40-45 minutes
4	Mumbai Trans Harbour Link	Operational; 22 Km expressway connecting Mumbai to Navi Mumbai, reducing travel time between South Mumbai and Navi Mumbai from 90-120 minutes to 20-30 minutes
5	Virar Alibaug Multimodal Corridor	126 km long expressway . Expected Completion 2030 Reduce travel time from 3-4 hours to 1.5-2 hours
6	Airoli Tunnel	Length: 1.69 Km . Expected completion 2024 Reduce travel times between Thane to Navi Mumbai from ~60 minutes to 30 minutes
7	Navi Mumbai Airport	Greenfield international airport Expected Completion: March 2025 Impact on reducing the congestion at existing airports with a capacity to manage air traffic of 60 million passengers annually
8	Bullet Train	Length: 508 km . Expected Completion: December 2028 Provide regional connectivity between Ahmedabad to Mumbai (BKC), reducing time from 7 hours to 2 hours

MMR Launches Split (CY 2019)

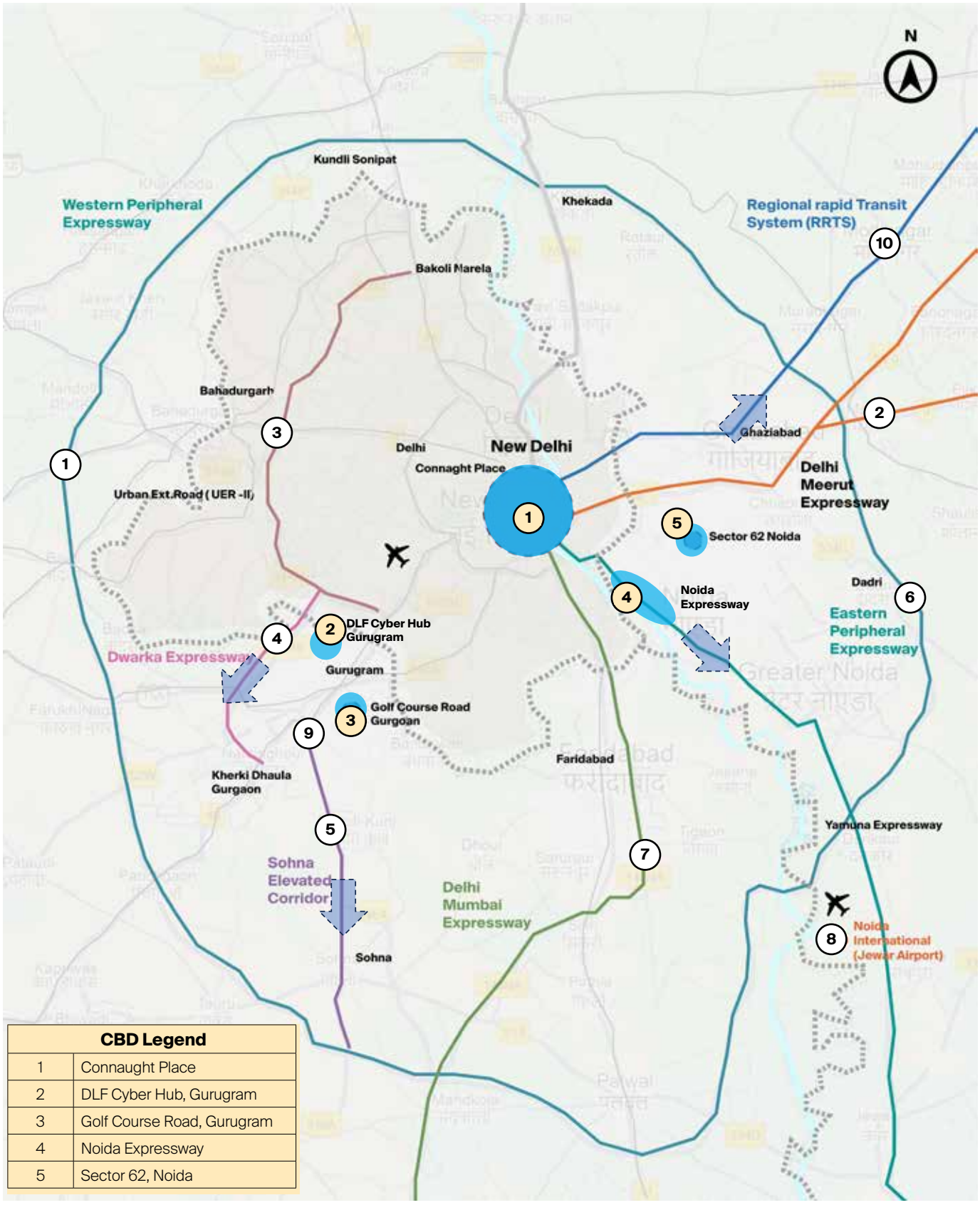


MMR Launches Split (H2 2023 & H1 2024)



Sr. No.	Micro-Market	Locations
1	Central Mumbai	Dadar, Lower Parel, Mahalakshmi, Worli, Prabhadevi
2	Central Suburbs	Sion, Chembur, Wadala, Kurla, Ghatkopar, Vikhroli, Bhandup, Mulund
3	Navi Mumbai	Vashi, Nerul, Belapur, Kharghar, Airoli, Panvel, Ulwe, Sanpada
4	Peripheral Central Suburbs	Kalyan, Kalwa, Dombivli, Ambernath, Bhiwandi, Mumbra, Karjat
5	Peripheral Western Suburbs	Vasai, Virar, Boisar, Palghar, Bhayandar, Nalasopara
6	South Mumbai	Malabar, Hill, Napean Sea Road, Walkeshwar, Altamount Road, Colaba
7	Thane	Naupada, Ghodbunder Road, Pokhran Road, Majiwada, Khopat, Panchpakhadi
8	Western Suburbs	Bandra, Andheri, Goregaon, Kandivali, Borivali, Santacruz, Vile Parle

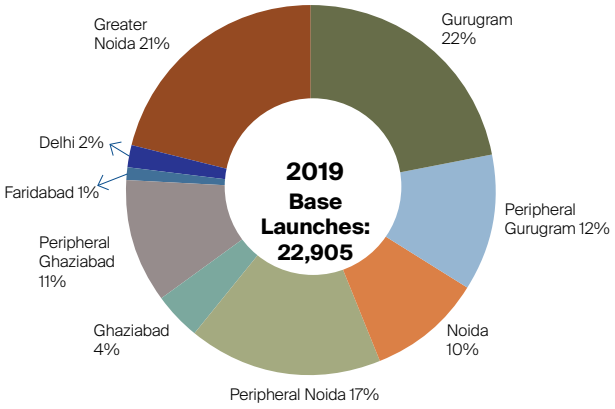
National Capital Region (NCR)



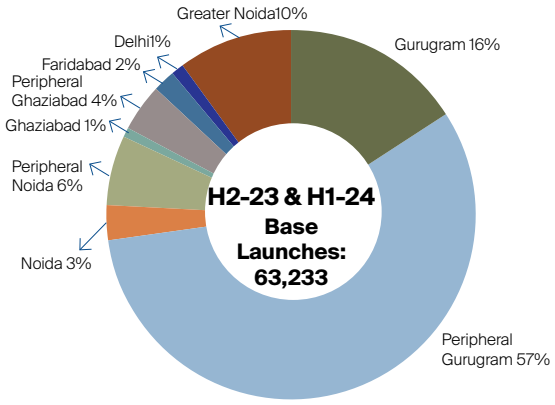
CBD Legend	
1	Connaught Place
2	DLF Cyber Hub, Gurugram
3	Golf Course Road, Gurugram
4	Noida Expressway
5	Sector 62, Noida

S.No.	Project Name	Description
1	Western Peripheral Expressway	Length: 135 km, Completed, Reducing travel time from Sonipat to Manesar from 2-3 hours to 1-1.5 hours Diverts non-Delhi traffic, reduces congestion in Delhi by 50-60%
2	Delhi Meerut Expressway	Length: 96 Km, Completed Reducing travel time from 2.5-3 hours to 45-50 minutes.
3	Urban Extension Road (UER-II)	Length: 75 Km. Expected Completion 2025 Reducing travel time from Panipat to Delhi airport from 2 hours to 20-30 mins
4	Dwarka Expressway	Length: 29 Km. Completed in 2024 Reducing travel time from Dwarka to Gurgaon from 1-1.5 hours to 20-25 mins
5	Sohna Elevated Corridor	Length: 21 Km, Completed Reducing travel time from Gurgaon to Sohna from 1 hours to 20-25 mins
6	Eastern Peripheral Expressway	Length: 135 Km, Completed Reducing travel time from Ghaziabad to Kundli from 2-2.5 hours to 1 hour
7	Mumbai-Vadodara-Delhi Expressway	Length: approx. 1,350 km, Expected completion 2025 Reducing travel time from ~24 hours to ~12-13 hours.
8	Noida International Airport	Capacity: Up to 12 million passengers annually, Expected completion 2025 Reducing congestion at IGI Airport and on roads
9	Proposed Gurgaon Metro	Length: 28.5 Km, Expected completion 2028 Expected to reduce time from Millenium City Centre to Dwarka expressway from 1hour to 20-25 mins
10	Regional Rapid Transit System (RRTS) from Delhi to Meerut	Length: 82.1 Km, Partially completed Reducing travel time from Sarai Kale Khan (Delhi) to Meerut City Centre from 1.5 hours to 30 mins

NCR Launches Split (CY 2019)



NCR Launches Split (H2 2023 & H1 2024)

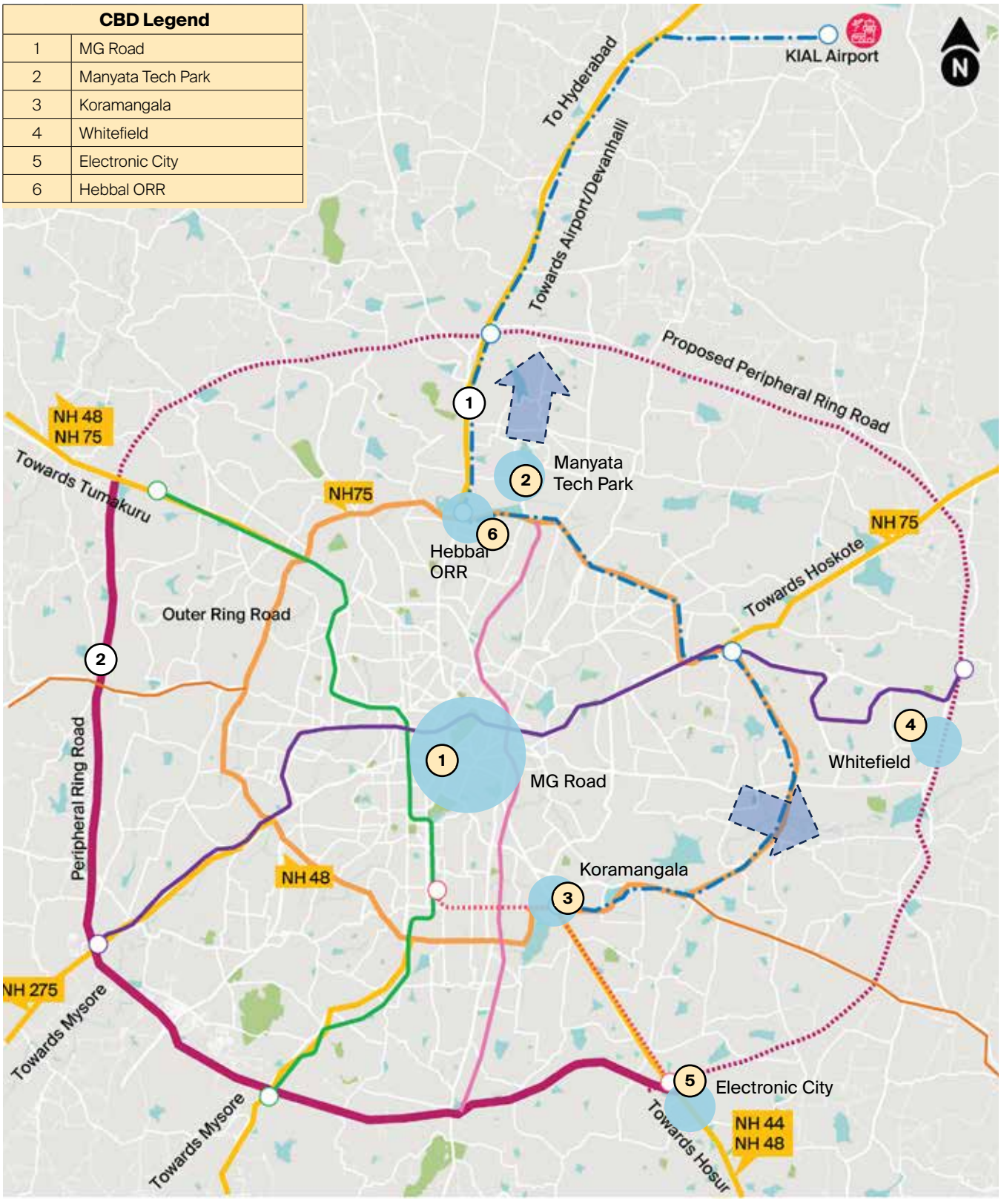


Sr. No.	Micro-Market	Locations
1	Gurugram	Old Gurgaon, Palam Vihar, Golf Course Rd, Golf Course Extension Rd, DLF Phase I to V, South City, Sushant Lok, Ardee City, Sohna Road and Faridabad Road, etc.
2	Peripheral Gurugram	Dwarka Expressway, New Gurgaon, Southern Peripheral Road, Sohna, Western Peripheral Road and Manesar etc.
3	Noida	Sector 16, 22, 23, 25, 26, 30, 31, 32, 44, 45, 46, 48, 50, 51, 52, 62, 70, 73, 74, 75, 76, 77, 78, 79, 93, 94, 96, 98, 100, 104, 106, 108, 110, 124, 128, 129 etc.
4	Peripheral Noida	Sector 113, 113, 117, 118, 119, 120, 121, 131, 133, 135, 137, 143, 144, 146, 150, 151, 152, and 168 etc.
5	Ghaziabad	Crossings Republik, Indirapuram, Kaushambi, Mohan Nagar, Raj Nagar, Sahibabad, Rajendra Nagar, Nehru Nagar, Shalimar Garden, Vaishali and Vasundhara etc.
6	Peripheral Ghaziabad	NH-24, Raj Nagar Extension, Lal Kuan, Govind Puram and Tronica City etc.
7	Faridabad	Sector 1, 19, 28, 30, 31, 34, 37, 39, 43, 48, 49, 57, 63, 64, 70, 72, 75, 76, 77, 78, 79, 80, 81, 84, 85, 86, 87, 88, 89 and Suraj Kund etc.
8	Delhi	Akshardham, Connaught Place, Dwarka, Okhla, Punjabi Bagh, Shahdara, Subhash Nagar, Greater Kailash, Shivaji Marg, Kishanganj and Kirti Nagar etc.
9	Greater Noida	Sector Alpha, Beta, Chi, Omega, Omicron, Phi, Sigma, Techzone, Pari Chowk, Knowledge Park, Jaypee Greens, Ecotech, Delta and Dadri etc.

Source: Knight Frank Research

Bengaluru Metropolitan Region (BMR)

CBD Legend	
1	MG Road
2	Manyata Tech Park
3	Koramangala
4	Whitefield
5	Electronic City
6	Hebbal ORR

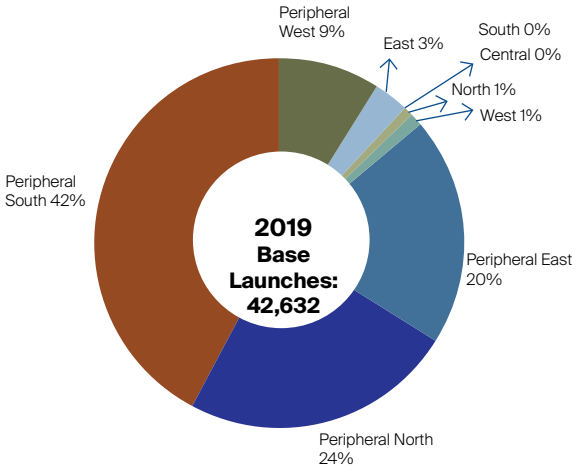


Peripheral Ring Road
Outer Ring Road
Bangalore Metro Green Line (Nagasandra – Silk Institute) Operational
Bangalore Metro (Airport Line) -UC
Bangalore Metro (Rashtreeya Vidyalaya Road – Bommasandra) UC
Bangalore Metro (Kengeri- Whitefield) Operational
Proposed Peripheral Ring Road
Bangalore (Nagavara to Gottigere) UC

S.No.	Project Name	Description
1	BMRCL Metro	Length: 73.8 Km Phase I & II: Completed Expected completion of phase III by 2026 Reducing travel time to 15 mins from 45-60 mins from MG Road to Baiyappanahalli
2	Nandi Infrastructure Corridor Enterprise (NICE) Road	Length: 41 Km Completed Reducing travel time from Bangalore to Mysore from 3 hours to 90-120 minutes.
3	Bangalore Suburban Railway Project	Length: 148 Km Expected completion 2026 Expected to reduce congestion on city roads and shorten commute times from suburbs by up to 50%
4	Satellite Town Ring Road (STRR)	Length: 204 Km Expected completion 2026 Reduce travel time from 3 hours to 1-2 hours

- Peripherals of East and North Bengaluru led unit launches, with suburbs of East Bengaluru towards Whitefield seeing a more than twofold increase from 9,504 to 24,450 units.
- Upcoming infrastructures like Peripheral Ring Road and airport expansion is attracting project launches and price escalation in the proximity around areas like Whitefield and Yelahanka.

BMR Launches Split (CY 2019)



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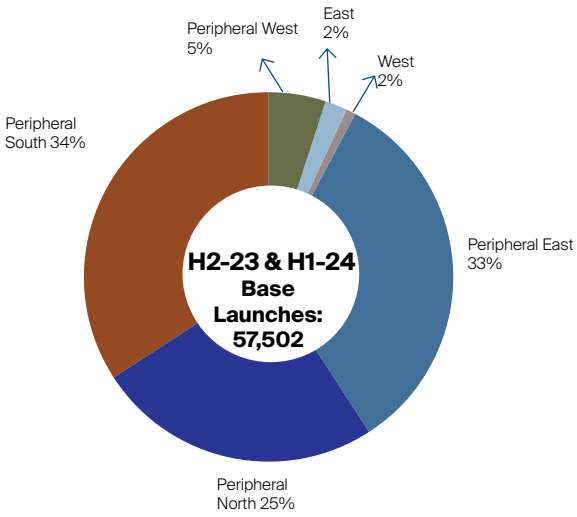


Sr. No.	Micro-Market	Locations
1	East	Indiranagar, Domlur, Cambridge Road, Marathalli, Yemalur, Vimanapura, New Tippasandra, Bellandur, Kodihalli
2	Central	Cantonment, Dickenson Road, Infantry Road, Kasturba Road, M.G Road, Vasanth Nagar, Richmond Road, Richmond Town, Lanford Road, Chickpet, Chamrajapet
3	North	Cox Town, Fraser Town, HBR Layout, Richards Town, Sanjay Nagar, R.T Nagar, Kalyan Nagar, Lingarajapuram, Nandini Layout, Ganganagar
4	South	Banashankari, BTM Layout, Hosur, Jayanagar, Koramangla, HAL Layout
5	West	Malleswaram, Mathikere, Yeshwanthpur, Rajajinagar, Okalipuram, Cottonpet, Mahalakshmi Layout, Vijay Nagar
6	Peripheral East	Bhoganahalli, Brookefields, Whitefield, Hoskote, Huskur, Chikkadasarahalli, Munnekollal, K.R Puram, Chansandra, Gunjur, TC Palaya, Mandur
7	Peripheral North	Hebbal, Yelahanka, Devanahalli, Jallahalli, Jakkur, Mallasandra, Nandi Hills, New Airport Road, Sanjeevni Nagar, Thanisandra
8	Peripheral South	Electronic City, Dommasandra, Jigani, Hosa Road, Haralur Road, Sarjapur, Sarjapur Road, Uttarahalli, Sompura, ORR-South East, Rayasandra, Kudlu, Kasavanahalli, Chandapura, Bannerghatta, Bomanahalli
9	Peripheral West	Dasarahalli, Bidadi, Kumbalgodu, Mysore Hughway, Tumkur Road, Mallathahalli

Source: Knight Frank Research

2.3 Leveraging Technology to Improve Affordability in Housing

With a median age of 27.6 years, India is currently benefitting from its demographic dividend having a large share of population in the youthful age-group. This young population is not only driving the overall economic growth but also rapidly embracing technology.

DIGITALISATION IN INDIA

7.4%

CAGR growth of Internet Users from 2019 to 2023[4]

52.4%

Internet Penetration[5]

[4]Internet and Mobile Association of India | [5]Digital 2024: India

Source- Internet in India 2023, State of India's Digital Economy, 2024

Real estate industry faces unprecedented market dynamics, influencing demand, competition, quality and service expectations. The volatile market dynamics have given impet logical innovations. Smartphones, tablets, WiFi, and 4G/5G connectivity have transformed the dissemination of information, enhanced our ability to work on the go, and spurred a wave of entrepreneurship.

One of the largest impacts of technological innovations is on how building projects are conceptualised, designed, planned, constructed, monitored, and delivered. It has even influenced the service level expectations of the end customers. Efficiently designed buildings supported by lifecycle cost-reducing technologies are cornering demand.

PropTech technologies are disrupting property development. Pre-fabrication, construction site robotics, and process automation have already found wide range of acceptance across the industry. Intelligent building design, Smart building technologies and Building information modelling are beginning to influence the way buildings are designed, constructed and managed. There exists consensus across the industry on future impact of digital and technological innovation on business.

Data is at the heart of all PropTech. Companies are fast moving from the data they have to data they need. A well-structured relevant data will be key to PropTech technologies facilitating faster, smarter data driven decisions.

One crucial area where PropTech can significantly impact is housing affordability. By utilizing technology, data analytics, and automation, PropTech platforms are transforming traditional processes, faster construction, streamlining operations, and creating new opportunities for increased affordability in the housing market.

The ability to foresee technological disruptions and the ability to rapidly and masterfully adapt to PropTech will be key to future success in development of the real estate industry.

3

PROPTECH – SHAPING THE FUTURE OF REAL ESTATE INDUSTRY

3.1 PropTech: Global Perspective

~USD 50 bn
Investment in PropTech in 2023

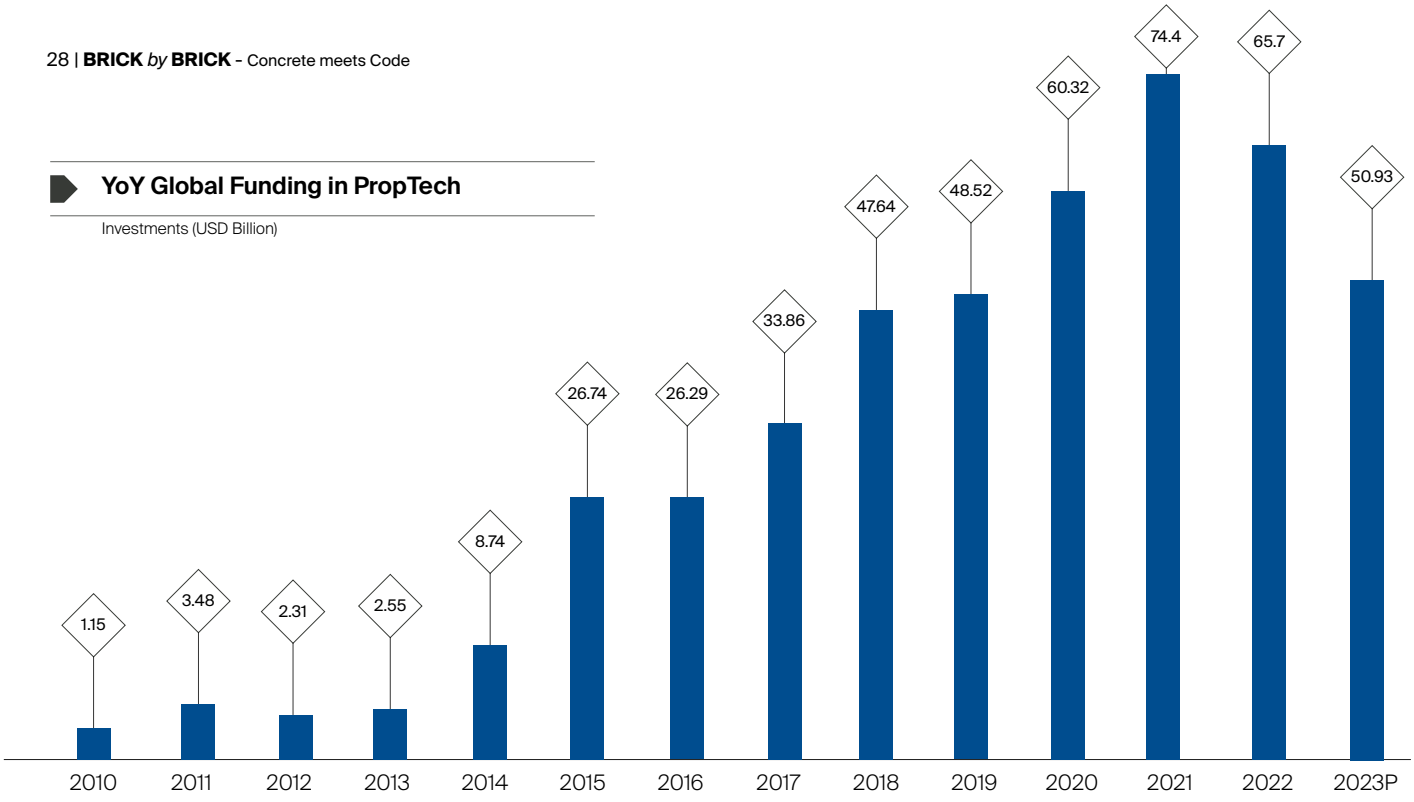
The US, China and The UK
received maximum investment in 2023

Source – PropTech Global Trends 2023 Barometer

The term ***"PropTech"*** gained traction following the dot-com boom of the 1990s and experienced significant growth during the second decade of the 21st century. As internet usage and digitalization accelerated, PropTech's role became increasingly important, fuelled by advancements in emerging technologies.

YoY Global Funding in PropTech

Investments (USD Billion)



Source – PropTech Global Trends 2023 Barometer

During the COVID-19 era, there was a surge in interest in exploring properties through technologies like augmented reality (AR), virtual reality (VR), and digital tours, which created new opportunities and engaged various stakeholders. The annual funding in global PropTech market reached USD 74.4 billion in 2021. However, by 2023, this figure declined to around USD 50 billion, reflecting a normalization of the market after a period of rapid growth and optimism during the pandemic.

As of 2022-23, India ranks 6th among the top 500 global PropTech deals, following industry leaders such as the USA and China, which hold the 1st and 2nd positions respectively, highlighting, India's growing presence and influence in the global PropTech landscape.[4]

[4]PropTech global Trends Barometer 2023

Top Global PropTech Companies

Opendoor

PropTech platforms specializes in selling and buying residential property

Founded in 2014 | Region: United States
Market Capitalisation: $1.33 Billion

Zillow Inc

app-based listing platform for residential properties

Founded in 2005 | Region: United States
Market Capitalisation: $14.7 Billion

Redfin

PropTech platforms specializes in selling and buying residential property

Founded in 2004 | Region: United States
Market Capitalisation: $1.37 Billion

Matterport

Provider of cloud and AI-based virtual tour solutions for construction professionals

Founded in 2011 | Region: United States
Market Capitalisation: $1.53 Billion

EliseAI

Conversation AI platform and CRM solutions for Housing sector

Founded in 2017 | Region: United States
Last Valuation: $1.0 Billion

Source: Yahoo Finance, Pitch Book
Market Cap in USD as of 15th Oct. 2024

3.2 PropTech in India

The impact of technological advancements in Indian real estate is becoming increasingly clear, as the sector shifts away from its reliance on outdated methods that lacked transparency and resisted innovation. The rise of the internet and digitalization has significantly boosted the acceptance of PropTech among stakeholders. This digital transformation in India, driven by the need to address inefficient processes, meet evolving consumer expectations, respond to globalization and rapid urbanization, and align with government initiatives like Digital India, has led to the emergence of innovative solutions.

2030 **$16 bn**

2023 **$6 bn**

Cumulative PropTech investment is projected to grow by 15% CAGR

6%

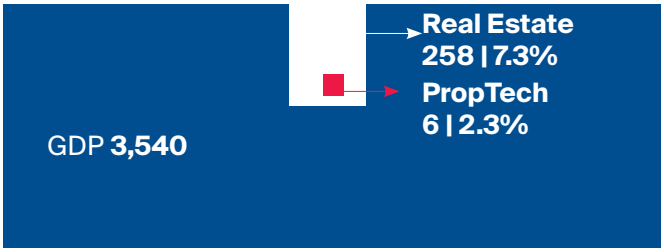
Share of PropTech in total recognized Indian startups (2023)

6th

in the world based on total funding raised

Source-Knight Frank Research, Aurum Proptech Annual Report 23-24, Startup India
Note- The projected value is basis growth in real estate, IT sector and internet users

Share of PropTech in Real Estate in 2023 (USD Billion)



Source: IBEF, Aurum PropTech

The real estate sector in India accounts for 7.3% of the country's Gross Domestic Product (GDP). Within this sector, PropTech contributes approximately USD 6 billion, representing a 2.3% share of the overall real estate market.

Private Equity Landscape in Indian PropTech

Major Global Investors focused on PropTech

- SoftBank Group
- Tiger Global Management
- Accel

Major Indian Investors focused on PropTech

- HDFC Capital
- Brigade REAP
- Gruhas Venture Capital

The surge in investment in 2022-2023 period underscores the confidence that venture capital firms and corporate investors are placing in the sector's potential.

- NoBroker raised $210 million in a Series E round led by General Atlantic, Tiger Global, and Moore Strategic Ventures in 2022.
- Square Yards secured $70 million in Series D funding from Goodwater Capital and Kalyani Group in 2023.
- Propstack raised $45 million in Series B funding led by WestBridge Capital in 2023

Top Indian PropTech Companies

Infra.Market

Online marketplace platform for procurement of construction materials

Founded in 2016

Major Investors: Tiger Global Management

LivSpace

Online platform offering in-house interior designs for home improvements

Founded in 2014

Major Investors: Bessemer Venture Partners

NoBroker

Provider of a listing platform for residential and commercial properties

Founded in 2014

Major Investors: General Atlantic

MapmyIndia

Provider of map data, GPS-based navigation products, and mobile apps

Founded in 1995

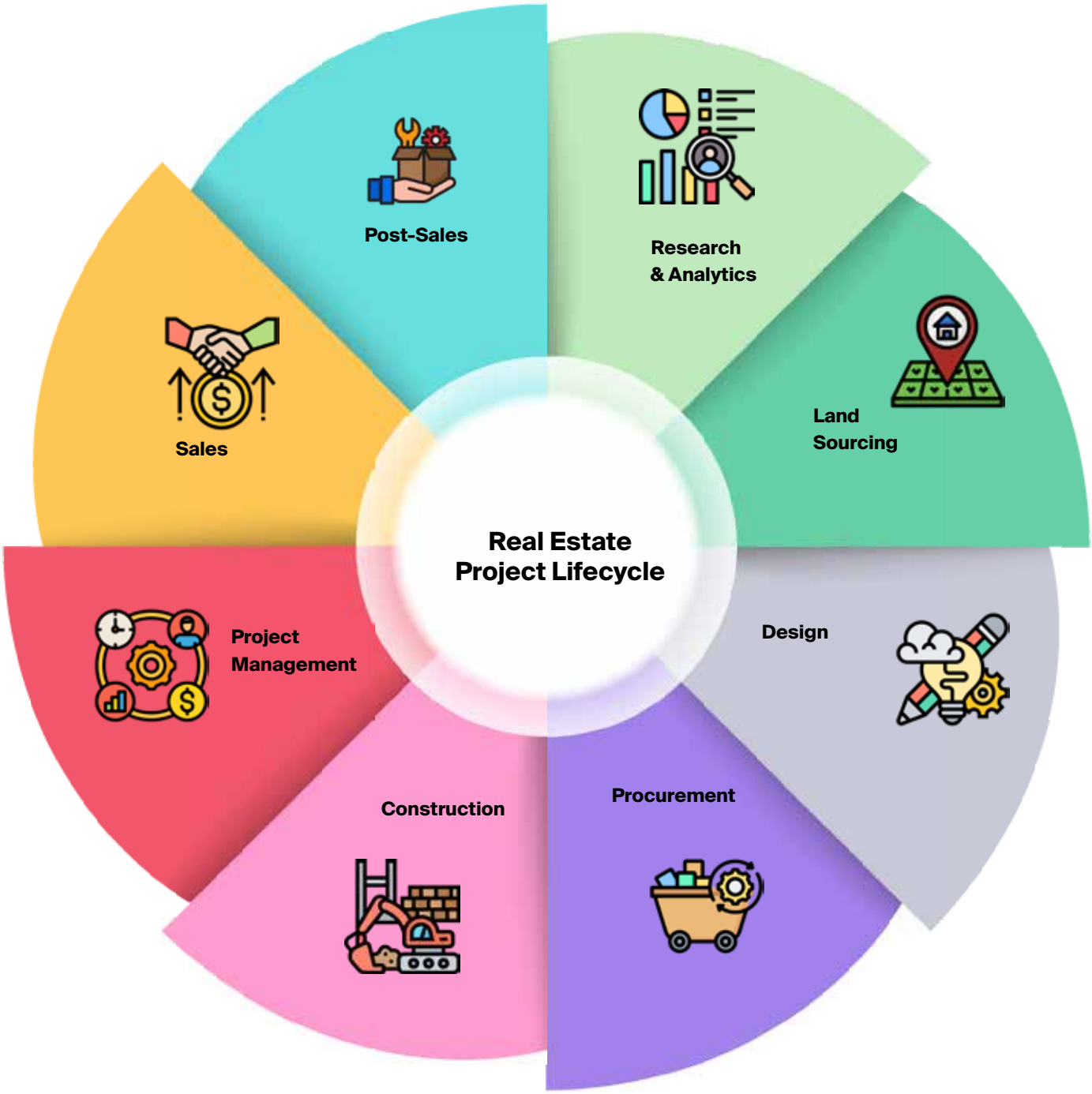
Market Cap: $1.39 Billion* (Publicly Listed)
Major Investors: Phonepe Private Limited
Zenrin Co. Ltd

- Launch of dedicated sector specific funds like EARTH fund and Spyre further showcases the strength of the sector and its attractiveness to investors.

- While the Indian PropTech sector is smaller in scale of investment compared to markets like the US and China, the huge growth rate of investment in Indian PropTech indicates strong future potential and positions India as an emerging leader in the global PropTech landscape.

3.3 Integrating PropTech into the Real Estate Project Lifecycle

PropTech, or property technology, encompasses a range of digital tools and platforms that streamline various stages of real estate development, from planning and design to construction and sales. For instance, Building Information Modeling (BIM) allows for precise 3D modeling and simulation, reducing errors and optimizing resource allocation during construction. Smart home technologies can be incorporated from the design phase, offering future residents enhanced security, energy efficiency, and convenience. Additionally, digital platforms for property management and sales can provide real-time updates and seamless communication between developers, contractors, and buyers, ensuring a smoother transaction process. Overall, PropTech integration not only modernizes the real estate industry but also creates more sustainable and user-friendly living environments. Therefore, we are presenting below the various solutions offered by various Proptech companies and their impact on the sector.



Research & Analytics

Research and analytics serve as the foundational phase of the project lifecycle, enabling a comprehensive understanding of current market trends.

Technology solutions

Market Feasibility Studies:
These platforms provide developers with comprehensive market intelligence on pricing, demand-supply trends, and competitor analysis.

Customer Segmentation & Targeting:
The analytics tools help real estate developers understand buyer behaviour, enabling personalized marketing and targeted outreach for residential projects.

Predictive Analytics for Sales Forecasting:
These solutions provide predictive models, helping developers forecast sales, rental trends, and future price movements.

Sustainability & Green Building:
Research tools like IFC Edge Buildings provide developers with insights into energy efficiency and sustainable construction, helping them achieve green certifications.

Focus Area

Quality Data Availability

Understanding Consumer Needs and Preferences

Predictive analysis for informed decision making

Impact Report

Problem: The data available in real estate is often unreliable and inauthentic with inefficient records and errors. Also, the information is fragmented and cost-extensive in nature.

Tech Solution: The companies have extensive primary and secondary transactions databases, through which they provide customized business intelligence, market research, and risk management services for various asset classes.

Impact:
- Guided large, private Indians banks by executing 20 years' rental leases at the correct market price. Over a hundred tenants, retailors, office space occupiers have used this platform to save rental outgo and costs.
- Provided basic market and competitor analysis and knowledge impacting multiple-developer's project plans.

Solution Provider: *CRE Matrix, PropEquity and Propstack*

Land Sourcing

Land sourcing is a vital phase in the real estate project lifecycle, encompassing due diligence, negotiations, and documentation. Selecting the right land parcel is a complex process that involves navigating various challenges.

Technology solutions

Data Aggregation:
Platforms consolidate data from multiple sources, including property databases, market reports, and geographic information systems (GIS), providing comprehensive information on available land parcels and availability of various resources like water.

Due Diligence Tools:
Technology-enabled software that is integrated with relevant authorities, enabling the efficient sourcing of necessary documents for the process. Also enhances transparency regarding intermediaries and land ownership, making the process of due diligence more efficient.

GIS and drone-based tools:
GIS based tools are instrumental in analysing patterns in land use and environmental factors. Meanwhile, drones provide high-resolution aerial imagery, enabling detailed assessments of land conditions, vegetation, and topography. Together, these technologies enhance decision-making by offering valuable insights into land suitability, development potential, and environmental impact.

Focus Area

Scouting Land Parcels

Due Diligence

Location Assessment

Impact Report:

Problem: Establishing a sustainable business necessitates addressing issues around water availability, quality, infrastructure, and risk management to ensure effective operations in a viable living environment.

Tech Solution:
- AI analyses extensive geological and hydrological datasets, offering insights into groundwater availability, quality, and sustainability. This enables effective resource allocation and maximizes operational efficiency.
- Smart sensors monitor groundwater quality and availability in real time, providing alerts and insights. Combined with AI-driven analysis, this data helps identify trends, predict patterns, and optimize resource management.

Impact: 70% reduction in drilling costs, improved water quality and reduced RO cost; 48% energy savings and better green building rating; enhancement of structural safety and knowledge of site conditions before project kick-off.

Solution Provider:*The Ground Water Company.*

Problem: Access to satellite, customer and geotag data related to construction sites, urbanisation heat maps and change monitoring.

Tech Solution: With the help of technologies such as satellite remote sensing, machine learning, big data and cloud computing, the company provides an innovative geospatial data platform that integrates various data sources and provides insights on infrastructure construction, damage detection due to natural disasters, etc.

Impact: Better market understanding and decision making.

Solution Provider: *Satsure.*

Design

The design stage is vital for defining the project's visual and functional direction, increasingly supported by the growing use of advanced design tools that enhance project planning, marketing, and execution. These tools facilitate the creation of visually appealing designs, improve efficiency, and lead to better project outcomes.

Technology solutions

3D Modelling and Visualization:
Powered by VR & AR, these tools enable the creation of detailed 3D models of projects, allowing stakeholders to visualize the final product before construction commences.

Real Time Collaborations:
These technologies enable simultaneous, interactive design sessions, allowing for quicker decision-making and improved project outcomes.

Building Information Modelling (BIM):
These software help in creating comprehensive building information models that integrate architectural, structural, and MEP (mechanical, electrical, and plumbing) designs, improving coordination and reducing errors.

Digital Twins:
This technology creates computer models that mimic the behaviour and performance of physical buildings which helps to analyse and optimize the design and energy efficiency and overall performance of buildings.

Focus Area

Optimal efficiency and functionality

Effective collaboration among various professionals

Integrating digital elements into the real world

Impact Report:

Problem: Designers face challenges in visualizing their designs in an immersive virtual environment, which can help them better understand spatial relationships and aesthetics before construction begins. By enhancing visualization and communication, costly design revisions and changes during the construction phase can be minimized.

Tech Solution:
SaaS and VR-based visualization solutions cater to the construction industry by offering a platform that includes features such as immersive design presentations, real-time design communication, collaborative design reviews, and VR-enabled coordination meetings. The solution enhances the design and construction process by improving visualization, collaboration, and decision-making, leading to more efficient and successful project outcomes.

Solution Provider: *Trezi*

Problem:
Lack of sustainability in the construction industry, causes an annual increase of upto 4.5% in construction cost and upto 50% increase in maintenance cost with as building ages. Moreover, there are rising regulatory obligations which make it difficult for buildings to attain sustainability.

Tech Solution:
The tools available in the market help in evaluation of environment impact on the project's design, optimizes costs and ensures maximum design performance against project budget through stimulation and modelling. In projects pursuing IGBC certification, these tools utilize design information to accurately assess the certification level and potential points for each credit. It streamlines documentation and monitors project progress throughout the certification process.

Solution Provider: *Smarter Dharma*

Procurement

Once the design is finalized, the process of ordering materials and assessing staff requirements commences. While the procurement process is continually being improved, it still encounters various challenges.

Technology solutions

E-procurement software:
Digital solution that streamlines the purchasing process enabling management of procurement activities online, including sourcing, ordering, and invoicing. It also reduces effort for smaller players who don't have full-fledged procurement teams.

Process Automation:
Automation improves vendor management by utilizing algorithm-based evaluations, promoting fairness and fostering competition among vendors. Quality inputs can be recorded in the software for assessment, aiding in the shortlisting of vendors. Software solutions automate inventory counts, reducing manual errors and improving accuracy.

Focus Area

Procurement Planning and inventory management

Engaging a wide vendor base while ensuring quality

Vendor Management

Impact Report:

Problem:
Procurement, usually taken up by builders/developers, is the largest cost, being approximately 70% of the project cost. The traditional practices adopted are inefficient, with no standardized processes or tools in place. This leads to non-transparency and high costs.

Tech Solution:
With the help of an AI-powered RFQ based aggregator, material specifications, market price and reliable suppliers can be identified and assessed using the mobile app. With use of technology, builders save ~90% time spent on vendor onboarding and 3-7% of the material cost.

Solution Provider: *Mprocure.*

Construction

Construction has made significant strides over time in materials, techniques, resource allocation, and regulatory compliance. However, it still encounters challenges in several areas, particularly in adhering to quality standards, ensuring cost efficiency, meeting deadlines, and addressing sustainability issues.

Technology solutions

Prefabricated construction technology:
The process of fabricating or "pre-building" parts of buildings in a different location from the construction site, which are then transported and assembled on-site, is a method used by developers to expedite construction while maintaining consistent quality.

3D Printing: This innovative technology enables the creation of complex structures directly on-site using a computer-controlled printer. It reduces construction time, minimizes waste, and provides greater design flexibility.

Engineered Formwork: Systems such as Mivan/ Tunnel formwork utilize prefabricated aluminium/ steel forms to cast entire building sections in a single operation. This technology improves construction speed and precision, making it especially beneficial for large-scale residential projects.

Robotic Assembly: This approach employs robotic systems to assemble building components, enhancing precision and lowering labour costs. For instance, robots can perform tasks such as bricklaying and concrete pouring with improved accuracy and speed.

Autonomous Vehicles and Drones:These technologies, including drones and self-driving construction machinery, are utilized for tasks such as site surveying, material transport, and monitoring construction progress. They help reduce human error and enhance site safety.

IoT Solutions: The Internet of Things (IoT) facilitates real-time monitoring and management of construction sites. Sensors and connected devices can track equipment usage, monitor structural integrity, and enhance worker safety.

Focus Area

Reduction in construction cycle time while ensuring quality

Effective monitoring and reporting

Safety & Security
Human Resource Constraint

Ensuring sustainability and meeting compliance requirements

Impact Report:

Problem: Long construction cycles cost overruns, and quality issues are major challenges in delivering housing projects.

Tech Solution: Precast technologies are increasingly getting used in the residential construction space.The process primarily uses custom-designed precast concrete elements such as slabs, beams, and wall panels , which are manufactured in a controlled factory environment. These elements are then transported to the construction site, where they are assembled using cranes. The precast components are joined together with grouts and screeds to form a robust and stable structure. This method significantly reduces construction time and labor dependency, while also enhancing the overall quality and durability of the buildings.

Solution Provider: *Hommission.*

Problem: Developers face several challenges during the construction stage, including project management issues, design coordination difficulties, technology deficits that result in information asymmetry, manpower challenges, and payment management concerns.

Tech Solution: The technology solutions are aimed at optimizing labor management and project execution in the construction industry.

Construction Workforce Management: the platform helps developers and contractors digitally source, manage, and deploy construction labor & contractors across projects

Project Monitoring and Analytics: Through real-time project tracking and data analytics, the platform provides developers with insights into labor performance, timelines, and project costs

Solution Provider: *Bandhoo*

Project Management

Project management is vital for meticulous planning by employing various skills, techniques, and strategies to effectively execute the project and achieve its objectives. It ensures timely and budget-compliant project completion, resource optimisation and risk mitigation.

Technology solutions

Construction ERP software:
Enterprise Resource Planning (ERP) software, specifically developed for the construction industry, offering unique features that address the complexities of construction projects. It streamlines project workflows, ensure accurate cost tracking, and enhances overall project delivery and profitability. The services include financial tracking and job costing, resource allocation and site-specific daily progress reports, Inventory management with equipment tracking, HR, CRM, document management, procurement as well as risk management.

Field management software:
Assist in managing field operations by enabling teams to track issues, communicate updates, and handle inspections directly from the job site.

Cost management software:
Software enabling accurate budgeting, expense tracking, and financial reporting, ensuring projects stay within budget.

Asset Performance Management Platforms:
Data and AI based real estate technology platform with advanced monitoring of under-construction projects, including construction progress, cash flow management and compliance management, enabling greater transparency and efficiency to various stakeholders.

Focus Area

Comprehensive management with control over budget, time, and resources

Risk Management and effective control

Effective communication and reporting to various stakeholders ensuring transparency

Impact Report:

Problem: Developers face several challenges during the construction stage, including project management issues, design coordination difficulties, technology deficits that result in information asymmetry, manpower challenges, and payment management concerns.

Tech Solution: A tech enabled offering developed by a company offers one stop solution from design to build. It has a suite of applications for faster updates and improved coordination. It helps in getting screened contractors and subcontractors, BIM Modelling and quality assurance.

Solution Provider: *Brick & Bolt.*

Problem: A developer wanted to deliver large number of apartments in a year, was experiencing delays in completion of the project due to multiple inspections.

Tech Solution: AI based technology solution deployed at various stages of the construction and fit out cycle. It allowed stakeholders to monitor in real time key project metrics like progress, cost and quality

Impact: Reduction on snagging time by 15 days in general to 1-2 days post implementation, resulting in faster handovers and better customer satisfaction scores. Internal trainings could be conducted based on data from the platform.

Solution Provider: *QwikSpec.*

Sales

The real estate sale process consists of several stages, including customer discovery for targeted marketing, customer engagement and negotiations, due diligence and contracting, as well as financing and the closing process. Successfully navigating these stages leads to a smoother transaction for both buyers and sellers.

Technology solutions

Hyper-Personalized Content and Digital Marketing:
This approach involves utilizing analytics to understand consumer behaviour and creating highly tailored messaging that directly appeals to individual preferences. By leveraging hyper-personalized content, real estate marketers can forge stronger connections with their audience, enhance the customer experience, and drive sales more effectively.

Property Discovery Platforms:
These online platforms facilitate the listing of properties across various asset classes for sale and purchase, offering enhanced visibility. Incorporating blockchain technology improves transaction transparency and provides valuable insights into recent transactions, further enriching the user experience.

Virtual Walkthroughs:
Virtual Reality (VR) and 3D walkthroughs provide immersive experiences that enable potential buyers to explore properties remotely, helping them visualize spaces and make informed decisions. Drones are utilized for aerial photography and videography, offering unique perspectives of the property and its surroundings, thereby enhancing user experience.

Customer Relationship Management (CRM) System:
A CRM system designed for real estate sales streamlines client interactions, tracks lead and manages sales pipelines. It offers valuable insights by storing customer data, supporting data-driven decision-making and strategic planning. By utilizing a CRM system, real estate professionals can strengthen customer relationships, enhance efficiency, and ultimately achieve more successful sales outcomes.

Loyalty Management:
Developers implement loyalty programs and online campaigns to keep existing and potential customers engaged and feeling valued. These initiatives feature timely events and promotions conducted both in-person and virtually, enhancing customer connections and fostering long-term loyalty.

Smart Payments and Contracts:
FinTech companies streamline processes by reducing paperwork, facilitating digital payments, and enabling faster financing approvals. Smart contracts, utilized through blockchain technology and digital signatures, enhance transparency and security in transactions.

Focus Area

Analysing consumer behaviour and buying pattern for targeted marketing

Effective utilization of various marketing tools and property discovery

Creation of real-time experience for prospective buyers using various tools

CRM and reducing customer acquisition costs

Seamless transaction execution and financing

Impact Report:

Problem:
A real estate advisory service company faced challenges with customer experience, manual management, lack of analytical insights and high turnaround time.

Tech Solution:
Through integration of various activities on a single platform, all departments could be managed such as pre-sales, sourcing team, closing team, on-site operations, CRM, collections, property management. This could be achieved with the help of tech-enabled products. These platforms provide virtual versions of a project, offering ways to interact via automation with inventory selection, cost sheets, eKYC, etc. Generative AI is used for conversation and interaction for better engagement.

Solution Provider: *Relata.*

Problem:
Enhancing user experience in the marketing process by creating a drone shoot footage.

Tech Solution:
Aerial virtual tours, drone location videos, an interactive 360° floor picker, project location animations, and construction monitoring videos. Additionally, Aerial Intelligence, powered by AI and ML, offers precise analysis for informed, data-driven strategies.

Solution Provider: *YelloSkye.*

Post Sales services

Post-sales activities include all services offered after a purchase, such as maintenance, customer support, legal assistance, and resale or rental assistance. By prioritizing these areas, businesses can improve customer satisfaction and build long-term relationships.

Technology solutions

Advanced Asset Management Software:
The software effectively oversees tenant relations and maintenance to ensure a positive living experience. Key features include tenant communication, visitor management, maintenance tracking, lease management, and feedback mechanisms.

Home Automation Tools:
Internet of Things (IoT) technology plays a crucial role in monitoring internet-enabled devices like HVAC systems and smart lighting. These tools help save energy and allow for remote issue management, enhancing overall efficiency and convenience.

Smart Parking Systems:
These systems optimize parking space utilization by using sensors to monitor availability in commercial, retail, and other asset classes. This technology enhances efficiency and improves the overall parking experience for users.

Integrated Platform for Owners and Tenants:
These platforms facilitate effective communication regarding bill payments, rent reminders, maintenance tracking, and feedback. It can be seamlessly adopted across multiple asset classes, enhancing the overall management experience for both owners and tenants.

Focus Area

Seamless property management and tenant relations

Smart home and parking solutions

Fostering community engagement

Impact Report:

Problem: Once the property has been sold, stakeholder engagement diminishes significantly, which hampers the potential for generating referrals and consequently limits opportunities for enhancing sales.

Tech Solution:
The companies have started creating digital platforms for homebuyers and channel partners to enhance engagement and increase referral sales for the developers from their existing set of customers. Conducting contests, giving benefits to the referrer of the month, creating virtual events and seminars by celebs to constantly engage customers can help.

Impact:
- Enhanced significant portion of sales through referrals.
- Minimised the cost of sales.
- Increased page views.

Solution Provider: *Reloy.*

3.4 FinTech Empowering PropTech

The integration of FinTech and PropTech refers to the collaboration between financial technology (FinTech) and property technology (PropTech) to create more efficient, transparent, and accessible real estate solutions. FinTech is being used to automate real estate transactions and expand use of financial services to improve transparency and overall customer experience.

Fintech Integration

Fractional Assets:
Fractional ownership in India's residential sector is an emerging trend that allows multiple investors to co-own high-value properties by purchasing smaller fractions. This model democratizes real estate investment, making it accessible to a broader audience by reducing the financial burden on individual investors.

Invoice Discounting:
Invoice discounting is a valuable financial tool for vendors in India's residential sector, enabling them to access immediate funds by selling their unpaid invoices at a discount. This process helps vendors manage cash flow more effectively, ensuring they can meet their short-term financial obligations without waiting for the developers to pay

Digital Escrows:
These services allow home buyers and sellers to securely manage payments through a neutral third party, ensuring that funds are only released when all contractual conditions are met. This reduces the risk of fraud and disputes.

Enhanced Customer Experience
User-friendly apps and platforms that allow for easy access to property listings, mortgage applications, and payment systems.

Challenges

Lack of transparency in processes

Poor data management

Delayed decision making owing to high cost of ownership

Impact Report:

Problem: Real estate is generally a high value investment that comes with issues such as high initial entry cost, cumbersome transaction processes and low liquidity. This becomes a bottleneck for investors, who wish to invest in a diversified portfolio of high-quality residential assets.

Tech Solution:
The companies operating in this space have created digital real estate marketplaces to buy & sell tokenised residential assets, powered by algorithmic daily pricing, instant settlements and securing buyer interests through blockchain ledgers.

Impact:
- Making quality real estate affordable for middle India by giving them digital access to invest across various cities and asset classes.
- Reduction in cost of sales, ensuring asset liquidity through a convenient digital platform.
- Increased transparency and access to information.

Solution Provider: *Alt DRX.*

3.5 Sustainability and PropTech

The concept of Environmental, Social, and Governance (ESG) has evolved from a niche investment criterion into a fundamental requirement that shapes corporate strategies and investor decisions globally. This shift highlights a growing recognition that sustainability and ethical practices are crucial not just for societal and environmental well-being, but also for ensuring long-term business success.

Certifications/rating agencies commonly used in India

These systems are designed to evaluate a building's performance throughout its life cycle in relation to environmental impact. Green building involves practices that promote environmentally responsible and resource-efficient structures, covering all phases from design to construction, operation, maintenance, renovation, and deconstruction. The most commonly used programs include:

GRIHA
Green Rating for Integrated Habitat Assessment

3,869+ | Projects
86+ mn sq mt | GRIHA footprint

IGBC
Indian Green Building Council

3,650+ | Projects
10+ bn sq mt | IGBC footprint

LEED
Leadership in Energy and Environment Design

5,240+ | Projects
290+ mn sq mt | LEED footprint

WELL
Well Building Standard

1,150+ | Projects
0.39+ mn sq mt | WELL footprint

EDGE
Excellence in Design for Greater Efficiencies

Source- GRIHA, IGBC, GBCI India, WELL

Benefits of ESG in real estate

- Energy Saving and Operational Efficiency
- Enhanced Property Value
- Environment Impact and long-term resilience
- Access to Incentives
- Enhanced Marketability and Positive Brand Reputation
- Regulatory Compliance and access to capital
- Risk Mitigation

Role of Technology in ESG

Integrating technology with ESG involves leveraging innovative solutions to enhance sustainability, improve energy efficiency, and maximize social impact within the real estate sector. This approach enables the development of smarter, greener buildings that not only meet regulatory standards but also contribute to a healthier environment and community well-being.

IoT Smart Sensors

- Tracking and optimizing use of energy and water.
- Reducing carbon footprints, water wastage.
- Efficient resource management.

Air Quality Sensors

- Assessing air quality, detection of particulate matter (PM), humidity levels, etc.
- Integration with HVAC systems for real-time data, ensuring air quality and energy efficiency.

Smart Solar Panels

- Real-time tracking and performance measurement
- Integration with smart home systems helps in automating energy consumption.
- Integration with Smart Grids for improved energy distribution and utilization management.

Water meters:

These meters provide real-time data, helping households track consumption patterns and identify leaks, thereby promoting water conservation and reducing wastage. By ensuring accurate billing based on actual usage, smart water meters also eliminate the inefficiencies of flat-rate billing systems.

Impact Report:

Problem:
A company faces workforce management issues such as workers routinely asking for loans, HR spending significant time to support staff with PF and ESIC, less work engagement and insurance access for workers.

Tech Solution:
An integrated platform using data and service engine created for employers, workers and third-party service providers which helps in managing the employees through reporting and data management, helps workers with service access via WhatsApp and call support, connects with third-party service providers.

Impact:
- No need for dedicated HR for PF/ESIC support.
- High workforce engagement with improved attendance and output.
- Lower cost of enabling benefits with custom products built for workers.
- Zero cost and no liability for enabling financial support.

Solution Provider: *Entitled.*

Impact Report:

Problem:
Bangalore based residential community that shifted dependency from tanked water to ground water through borewell. However, they wanted to take proactive measures to protect their groundwater.

Tech Solution:
IoT-based ultrasonic water sensors replaced traditional mechanical meters to enable real-time data collection, which was then sent to the cloud. After installation, water usage at every apartment was measured at a single point. Accurate water bills and leakage alarms were activated with a management app in place for monitoring.

Impact:
- Electricity bills came down by 17%
- 10% reduction in run time for blowers in the STP
- Daily usage dropped from an average of 50 kl to 35 kl
- Monthly saving on water INR 17,000-20,000

Solution Provider: *WeGot.*

Impact Report:

Problem:
Traditional methods of construction being hazardous to environment due to usage of non-sustainable materials, alternatives need to be sought.

Tech Solution:
The company aims to positively impact the environment by using eco-friendly construction materials made from recycled and upcycled unsorted waste plastics. Utilizing advanced technology, it produces paver blocks and tiles composed of up to 80% recycled plastic and 20% industrial waste, thereby reducing landfill waste and minimizing ecological impact.

Impact:
- Reduction in costs by 30% through using sustainable products instead of traditional concrete alternatives.
- The materials are twice as strong as conventional materials, leading to increased lifespan and lower maintenance. Efficiency improvement as the products is 50% light in weight.

Solution Provider: *Paving+*

- 15 lakh sq ft of green material have been installed
- 285 metric tons of plastic waste recycled
- 570 Metric tons reduction in CO2 emissions
- 80,000 liters saved by using recycled materials

4

TECHNOLOGY TRENDS IN REAL ESTATE

Technology is rapidly evolving, and industries are quickly adapting to these changes. The real estate sector is no exception, with more companies adopting advanced and innovative technologies. To thrive in this competitive landscape, real estate businesses must keep pace with emerging tech trends.

The real estate sector is undergoing a digital transformation, where technology increasingly influences every aspect of the value chain, from land sourcing and design to project management and sales. This shift is driven by a rising demand for convenience, efficiency, and transparency, along with the availability of advanced technologies. By integrating these innovations, the industry is not only enhancing operational effectiveness but also aligning with ESG principles, fostering sustainable practices and improving stakeholder engagement in the process.

Below are some emerging PropTech innovations to watch in the coming years, which have the potential to transform the real estate industry:

Future trends in PropTech

The tech driven shared economy revolution

- Fractional ownership models, democratising the real estate space with real estate tokenization
- Peer to peer platforms facititating transctions without intermidieries
- Co-living and co-working spaces

FinTech integration

- Financial technology will simplify transactions and improve financing options, making real estate investments more accessible and efficient.

Increasing role of sustainable technologies not only in commercial but also residential assets

- Increasing consumer awareness and preference for properties with green certifications or sustainable features.
- Development of sustainable construction materials
- IoT devices and smart systems allow for real-time monitoring and management of energy use, enhancing efficiency and sustainability.

Integration of AI and data-driven services in real estate

- Improved market analytics and appraisel
- Efficient Project Management
- Enhanced Security and Risk Management
- Property Management Optimization
- Personalized Customer Experiences

Abbreviation

PMAY (U)	Pradhan Mantri Awas Yojana (Urban)
PMAY (R)	Pradhan Mantri Awas Yojana (Rural)
EWS	Economically Weaker Section
LIG	Low Income Group
MIG	Mid Income Group
RRTS	Regional Rapid Transport System
PropTech	Property Technology
EMI	Equated Monthly Instalment
MoHUA	Ministry of Housing and Urban Affairs
WHO	World Health Organization
UN	United Nations
MMR	Mumbai Metropolitan Region
NCR	National Capital Region
TIG	Technology Innovation Grant
BLC	Beneficiary Led Construction
AHP	Affordable Housing in Partnership
ARH	Affordable Rental Housing
ISS	Interest Subsidy Scheme
GST	Goods and Services Tax
RAY	Rajiv Awas Yojana
NURHP	National Urban Rental Housing Policy
ESG	Environmental, Social, and Governance
IoT	Internet of Things
CRM	Customer Relationship Management
AI	Artificial Intelligence
GIS	Geographic Information System
ML	Machine Learning
VR & AR	Virtual Reality & Augmented Reality
BIM	Building Information Modelling
SCM	Supply Chain Management
ERP	Enterprise Resource Planning
RFQ	Request For Quotation

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