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Methodical Study of Integrated Townships of Mahindra World City in Chennai and Jaipur, India

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ABSTRACT

An integrated township isn't only about a set of buildings, but also about how it interacts with nature, about the availability of social amenities like healthcare, education and sanitation. Also, it must be frugal in the way it consumes natural resources, gives their scarcity. Integrated township development (ITD) is largely "inorganically organic" for the fact that they are special interventions by market forces to build communities from the scratch, on the periphery of the city, which could offer to their citizens better quality of life, though at a premium price. Greenfield developments are large in size, therefore, capable of initiating a huge difference and externalities; therefore, it is imperative to check their overall influence on the urban canvas. In this paper the impression on the user cum residents of Mahindra City of Chennai and Jaipur has been evaluated.

Keywords: Integrated township development, Mahindra City, Township Project, Greenfield project

1. INTRODUCTION

1.1 General

We can define Integrated Township as - well planned, self-sufficient, self- managed, self-governed, fully featured, mixed land use, greenfield development on an uninterrupted land parcel of over hundred acres, based on the idea of walk to work, play and school. 'Integrated townships' is chiefly a phenomenon and needed as the city centers are overburdened and municipal bodies stressed, in such a scenario Integrated township becomes the answer to many concerns like – higher property rates in the city center, increasing crime, deteriorating open and green areas, tedious commuting between workplace and home, security concerns, increasing pollution and many alike. And as such concerns come from all quarters of social, environmental and economic aspects of a city; they need to be attended to holistically. With cities as growth engines, they are generating economic externalities and living standards; all that people demand a better quality of life and living environment. The market found remedy to this is 'integrated townships.

People started suffering anonymity in the cities, with no participation in city making or even feeling empathy for the city, city governance and management went for a toss. There is enough pressure on municipal bodies to enhance city services through with no effect, the market mechanism found out a model that could have had the capacity to call for changes that were being asked for in favor of city sustainability. Hence, integrated township's development started getting built, especially in metropolitan and big cities that were experiencing excessive expansion.

1.2 Features of Township

Following are the common features of integrated township projects:

(i) Large scale Greenfield development

(ii) Private participation / Market at play

(iii) Mixed use of land (residential, commercial, office, etc.)

(iv) Planned for enriched quality of life

(v) Self-sufficient, fully-featured and self-managed

1.3 Problem Statement

The exponentially increasing population along with rapid migration grows a constant demand for housing and other basic infrastructure amenities. But providing the sufficient amount of housing at the correct price has always been problematic due to the lack of sufficient fund and various other problems that real estate faces in all over the country. Integrated township developments are looked upon as the real estate future in India.

2. AIM AND OBJECTIVE

"The definitive aim of this work is to systematically understand the impression of integrated township development in the respect of sociological, economical, institutional, political, ethical determinants with the help of case study".

1) To study and understanding the concept of ITD with the help of Mahindra City case study.

2) Exploration the enhancements in life due to ITD on user of township.

3. LITERATURE REVIEW

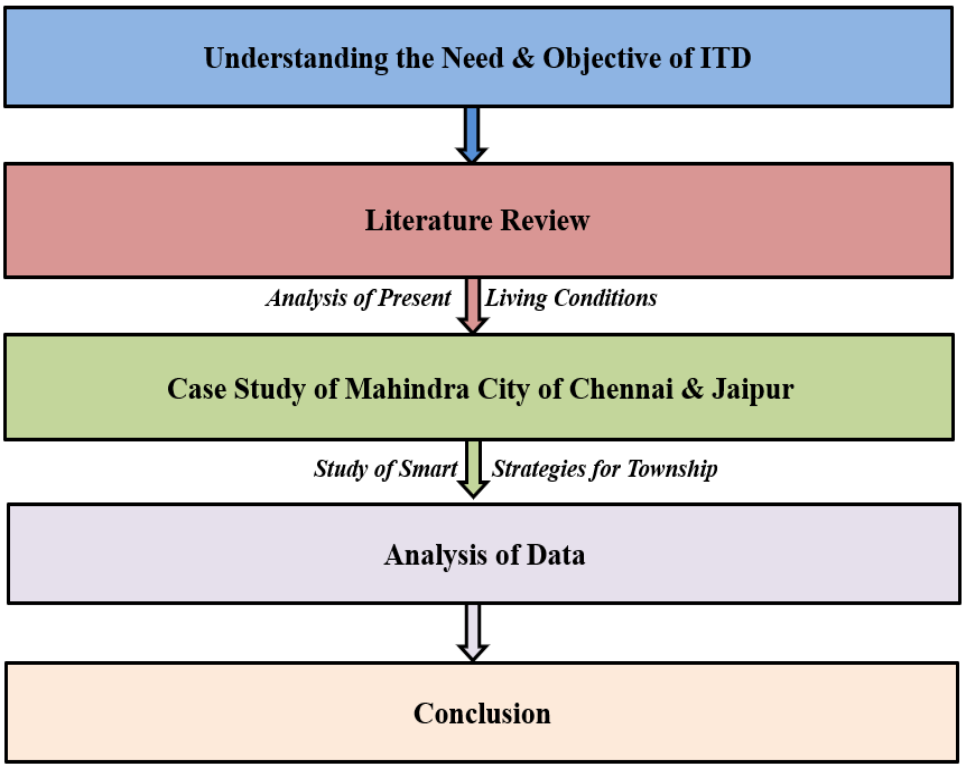
A literature review of scholarly articles, books, dissertations, conference proceedings and other resources which are relevant to the study and understanding the appliance of integrated township development is carried out to set the background on what has been explored on the topic so far.

Table No 1: Literature Review in Tabular Form

Sr. No	**Project Name & Location**	**Project Area**	**Key Sustainability Features**
1	Lavasa Hill City,	25,000 acres	Natural resource
	Near Pune		conservation and
			Eco-friendly housing
2	Magarpatta City,	400 acres	Eco-friendly
	Pune		Township development
3	Marg	1000 acres	Pilot project for
	Swarnbhoomi, Near Chennai	SEZ, 172 acres	platinum rating by IGBC GTRS
4	GIFT City, Ahmedabad	550 acres	Technology based, smart city concept
5	Esencia Green township, Gurgaon	112 acres	Pilot project for GRIHA green township rating
6	Amanora Park, Pune	400 acres	Award winning Eco township
7	Mahindra World, City, Chennai	1550 acres	First IGBC gold rated township integrated with IGBC gold rated SEZ
8	Wave City,	4500 acres	Smart growth
	Ghaziabad, NCR	1671 acres in	principles and IGBC rating targeted
9	Nanded City, Pune	700 acres	Eco-friendly township development
10	Palava City, Mumbai	2780 acres	Promoted as Smart City

4. METHODOLOGY

The research work includes the efforts for understanding the need and objective of integrated township, exploration of present living conditions by means of a literature review of various research papers, then perceiving smart strategies for township via case studies and on the bases of data collected and interpreted. Data analysis & paper writting will be done on the bases of data obtained and investigation.



5. CASE STUDY

5.1 Case Study Brief

Project details of case study of Mahindra world city (MWC) of Chennai has been evaluated in the following

Table No 2: Project Details of Mahindra Chennai Project

Location	Chennai, Tamil Nadu	
Population	9 Million	
Area	1550 Acres	
Joint Venture With	TIDCO (Tamil Nadu Industries Development Corporation)	
Project Start Year	2002	
Integrated City Area Distribution	Apparel & Fashion Accessories Sez	50 Acres
	Ancillary Sez	89 Acres
	Domestic Tariff Area (DTA)	400 Acres
	IT Sez	284 Acres
	Resident	285 Acres
	Others (Area for Infrastructure & Open Spaces)	442 Acres

Figure No 1: Site Layout Plan of Mahindra Chennai Project

Project details of case study of Mahindra world city of Jaipur has been evaluated in the following

Table No 3: Project Details of Mahindra Jaipur Project

Location	Jaipur, Rajasthan
Population	3 million
Area	3000 Acres
Joint Venture With	RIICO (Rajasthan Industries Investment Corporation)

Project Start Year	2006	
Integrated City Area Distribution	Multi product Economic Zone (SEZ)	1500 Acres
	IT / ITeS SEZ (Part of 1500 Acres)	750 Acres
	Domestic Tariff Area (DTA) & Social Infrastructure	1000 Acres

Figure No 2: Site Layout Plan of Mahindra Jaipur Project

5.2 Environmental Sustainability

The following initiatives have been reported by MWC's.

A) C-40 cities climate leadership group

MWC is committed to C40 principles for tackling climate change and support urban development that reduces greenhouse gas emissions and climate risks, while increasing the health, wellbeing and economic opportunities of urban citizens. And its projects are focused on developing measurable and sustainable aspects on climate change.

i) Green Buildings:

The MWC Club at Chennai became the 1st Club in India to receive a Gold IGBC LEED NC certification and the Mahindra World School, the IGBC Platinum Green School certification. Most buildings developed within MWC are based on the principles of Green development and some of the customer campuses have received IGBC/LEED Gold/ Platinum ratings for Green development. All the residential / retail / social establishments developed by MWC and MLDL within Mahindra World Cities are rated IGBC Gold / Platinum. Iris Court (Residential), Evolve IT Park (Commercial), Aqualily (Residential), Sylvan County (Residential).

ii) Solar Power Plant:

Mahindra World City has been a pioneer in commissioning an off-grid solar power plant in the state of Tamil Nadu. Located in 'The Canopy'- the commercial center, the 75 kW power plant has the capacity to generate 116,000 units of clean electrical energy annually, offsetting almost 60 tons of CO_2. MWC-Jaipur recently commissioned 210kWp rooftop solar project on BOOT model that meets 5% of electricity demand for commercial operations.

The annual energy savings at MWC-Jaipur through rooftop solar PV plant is estimated to be 300,000 kWh, which would reduce CO2 emissions of 270,000 kg. and provide annual saving of INR 560,000 Use of LED/Induction lights: Approximately 50% of the common power consumption is from street lighting. Hence in order to reduce power consumption all the sodium and mercury lamps in street lighting system in MWC Chennai and Jaipur are being replaced with LED/ Induction lamps. It is estimated that MWC-Jaipur would save energy of 99,450 kWh annually and reduce CO_2 emissions of 89,510 kg. with an annual savings of INR 175,800.

B) Water Management

In this section we examine existing processes in MWC for sustainable water management by considering water supply, rain water and storm water management and waste water management. This is also suggested according to the Sustainable Water Management Improves Tomorrow's Cities' Health (SWITCH) which is a project conducted by a cross-disciplinary team of 33 partners, including Europe, South America, Asia and Africa between 2006 and 2011 and was co-funded by the European Union (Howe et al. 2011).

i) Water supply:

MWC's have been planned to ensure the balance of demand and supply of water in order to meet water requirements of clients and across all the needs of the cities. Based on its core value of sustainable development MWC-J meets 65-70% of its long-term water requirement through recycled water. For instance, the total water demand at MWC-J is 60 MLD, of which 40 MLD water is met from recycled water. Half of recycled water is self-generated and remaining is secured from Delawas STP and PHED (Government of Rajasthan).

ii) Rainwater and storm water management:

At MWC-C, all companies within MWC have installed rainwater harvesting facilities within their campuses. Rainwater harvesting facilities have been made for the public spaces comprising the park. A network of storm water drains has been constructed along all the roads, such that all run-off water can be flowed into the Kolavai Lake, which is located at the southern periphery of the park.

The storm water management system has been constructed effectively taking into account the geographic characteristics such as the natural slopes; lay of the land and historical floodwater levels in the region.

Storm water could pose a risk of water pollution as it can convey contaminants such as oils, heavy metals, nutrients and sediment into water supply sources (Howe et al 2011). Additionally, this can increase the cost of treating the water to drinking quality. As manufacturing and engineering industries are located within MWC, hence it is important to regularly examine storm water quality to ensure that it does not pose any pollution threat.

iii) Evergreen landscape:

Xeriscaping, a process for growing plants that consume less water, is practiced in all their projects. Recharge pits have been built to collect rainwater, which is used for watering the plants and lawns in the park. Further, they plant native plant species that do not consume much water and are drought resistant. At MWC-J the landscape that was designed to inspire struggled to survive the intense heat in Jaipur and most saplings withered away. The team overcame these challenges by identifying and selecting plant species, which could survive in the climate prevalent in the region. Through research and execution, they established an in-house nursery for these plants that has become a repository of best practices in horticulture. The nursery also supplies plants for the companies in MWC-J. In additions to environmental benefits, other advantages include cost reduction, potential revenue stream and also relationship building with clients.

C) Waste Management

i) Wastewater recycling:

MWC Developers Ltd (MWCDL) have installed a centralized Sewage Treatment Plant (STP) of 2 MGD capacity and Tertiary Treatment Plant (TTP) of 1 MGD capacity at MWC-C, designed according to Tamil Nadu pollution control standards, which are capable of treating water having raw domestic sewage. Sanitary sewage generated flows through 20 km of sewer pipe by gravity to the STP. A wastewater pipe network has been laid all across the township and this treated water generated from TTP is used for landscaping and gardening in common areas and the campuses within MWC as well as for re-charging the reservoir.

ii) Recycling of Food waste:

MWC-C generates an average of 8 tons of bio-degradable waste every day of which ~5 tons is food waste. A bio-methanation Plant was set up as a partnership between Naandi Foundation, Mahindra Research Valley and MWC-C. This biogas plant, spread across 1,000 square meters converts the 8 tons of food and kitchen waste generated daily at MWC, into 1000m3 of raw biogas which is enriched to yield 400kg/day of purified CNG grade fuel which is then used to operate the shuttle buses and tractors collecting food waste and DG sets running with CNG and facilitates powering the STP operations and street lights of the area. A byproduct is 4 tons of organic fertilizer being produced each day, which is used by farmers to enhance soil fertility.

D) Air Quality

In this section we have considered air quality index (AQI) based on the levels of PM10, PM2.5, SO_2 and NO_2 particulates in the atmosphere in MWC. We also consider these measures in relation to other eco-cities, from the global standard. According to WHO reports, PM levels affect more people than any other pollutant. The major components of PM are sulphate, nitrates, ammonia, sodium chloride, black carbon, mineral dust and water. The most health-damaging particles are those with a diameter of 10 microns or less, (≤ PM10), which can penetrate and lodge deep inside the lungs. Chronic exposure to particles contributes to the risk of developing cardiovascular and respiratory diseases, lung cancer. The microns can even lodge themselves in the brain and are reported to increase the risk of dementia.

Figure No 3: Glimpse of Mahindra City

6. CONCLUSION

As per study, its evident that air quality index (AQI) in MWC-C is better in comparison with the index for Chennai city. The SO_2 and NO_2 levels in MWC-C are comparable with other global eco-cities. However, there is some way to go in order to improve PM levels to reach the standards in other global eco-cities and a long way to go to reach WHO guidelines. The main challenge for improving PM levels further is in that MWC-C covers a small area of 6.27 km² near Chennai city, so that the air quality in MWCC would be impacted by the air quality of Chennai metropolis.

The AQI in Chennai is approximately similar to the WHO PM10 indicator of 70µg/m3 for developing countries. According to the WHO (2016) reported pollution index based on PM2.5 measure, Chennai is ranked 29th most polluted in South Asia and 53rd most polluted in Asia. Strong efforts are needed to improve air quality in Chennai to meet global standards. MWC-C has demonstrated that air quality can be improved in the region.

Further this offers greater market opportunities for MWC-C as well as other public-private cooperation. MWC's have made early start toward following low-carbon development path for clean, green, efficient townships toward achieving aspects of sustainable development goals. The environmental performance report suggests that greenhouse gas emissions from burning fuel for energy in MWCs have reduced by 41% during 2015-16 (MWC Sustainability Report, 2015- 16). They also provide concrete evidence of the benefits for others seeking to progress toward sustainable development. Thus these eco-township models clearly demonstrate gains and advantages in pursuing environmental sustainability goals and setting up the required processes. Thereby they provide concrete evidence of the benefits and a model for others seeking to pursue sustainable urban development in India.

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