
Research Paper

Revitalization of Walled City Case of Udaipur, India

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Abstract

Historical city of Udaipur in India is famed for its enthralling allure, welcoming environment, and the fascinating royal heritage. With its picturesque landscape, lakes, and historic significance, Udaipur has been a major tourism destination in the western state of Rajasthan. The city has two distinct areas, a Walled City dominated by the rich cultural, traditional markets, and architectural heritage and the area outside the walled city which is more planned and equipped with modern amenities and facilities. In the recent years, the city has experienced an unprecedented rise of tourism and its allied activities which have been found to be concentrated in the Walled City. There has been a direct impact of this on the increase in commercial activities furthering the increase in traffic and congestion in the not so wide streets and by lanes of the Walled City area. Issues caused due to traffic in tandem with poor and crumbling physical infrastructure is leading to deterioration of the overall environment of this famed city, including the outflow of the residents to the parts of the city with better physical infrastructure. It has been noted by the authors that the traffic congestion in the Walled City has progressively become the major deterrent and has led to influencing the travel and work experiences of not only the residents but also the tourists.

With the purpose of devising a strategy for the revitalization of the Walled City, the authors have approached the issue being faced by the Walled City of Udaipur from the lens of transportation management. The study delves on the concept of activity rescheduling and analyses based on livability index within the Walled City area. Further, research identifies various determinants of tourism potential in the Walled City. The proposals made for reviving the Walled City are primarily for the residents as it is understood by the authors that the benefits of the economic activities should be accrued to the locals and as much as possible to those within the Walled City. The intent has been to maintain the unique physical and cultural character blending the traditional with the new age technological solutions. The recommendations made may be applied in similar environs in old city areas in any part of the world by appropriately modifying to suit the local conditions.

Keywords

Walled City, Revitalization, Udaipur, Tourism, Heritage, Inclusivity

1. Introduction

Cities are the physical manifestation of socio-economic activities, needs, aspiration and action of people who live there. In the natural process, with time, the population of settlement increases leading to city's densification. Majority of the old cities and town, not only in India but world over have a typical morphological structure of old city or walled city and the city that outgrew the initial defined limits by proliferating to the available surrounding areas.

Owing to the heritage and commercial activities these cities have become hubs of tourism. The Walled City or the city core generally provides a strong well – networked and convenient relationship between workplace (commerce or household industry) and residence and among various other work-related activities with other parts of the city. Within the Walled City, most of the facilities are typically available within a short distance. There is a mixed-use pattern that has evolved over years which is convenient in some cases and generates conflicts in others, especially when the uses are not compatible and leads to pollution and environmental degradation.

Over time, with increasing densification in the Walled City area, there has been a deterioration in its environment. This can either be improved, restored, and revitalized or the people and authorities can continue to live with the business-as-usual situation. The authors perceive revitalization as an important strategy for the revival of the Walled City areas.

Revitalization is bringing back new vitality and life to a building, a community, a neighborhood, activities, and business. It may involve the allocation of new uses. Revitalization means the action of imbuing something with new life and vitality (Lexico, n.d.). Urban Revitalization refers to a set of initiatives aimed at reorganizing an existing city structure, particularly in neighborhoods that are declining due to economic or social reasons. Urban revitalization initiatives generally include improving features of the urban environment, such as the quality of pavement and the functionality of the sidewalks (United Nations, 2008). It has been adopted world over, with an aim to create a vital urban realm that the neighborhoods fit within.

The approach has been taken to the next level by making it inclusive and integrated which includes preservation and development of the needs to improve the living conditions of the inhabitants wherein the economic and social viability is considered as well. Preservation involves material improvements and enhancing the attractiveness of the area and its residential character, while development tends to stabilize economic viability and diversity. It diversifies urban functions and ensures income sources for the inhabitants. Revitalization can be understood as the process of giving rebirth to the place, area, or land, by giving rebirth it doesn't mean that the area is dead, but it means that this area needs revival, is somewhere not that much sustainable and compactable to survive.

2. Significance of Walled City

Old cities are repositories of rich socio-cultural heritage demonstrated by lifestyle, music, art, bazars (markets), and monuments. In many cases, these heritage sites and buildings are neglected, misused, and encroached upon (Kulshrestha, 2018). This is due to changes in lifestyle and economic status, technological advancement, lack of administrative support for improvement, ineffective laws and, above all, public apathy towards heritage conservation. The Ancient Monuments and Archaeological Sites and Remains Act, 1958 (updated in 2010) (Government of India, 2010) provides for the protection of heritage, but it covers only those monuments that are protected under this Act. Other such thousands of places are left unattended, which adds to its as well as the decay of surrounding areas. The Walled City areas are characterized by a typical and unique local character, congestion, high density, mixed use, and adaptability.

2.1. Revitalization Practices in the World

Revitalization in the world has been a continuous process and is now statutorily incorporated in physical planning (Sharma, 2018) in many countries. It consists of both physical and economic planning. By law, revitalization must be incorporated within a framework of a detailed development plan for its successful implementation.

In the revitalization process in many countries, both public and private sector participates. In some countries, there is a participation of non-profit organisations, which operate in partnership with local authorities. The legal provisions in these countries require urban renewal matters to be taken into considerations during the preparation of master plans. These practices are extensively followed in Sweden, Denmark, and North and South Africa to name a few.

Through studies of revitalization activities world over in the old city areas, some learnings have been captured by the authors as in the case of the urban fabric of the Medinas in Tunis, the capital city of Tunisia, which is similar in characteristics to the historic cities of India in the following ways:

- Square courtyards, multistoried houses left by the noble families after the colonization to settle outside the walls, same densification of low-income people,
- Problems of shared or bad registered properties,
- Problems of overpopulation,
- Decaying of civil heritage
- Narrow streets network (the bazaars ¹of Udaipur are a specificity) with trade and handicrafts, sanitation problems and low network equipment,
- Problems of accessibility by motorized vehicles
- Traditional handicrafts workshops replaced by storages or recycling of materials.

Over many decades, the authorities have been giving priority to the resorption of slums in the outskirts and the construction of new districts to cope with the housing shortage (Jain, 2009). During this time, the situation of the inner historic former cities, called medinas (from 20 ha to 200 ha), worsened, with more densification and decaying housing conditions. However, in some medinas, the situation started changing 20 years ago, through different actions like:

- Creation of a strong Heritage Cell (creation of the medina preservation association of Tunis in 1975 associating the regional government and the city) for public awareness and demonstrative public rehabilitations or reconstruction of buildings on public properties, and for helping owners for rehabilitation. This association receives 40% subsidies and 60% resources from consultancy and work controls.
- Identification of pilot areas (10 to 15 ha) to start the process through local and simple actions.
- Improvement of urban services, including solid waste management, local green and local facilities.
- Loans from international donors and public subsidies to bring basic urban services to the population.
- Decentralize rent acts to increase owners' revenues to maintain their building.
- Re-use of civil heritage buildings for local facilities or cultural citywide facilities. As a consequence of the progressive shift of the image of those districts: increasing land value, settlement of modern shops and settlement of new rather well-off families in some parts of the medina, the rest remaining rather vibrant and popular.

Likewise, the revitalization of the main street of old neighborhood in Istanbul was found to be similar to the main street markets of Udaipur. Dokmeci et. al. (2007) investigated the main street of Beyoglu, the westernized part of Istanbul's CBD in the nineteenth century. Beyoglu had started to develop in the sixteenth century with the introduction of embassy buildings of European countries.

¹ market

Its development reached a climax during the nineteenth century as a result of increased European trade and cultural influence, remaining the most distinguished quarter of Istanbul until the 1960s.

Thereafter, it suffered from decay, disinvestment, and abandonment as a result of later suburbanization and the multi-center development of Istanbul. Revitalization of the quarter started with the pedestrianization of the main street. Dokmeci et. al. (2007) investigated the functional transformation and changes in land prices after pedestrianization and concluded that access to mass transit, its central-city location with easy access to city's main transportation arteries, distinguished architectural character and international companies opening up stores and eventual market-led restructuring were some of the factors for the street's successful revitalization.

2.2. Revitalization Practices in India

Most Indian old cities have been marginalized in the process of urban growth. The walled city segment of the old cities languishes from multiple deprivations such as paucity of urban infrastructure, poverty of income and employment. However, it needs to be remembered that the development of a city is the result of centuries of growth in the course of which new development is constantly juxtaposed with the older ones. Though the walled cities areas are today dilapidated there is still hope of survival, of improvement, of getting life back to them.

As stated by Nayak (2003) efforts at understanding the concept of urban conservation in the Walled Cities of India gained momentum when heritage become an issue in the context of Indian cities like Calcutta, Ahmedabad, Jaipur, Mumbai and Delhi. However, all these efforts have been for the conservation and improvement of the architectural heritage of its Walled Cities only. For the revival and renewal of the walled city economy, there has been a unique effort in the 1990s when a group of people created an organization called Ahmedabad Local Economy Rejuvenation Trust (ALERT) and prepared Ahmedabad project of recycling and redevelopment of the land of closed mills. It was posed to the National Renewal Fund (NRF) Empowered Committee. NRF was established for funding, urban rejuvenation being amongst its other agendas.

The budget was sanctioned and published but could not be executed because NRF funds most of the money was spent on Voluntary Retirement Scheme (VRS) and some non-viable training schemes only. No scheme of urban rejuvenation was taken up which was the most important component of NRF.

Analysis of revitalization of some case studies like Walled City of Delhi (Shahjahanabad), Walled City of Ahmedabad, Walled City of Lahore, Pakistan was undertaken to gain a deeper understanding. Although historic areas face common problems, each area is characterized by its diversity of socio-cultural, bioclimatic, economic, and political contexts. The revitalization strategies must consider the concrete local situations and rely on the local resources, notably cultural resources. Each city must be able to design and develop its own projects according to the financial, technical, and human resources available and according to its own procedures.

There is no single or miracle method even for seemingly similar problems. The failures and the effects of the process, the methods used, and the lessons learned from the experience, are the best elements for progress. The positive results and good practice indeed have far-reaching consequences but are often limited in terms of usefulness for the stakeholders.

Difficulties encountered in the process of revitalization often vary in terms of –

- lack of political strategies, serious diagnosis, and competent expertise;
- Ambiguity or inadequacy of data;
- Lack of training, the inadequacy of technical capacities, notably in terms of linking traditional with modern know-how;

- Insufficient involvement of local populations, notably in non-democratic political systems;
- Consequences of gentrification difficult to foresee but sometimes intended (little account is taken of social criteria, rise in rental costs, and refusal of social mix);
- Complete destruction, no consideration of heritage value, in order to build new constructions, notably in residential areas;
- Exclusive heritage approach, underestimating the functionality of the district and the city as a whole;
- Lack of cooperation and coordination among the actors (national and international) linked to a lack of transparency in the process;
- Incoherent financing, relying essentially on the State; and
- Tourism as the sole activity making qualitative approaches impossible.

Historic areas should not be isolated pockets but integrated into the rest of the city. Revitalization experiments in historic areas show how the action is increasingly restricted when it centers solely around one specific building and does not consider networks, locations and interact with the city and its wider area. Local projects must, therefore, be supported and integrated into an overall urban development plan to make sure the historic areas do not become an element of spatial segregation in the area.

In order to be most effective, the conservation of historic towns and other historic urban areas should be an integral part of coherent policies of economic and social development and of urban and regional planning at every level as has been stated in principles and objectives of the Washington Charter of 1987 (ICOMOS, 1987) and hence the conservation plan should aim at ensuring a harmonious relationship between the historic urban areas and the town as a whole.

Rahbarianyazd (2017) has aptly stated that revitalization, thus, means reaching a satisfactory balance between the laws of economic development, the needs and the rights of inhabitants and the value enhancement of the city as a public good. The heritage, economic, environmental, and socio-cultural approaches do not conflict; not only are they complementary but long-term success is dependent upon these approaches being linked together.

2.3. Genesis and the Current State of Udaipur City

The historical city of Udaipur had been the capital of the Mewar dynasty. Chittorgarh was the former capital of Mewar Kingdom and Maharana Udai Singh successor of the Sisodia clan. When the Mughal Emperor Akbar captured Chittorgarh in 1568, and the fort was looted and destroyed, Rana Udai Singh founded Udaipur, the new capital of Mewar. Udaipur was naturally safe under the natural fortifications of Aravalli Hills. Since that time, Udaipur developed into a full-fledged city. Udaipur continued to be the capital of Mewar, till it became the princely state of British India in 1818 (Government of India, 1979).

After independence in 1947, the Maharaja of Udaipur accessioned Udaipur to the Indian Government and Mewar was merged into the Rajasthan state. Currently, Udaipur is an important city in Rajasthan. It is famous for its charming surroundings, its regal history, beautiful palaces and monuments, lakes and fascinating temples (Ministry of Urban Development, 2014).

Udaipur city is a part of Girwa tehsil of Udaipur district in southern Rajasthan, a state in western part of India. Known as the City of Lakes, located in the Aravalli ranges of Rajasthan, the city of Udaipur is situated at a distance of about 405 km from the state capital Jaipur and 662 Kms from the national capital, New Delhi. The City of Dawn, surrounded by the ancient Aravalli Mountains and set on the edge of three lakes, is a brilliant kaleidoscope of narrow lanes flanked by bright stalls, gardens, lakes, palaces, and temples. The city is famous for its palaces, lake, museums, temples, and gardens and much more.

In 1960, Udaipur was connected to Ahmedabad through a meter gauge railway line, which increased the tourist traffic from Gujarat to Udaipur and also increased the trade between these two important

regional trading hubs. In April 2013, the city got the status of Municipal Corporation. Udaipur is now directly linked to major cities of India like New Delhi, Jaipur, Ahmedabad, and Mumbai through roads, railways, and air routes. It has the distinction of being the only city in the country to have both the East-West and North-South Corridors of the Golden Quadrilateral Highway (connecting the four major mega cities of the country) passing through it.

Udaipur is bounded by Urban Control area prepared to control unplanned development and ensure systematic urban development (Government of Rajasthan, 2013). This belt is about 3 to 4 km radius around Udaipur. This belt consists of an urbanized area, an Urbanizable area and a Municipal area and 62 revenue villages (Refer Figure 1). The land within the urban control area can be utilized apart from agriculture, for dairy horticulture, farmhouses, resorts, motels, amusement parks, water theme parks, and agro-based industries.

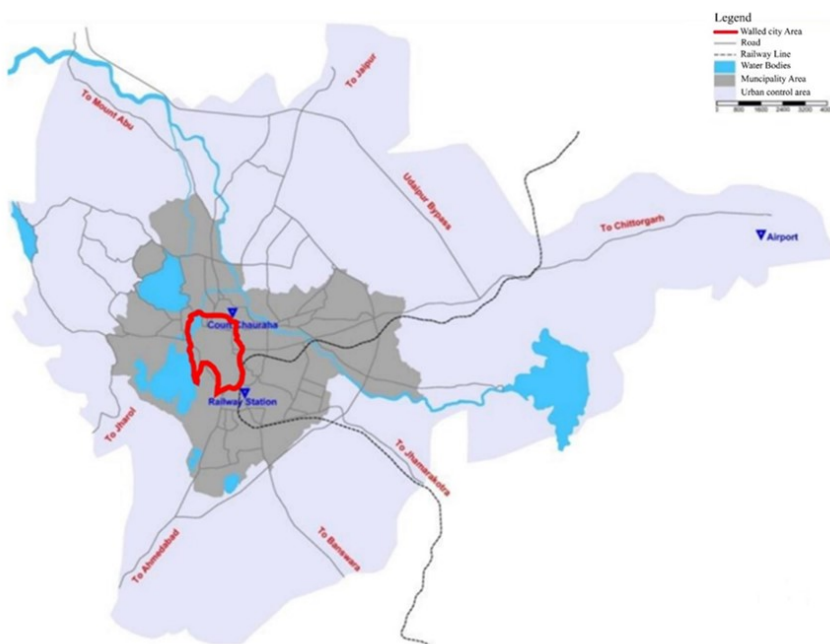


Figure 1 Administrative Boundaries of Udaipur City
Source: City Development Plan for Udaipur 2041, Ministry of Urban Development, 2014

Tabel 1 Administrative Areas in Udaipur City

Zone	Area in Ha.	Population 2001	Density per Ha.
Village area	11,296	96,112	8.50
Urbanizable area	11,348	7,540	0.66
Urbanized area	5,737	2,492	0.43
Municipal area	6,410	389,438	60.75
Total Urbanizable area	34,791	495,582	14.24

Source: City Development Plan for Udaipur 2041, Ministry of Urban Development, 2014

The total municipal area is 64 sq. km with 55 wards. The density of the municipal area is 7048 people per sq. km. As per Census of India, 2011, Udaipur having population of 451,100 (2011) that is. 2.6 percent of the urban population of the state. Population density within the city has decreased from 10,525 persons per sq. km (2001) to 7,048 persons per sq. km (2011), due to the expansion of the urbanizable area. Density in the core city is about 7,048 persons per sq. km.

Tabel 2 Population Density of Udaipur City

Year	Population	Area (Sq. Km)	Population density (persons per Sq. Km)
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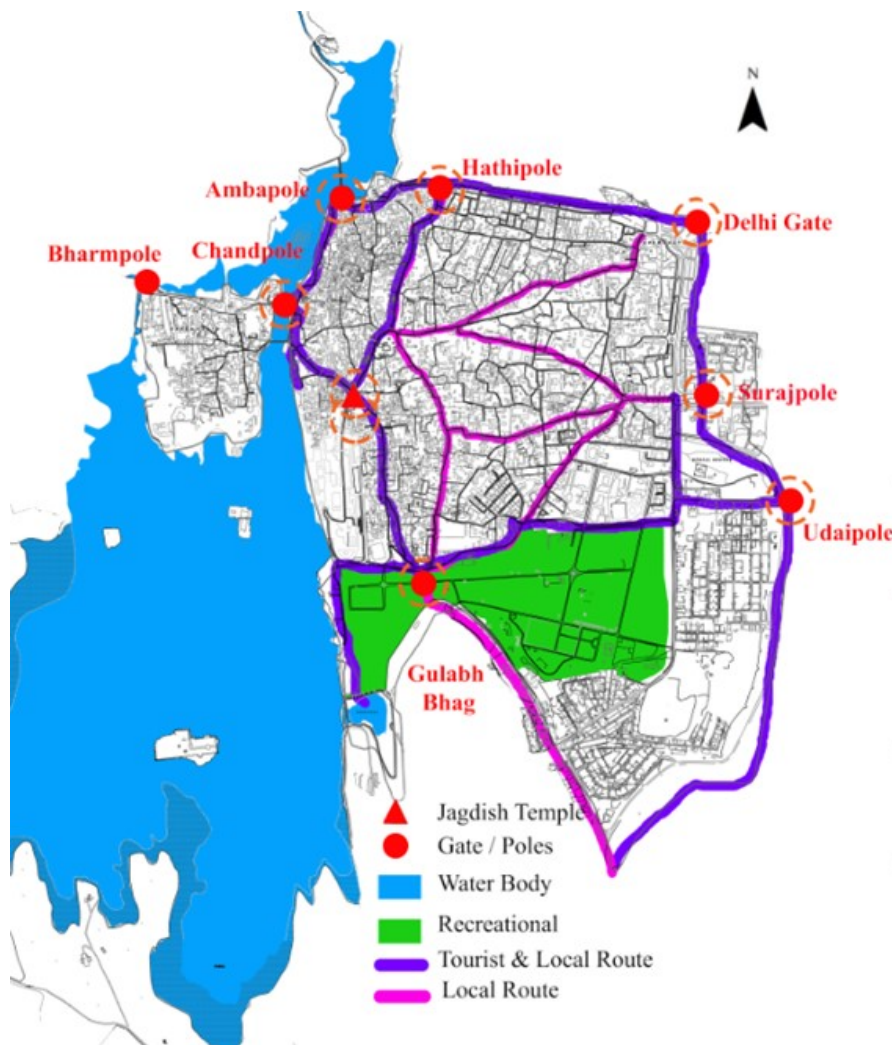
2001	389,438	37	10,525
2011	451,100	64	7,048

Source: Census of India, 2011

Within the municipal limits of Udaipur Municipal Corporation (UMC) lies the Walled City Area which is the city core and forms the oldest part of the Udaipur city. This Walled City Area is approximately 5% of the municipal area spread over 3.4 sq. km/ 828 acres. Predominated land use of the Walled City area is mixed-use.

Figure 2 Walled City with Major Landmarks
 Source: Developed by Authors

Physically segregated from rest of the city by the wall around it, due to which it is known as Walled City and is one of the famous international tourist destinations concentrated within the proximity of each other; are hotels and famous restaurants. Equally important among locals, for its temples and major markets within the Walled City. This area has been selected for Area Based Development (ABD) under Smart City project (Udaipur Smart City, 2019).



Udaipur’s old city is divided into sections by huge ornate gates along these erstwhile rampart walls that are locally known as pols (Sharma, 2002). The physical fabric of the old city is made up of a system of streets that meet intermittently at a square which becomes an important landmark. These are responses to the topography of the site as well as to the social fabric of the city.

There are several gates to the fort wall called the pols. Each has its own significance and is appropriately named. Many pols have become traffic islands, like Chand pol, Brahm pol, Amba pol, Hathipol, Delhi Darwaza, Suraj Pol, Udai Pol, Kishan Pol, Hanuman Pol, and Bari pol.

The city has several religious structures, primarily temples which have a historic significance and are actively living up to their traditional role of being social institutions like Amba Mata Mandir, Arya Samaj, Bara Ramdwara, Bhim Parmeshwarji mandir, Gurudwara, Hast Mata mandir, Heron ki Masjid and Jagdish Mandir.

*Havelis*² and the large buildings are an expression of the traditional hierarchy of the Mewari people. There are more than sixty Havelis in Udaipur, each with a history dating back to between the 16th to 18th centuries. They also represent a vast treasure of the decorative and the construction craft of building. Large gardens and orchards are an integrated part of the history of Udaipur. Their location and size represent the balance between the natural landform of the city and the built environment.

The city has already developed to a great extent in areas outside its municipal jurisdiction. The core city area/ old city area is narrow (2-4 feet wide road), highly dense (7,048 pph) and congested. These areas are characterized by narrow lanes, low-rise structures, and poor infrastructure services.

Table 3 Land Use Comparison with URDPFI Guidelines

Land Use Details	URDPFI Guidelines (percent)	Existing Land Use (percent)	Status against Benchmark
Residential	40-45	45	Yes
Commercial	3-4	23	Above
Industrial	8-10	1	Below
Public and Semi-public	10-12	8	Nearly same
Recreational	18-20	24	Above
Agricultural/Forest/Government reserved/water bodies and other open spaces	Balance	-	-

Source: Udaipur Master Plan 2011-2031 and URDPFI Guidelines, 2015.

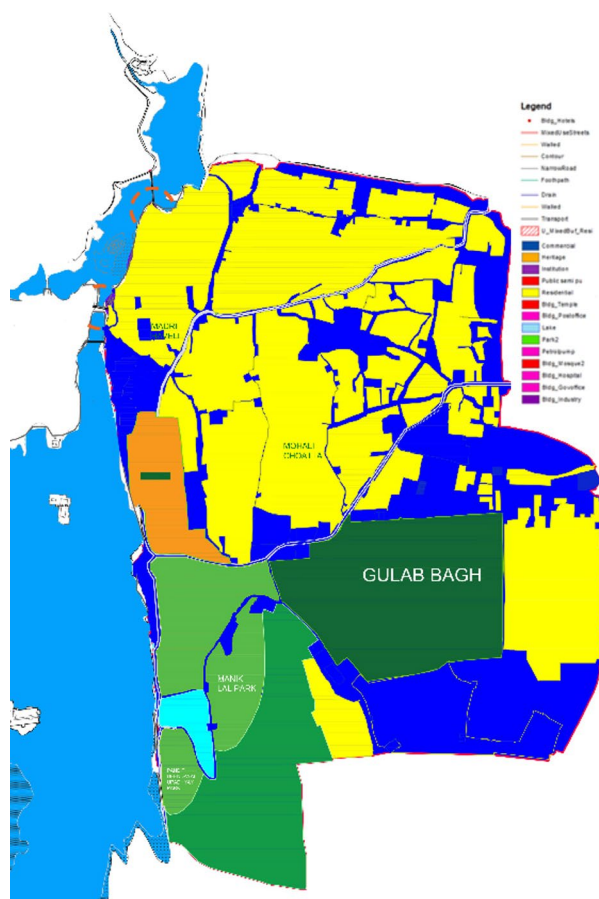
With reference to the above map, Land use of Residential area is the highest showing in yellow colour with 45% which is equal as Urban and Regional Development Plan Formulation and Implementation Guidelines (URDPFI Guidelines), on the other hand, the city residential area is not meeting the benchmark. Recreational and Commercial are very high (23%) in percentage as compared to the URDPFI Guidelines (3-4%) (Government of India, 2015).

Figure 3 Land Use of Walled City

Source: Developed by Authors

3. Tourism in the Walled City of Udaipur

The old city within the walls is built on smaller hills with narrow medieval twisting lanes and



² Traditional Indian mansion.

small temples at crossings that lend a charisma to the city. Interspersed with old dwellings, temples and palaces are new and modern shops, houses, markets, and down-to-earth bus-stands. Udaipur is home to various art and cultural centers as well as promoting and supporting rural and local crafts being a hub of jewelry and fabrics. The narrow winding lanes are lined with historic Mewari architecture of *havelis* and temples. The history and evolution of the city are documented as interesting historic layers of varying architectural forms and styles from the earliest period of the sixteenth century to the later transformations with Mughal and British alliances.

However, Udaipur as the capital of Mewar is renowned for its resistance to external influences of all kinds, a fact that is observable in its planning and architecture, which still retains the authentic Mewari character with its unique cusped arched openings and use of local stone.

The main attractions of Udaipur are as follows :-

City Palace Museum

One of the largest palaces in Rajasthan, Maharaja Udai Singh initiated construction of City Palace and later succeeding Maharajas added several palaces and structure to the complex. The palace complex is a beautiful collection of balconies, cupolas and towers made up of granite and marble. The main part of the palace has now been preserved as a museum. It has a large and varied collection of artifacts.

Lake Palace

The Lake Palace is one of the most beautiful places, afloat on the Lake Pichola, was built by Maharana Jagat Singh II in the 17th century as a pleasure palace. It was the summer residence of the rulers of Mewar. Today, the palace has been converted into a heritage hotel and since 1971, it has been managed by the Taj Group of Hotels.

Jagdish Temple

It is the largest and most beautiful temple in Udaipur. Located enroute City Palace, this temple is made in the Indo-Aryan style of architecture. It was built by Maharana Jagat Singh in 1651. The temple is dedicated to Lord Vishnu, the preserver of the Universe. There is a brass image of the Garuda in a shrine in front of the temple and steps up to the temple are flanked by elephants. The main Jagdish temple structure is situated in the middle with four smaller shrines in the four corners of the temple dedicated to Lord Ganesha, Sun God, Goddess Shakti and Lord Shiva.

Lake Pichola

This Lake is the centerpiece around which Udaipur revolves. It was originally built by Maharana Udai Singh II after he discovered the jewel of Rajasthan - Udaipur. It is surrounded by hills, palaces, temples, bathing ghats and embankments. In the lake there are two island palaces Jag Mandir and Jag Niwas, popularly known as Lake Palace.

There are many other tourist places which attract tourists from all over the world like Pratap memorial, Fateh Sagar Lake, Ahad museum, Eklingji temple, Nathdwara, Aisamand lake, which is the second largest artificial lake in Asia.

3.1 Tourist Arrival

Udaipur city is a well-known tourist destination globally, which is famous for its lakes, culture, architecture, and heritage. The tourism sector is the largest contributor to Udaipur's economy. The tourist season in Udaipur starts by August and lasts until March. The period between October and February is the peak season for tourism activities. Most of the fairs and festivals are held during this season. There is also a large religious tourist inflow during these months. The number of foreign tourists

has increased during the last four years, and the number of total tourists has also increased. Foreign tourists comprise around 22-24%, while domestic tourists comprise 76-78%. It has been observed that the tourist population has not grown significantly in the last few years. It has remained in the range of 7 to 7.5 lakh tourists (Government of Rajasthan, 2011 and 2017).

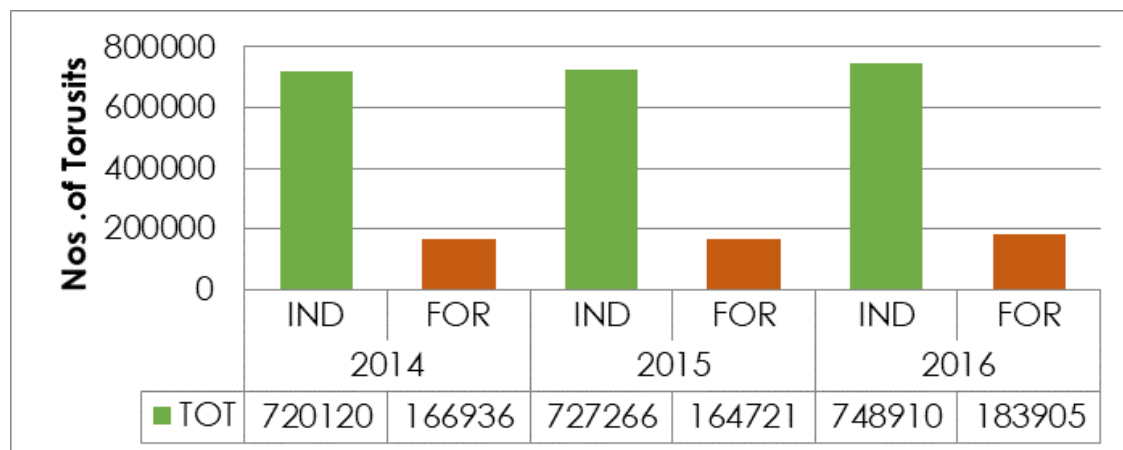


Figure 4 Tourist Inflow in Udaipur

Source: Rajasthan Tourism Development Corporation (RTDC), 2017

As the nodal agency to promote tourism in the state, the Department of Tourism (DoT), Rajasthan has played a key role in this growth along with the DoT promoted Rajasthan Tourism Development Corporation (RTDC), which was established in 1978 primarily to act as a catalyst for developing tourism infrastructure facilities for both domestic and foreign tourists, particularly by setting up of basic amenities like accommodation, food and organized tours/sightseeing facilities.

3.2 Economic Impact

Economy activity in the Walled City area is along the roads. Mainly three typologies exist, street market, hotel café and sabzi mandi which are explained in Figure 5 below by using the land use symbology of commercial activity in red. More than 400 restaurants are located at rooftop and beside lakes Pichola on city's narrow lanes (survey data, 2019). Udaipur's best-selling items range from valuable stones, dazzling colorful textiles, meenakari items, gemstone paintings, oxidized silver/ copper items, Pichwai/ miniature paintings, sculptures, panels, paintings, and another item in marble stone making that are sold in the shops along the street markets.

COMMERCIAL TYPOLOGIES				
TYPOLOGY (COMMERCIAL)	PLAN	SECTION	SORROUNDING LANDUSE	OWNERSHIP
STREET MARKETS				OWNERSHIP OF THE COMMERCIAL SPACER ARE GENERALLY PRIVATE. PEOPLE GENERALLY OWN THE COMPLEX. THEY HAVE THEIR HOMES ON 1ST FLOOR OR ABOVE IT AND SHOPS OR COMMERCIAL UNITS AT GROUND FLOOR
HOTELS				OWNERSHIP OF THE COMMERCIAL SPACER ARE GENERALLY PRIVATE. HOTELS GENERALLY OWN THE COMPLEX. THEY HAVE THEIR HAVELI CONVERTED INTO COMPLEX.
SABJI MANDI			TOTALLY COMMERCIAL WITH 3 DIFFERENT CLASSES OF MARKETS. 1) CLASS A- WHOLESALE GODDOWNS 2) CLASS B- FRUIT WHOLESALE 3) CLASS C- STREET VENDORS	CLASS A AND B HAVE THE OWNERSHIP ON LEASE. CLASS C ARE ON RENT

Figure 5 Commercial Typology in Walled City
Source: Site Survey and Observation by the Authors

Udaipur is celebrated for the amazing handicrafts that has made not only the city but also the state of Rajasthan unique. There is something enchanting and unique to offer to everyone. For décor this place is a paradise, as it offers a large variety from which one can choose ranging fine marble floorings, paintings in semi-precious stones, antique wooden furniture, jharokhas, lovely statues, waterfalls, and vibrant colored furnishings. The hand-printed linen is extremely popular as well.

3.3 Heritage

In the year 1982, the International Council on Monuments and Sites decided to celebrate 18 April as World Heritage Day. It was a step taken towards spreading awareness about monuments and other sites which are a part of history. Udaipur is one of the most prominent cultural heritage signatures of Mewar dynasty. Future generations get a chance to live history through these heritage sites and hence they should be preserved. Various organisations involved with the preservation of the heritage sites have documented the structures of significance in the city which are enumerated below (Innovation Center Denmark, 2015):

- Total Structure listed in Walled City – 203 (by Ford Foundation)
- Total Structure listed (within and outside city) – 350 by INTACH)
- Monument under ASI and State – 45 (as per ASI and State Government)

Cities make an important contribution to social and economic development through its heritage sites. In the process, they often get thwarted by persistent environmental degradation. The heritage city of Udaipur founded in the sixteenth century is under tremendous urban pressures and in dire need of measures for sustainable development. The rapid growth of the city has become a serious threat to the existence of the local environment including the river Ayad and its man-made lakes along with the beautiful hilly surroundings of Udaipur.

Tabel 4 Typology of Built Heritage in Walled City

Built heritage type	Listing within Walled City (No.)	Listing Outside Walled city (No.)
Fort and palaces	1	12
City Walls and Gates	60	7
Temples and Religious Building	187	24
Havelis and Houses	210	10
Public and Commercial building	41 (Public) + 528 (commercial : avg. 4-5 shops in one no.)	9
Wells and Bavdis	68	9
Cenotaphs	1	11
Total Structure Listed	1096	82

Source: Rajasthan Tourism Department RTDC, 2011

3.4 Survey and Analysis

The Walled City area is sub-divided into smaller areas called zones for the purpose of survey and data collection. The purpose of such a subdivision is to facilitate the spatial quantification of land use and economic factors which influence travel pattern. For doing a transportation survey, the Walled City was divided into 7 zones on the basis of existing major roads.

Zones were modelled as if all their attributes and properties were concentrated in a single point called the zone centroid. The centroids were connected to the nearest road junction or rail station by centroid connectors. Both centroid and centroid connectors were notional and it was assumed that all people have the same travel cost from the centroid to the nearest transport facility which is the average for a zone. The intersection from the outside the Walled City was normally represented through external zones.

3.4.1 Traffic Volume Count

Traffic Volume Count (TVC) is counting on a number of vehicles passing through a road over a period of time expressed in terms of Passenger Car Unit (PCU) and measured to calculate Level of Service of the road and related attributes like congestion, carrying capacity, V/C Ratio, identification of peak hour or extended peak hour, etc. In the walled city study area, TVC was done at 8 locations from which it came to be concluded that:

- 1 person having a delay of 10 min/ day, in total 2.5 days in one year spent in traffic.
- if the average wise rate is 15, 000 Rs. than 27,000 rupees wasted in traffic annually.
- each zone time delay depends upon the number of Traffic Volume Count.
- highest TVC count was at zone 1 with 6822 people traveling at peak hour, which meant that 51,165 per day were wasted in time delay accounting for around 18,675,225 INR annually.

3.4.2 Origin Destination Survey

Origin and Destination survey was calculated on the basis of four types of moving traffic, which was external to external (EE traffic) which is the through traffic. External to internal (EI traffic) that is running from external parts of the city to Walled City. Next was internal to external (IE traffic) which flows from

Walled City to the external city and lastly internal to internal (II traffic) running only within the walled city.

- By drawing the external-to-external matrices, it's calculated that 30% of traffic is through moving traffic from the core city.
- And external to internal and internal to external have the same amount of traffic in the morning and evening.
- The expansion factor for zones 1, 2,3 and 5 are very high.
- At the same time in zone 4, there is an error.

3.4.3 Socio- economic

It was essential to survey the existing social and economic status to obtain background information that would allow to identify the needs of the target population. By responding to expressed needs, the recommendations would have a better chance at adoption. It was understood that the recommendations must be technically feasible, economically attractive, and socially acceptable if it is to be adopted by people.

For collecting socio-economy data, three questionnaire surveys were done with residents, shopkeepers, and tourists covering a wide gamut of stakeholders.

3.4.4 Tourism Status

Tourism activity within the Walled City was collected through questionnaire survey and analyzed. Survey was conducted for both domestic and non– domestic tourists. The analysis was based on travel behavior, duration of travel plus tourism infrastructure facilities.

Tabel 5 Toursim Status

Tourism survey	Domestic	Non – Domestic
Type of tourist	60%	40%
Gender distribution	48%- 52%	39%-61%
Travel duration	3-4	6-8
Infrastructure	Parking, Congestion	Cleanliness,
Mode of travel	Car, Auto rickshaw	Walk, Auto rickshaw
Security	Very good	Quite safe
Ranking	3.8/5	4.5/5

Source: Survey conducted by authors 2019

Udaipur is a heritage and cultural city and attracts tourist, hence it is pertinent to analysis tourism activity within Walled City. For doing that, the questionnaire survey was done for both domestic and international tourist. The analysis was based on their travel behavior, duration of traveling plus tourism infrastructure facilities for them.

Tourism opened new vistas for employment of the people of this region. With tourism becoming a thrust area of development, the hotel industry witnessed a boom and, the explosion of hotel industry lead to a further increase in the number of tourists. The city saw several controversial constructions where the land reserved as green belt i.e. conserved for natural wealth and vegetation was used to construct new hotels. Further natural areas surrounding the lakes were encroached upon and the lakes often used as the disposal conduits for such hotels. With the mushrooming of hotels the demand for land too increased. As a result these lakes have been seriously polluted. These lakes, which are also a source for drinking water supply, are gradually ceasing to be a source of potable water. Hotels can exist only when

tourists keep on coming in large numbers. The arrival of tourists depends on the serene, salubrious historical surroundings of Udaipur. Due to the ecological-imbalance, if Udaipur was shorn of this distinctive feature, the adverse consequences will not be difficult to envisage.

3.4.5 Livability

Livability is defined by the standard of living for people or communities with respect to basic infrastructure like water supply, sewage, drainage. Livability was analyzed by the household survey data among 8 zones, with respect to the education facility, healthcare facility, nearby market, availability of parking, availability of playground for children and availability of basic infrastructure. For each of the zones the ranking was done which indicated the relative livability of the zone, the higher ranking being most livable.

Table 6 Livability Index

ZONE	Education	Healthcare	Market	Parking	Playground	Basic Infrastructure	Ranking
Zone 01	2	4	8	4	0	4	22
Zone 02	8	8	10	0	0	2	28
Zone 03	4	6	10	6	0	6	30
Zone 04	6	4	6	0	6	8	30
Zone 05	8	6	8	0	0	6	28
Zone 06	8	8	6	6	6	8	43
Zone 07	10	2	10	4	4	4	32

Source: Survey conducted by authors 2019

4. Problems and Issues in the Walled City of Udaipur

At a time of Udaipur's evolution, horses, elephants and hathgadi were the modes of transport. After passing centuries motor vehicle came in which completely change the scenario. A well-developed transport infrastructure surely provides increased accessibility to various parts of the city and opens up remote areas on the periphery as well, which is necessary from the point of future development and orderly growth of any town.

Transport Infrastructure

Approximately 85% of road length within the walled city is of less than 5.0M wide, which is not suitable for bigger vehicles (4 wheels, autos, loading/ unloading vehicles). Majority of motorable tourist routes are on the periphery of the walled city and local routes are within the walled city.

These routes cater to heavy tourist traffic being the approach road for major tourist activities and towards the hotels and restaurants. In absence of any restrictions, tourist vehicles end up driving up to the city center and often merge with the local traffic, resulting in frequent traffic congestion and traffic jams. This is mainly due to narrow ROW which is not suitable for cars and other bigger vehicles.

The road stretches, having their RoW between 3.0M to 5.0M are like Rangniwas Chowk to Jagdish Chowk, Jagdish Chowk to Hathipole junction, Jagdish Chowk to City Palace Complex, Jagdish Chowk to Chandpole Darwaja, and Chandpole Darwaja to Ambrai Ghat. Some road stretches have RoW less than 3.0M like the approach road to Lal Ghat and the approach road to Ganguar Ghat.

Parking

On-street parking exists up to 33% of the road network. The existing parking system of Udaipur is decentralized, unmanaged and largely dysfunctional. Parking is dominated by many small parking lots. Many of these facilities are generally poorly maintained and lack basic infrastructure. Haphazard street parking in major markets reduces the carrying capacity of roads. The Walled City area has major parking problems.

The tendency in Udaipur is of commercialization along the main roads, which has led to an increase in parking demand along the market roads which in turn reduced the effective carriageway. Most of the commercial areas don't provide parking space, hence, vehicles are parked on roads thereby obstructing smooth movement of traffic. This results in traffic bottlenecks especially in peak hours causing economic loss. Further, only 9% of the road network has traffic signage, adding to confusion for the tourists and outsiders.

Concentration of Economic Activities

Economy activity in the Walled City area is along the road. Mainly three typologies are their street market, hotel café and sabzi mandi. More than 400 restaurants located at rooftop & beside lakes Pichola on city's narrow lanes, Udaipur best-selling items range from valuable stones, dazzling colorful textiles, meenakari items, gemstone paintings, oxidized silver/ copper items, Pichwai/ miniature paintings, sculptures, panels, paintings, lather bags, lather dairies, bandaj, leharia and another item in marble stone making.

Udaipur has 12 market from local handicraft to sabji madi to wholesale markets all located within the Walled City area. All markets have the same opening and closing timing, with all being closed on Sundays.

Mixed Land Use

Udaipur city started developing organically, interspersed with old dwellings, temples and palaces are new and modern shops, houses, markets, and bus-stands, all in a contiguous plot. Udaipur is home to various art and cultural centers. It is a hub for promoting and supporting rural and local crafts specially jewelry and fabrics.

The walled city is dominated by the gargantuan City Palace. Picturesque *havelis* (carved mansions), *ghats*³ and old temples line the banks of Lake Pichola, whilst the bustling *bazaars* of the Walled City stretch along the arterial roads. This old *havelis* overtime have now been converted into restaurant and guesthouses.

There has emerged a mixed-use pattern that is convenient in some cases and generates conflicts in others, especially when the uses are not compatibles and cause noise and air pollution, traffic congestion and discomfort to residents. The winding and hilly streets which buzz around the Jagdish Temple are surrounded with shops and makeshift stalls selling all sorts; from jewelry to spices to leather. Some issues are listed out below:

- Due to the hot and dry climate, Havelis are deteriorating
- Electric wires, open drain, and traffic become a major problem, with changing lifestyle and increasing vehicle ownership, the area has become congested.
- Inadequate sewerage and solid waste management leading to land, water, and air pollution.
- No heritage management.
- Absence of broad-gauge connectivity to the city affecting industrial, commercial and tourism growth.

³ Flight of steps leading to the lake or river.

- Lack of efficient public transport leading to increase in private vehicular ownership and ineffective traffic management.
- Very high density in Walled City.
- Noise and air pollution due to traffic and population increases.
- Traffic congestion and discomfort for residences.

5. Conclusions

The traffic congestion in the walled city has progressively become the major component that has been influencing the travel experience, be it for work or leisure. **Revitalization of Walled City** will not only promote **heritage conservation** but also give a strong boost to **tourism** and consequent **economic upliftment** of the local population.

In the research process, the behavioral questionnaire and traffic flow survey as the first quantitative measurements were used. The behavior survey was attempted to identify the possible attitude or perspectives upon the people in Walled City, Udaipur. The results show that more than 50% of the participants expressed the view towards disagreement about the good transportation condition. Nearly 70 percent of the local residents stated that it was difficult for them to find a parking spot in the Walled City. Through the traffic flow survey attempt was to determine the potential transport condition at a different time interval on certain days. In the process, the different collection destination was collated, and it ensured the accuracy and usefulness of the statistics to a large extent.

To strive toward a sustainable Walled city that not only appeases the local community but also attracts the tourists the usefulness of **public transport**, connectivity, pedestrianization and **liveability** in Walled City Udaipur through **Socio and Economical Survey** was concluded. Sustainable development should be of strong focus, with well-localized parking, human-scaled pedestrian and inclusive heritage sites and benefits largely accruing to the local population. Convenient connectivity of the outer city to Walled City can be assured by efficient multiple types of transport modes, well-designed to contribute to the natural surroundings of the city and its suburb. Committed to offering choice and variety, the future of Walled City, the lakeside tourist city of Udaipur should sustain a diverse community of local families, tourists, local business traders.

Activity rescheduling along with **transport system management** holds the key to enhance tourism in the Walled City Udaipur and should be the focus. In parallel, the livability of the Walled City needs to be renewed to continue to attract the people to like and work in the core area. The Walled City is a living city and through inclusivity of the socio-cultural aspects clubbed with the existing economic structure the area should be renewed, revived and revitalised for generations to come.

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