Analysis of Active Mobility in the Historical core city of Kathmandu

Manish Maharjan [a], Padma B. Shahi [b]

[a, b] *Department of Architecture, Pulchowk Campus, IOE, Tribhuvan University, Nepal*
Corresponding Email: [a] manishmhr247@gmail.com

Abstract
The historical core city of Kathmandu valley is undergoing through several urban challenges, transportation being one of the most prevalent fields. The compact walkable streets of Malla period and the unique streetscape of Rana period are forced to accommodate the increasing vehicular flow higher than its design capacity resulting to the chaotic mobility and degrading life standard of the people. The increasing population coupled with addition of vehicles in the street have shifted people from walking and cycling to vehicular mode for mobility. In order to decelerate the aggravation of such situation, active mobility; defined especially as walking and cycling, can be a right solution for Kathmandu core city. This research tires to assess the eminence of active mobility in present mobility pattern of the core area on the basis of traffic survey done in identified stretches along with identification of ways for shifting vehicular mobility to active mobility in the streets of core area.
Mobility in historical core area of Kathmandu has been pressing problem to be solved as Mechanical mobility is posing great threat to city life. In context of social sustainability of a city, the paper has raised the issues critically. Pedestrianization will contribute to enhancement of urban environment of city core by curtailing mobility by motorized vehicles. The paper tries to give emphasis on desirability of pedestrianized mobility which cuts down the pollution level too. The research aims to analyze different factors affecting active mobility in the study area and also identify the ways to improve them. For this, the research follows post positivist paradigm with triangulation of review of existing literature, related case studies and site observation constituting the structure of methodology. The research also discusses the attitude and perception of people towards the active mobility through the results obtained from questionnaire survey.

Keywords
Active mobility, Historical core city, Mobility pattern, Attitude, Perception

1. Introduction

Active mobility or active transportation is the transport of goods or people through human-powered modes whereby the travel is based on human physical activity. The best-known forms of active mobility are walking and cycling where other modes include skateboards, roller skates, rickshaws, etc. Active mobility proves to be the cheapest, most healthy, and practical for a distance of about 5km [1]. It is one of the most promising ways of tackling the persisting challenges arising from increasing traffic volume. However, in order to determine the strengths and weaknesses of active mobility network, it is essential to understand travel behavior, attitudes and needs of pedestrians and cyclists for prevailing conditions [2].

Today cities are going through many different urban challenges; growing population and high population density being one of the major causes [3]. Countries are rapidly evolving and adapting to today's globalized and competitive world. Transportation being one of the most prevalent fields that leads to the problem of traffic congestion and air pollution where vehicular emission is one of the major contributors of air pollutants like carbon monoxide and nitrogen oxides etc. (Krzyzanowski et al. c.f. Terh H.S, 2018 c.f. 2005). Bicycling and walking as an active mode of transport are basic fundamental forms of transportation that are used by travelers during some point of their trips but are at times overlooked in this modern age of high-tech motorized mode of travel.

Streets in Kathmandu valley were traditionally designed for walking with communal space for people to meet. However, research published by ADB in

2011 clearly shows that Kathmandu is one of the least walkable cities in Asia. As per a study made by MoPIT/JICA in 2012 walking share was reduced from 53.1% in 1991 to 40.7% in 2012 and further forecasted to decrease to 38% [4]. The lively and pedestrian-friendly streets of the Malla period and the unique streetscape of the Rana period, including streets in planned and haphazardly developed areas, are being rapidly transformed due to unmanaged urban growth, chaotic construction, and a growing number of vehicles in Kathmandu [5]. For a compact dense city core like Kathmandu, active mobility can be the best alternative to preserve its original urban fabric and priceless architecture. A walkable and bicycle city can be an important step toward greater sustainability.

An increase in in the population of the valley at the rate of 3.37% as of 2020 coupled with the increased vehicular flow has resulted in conflicts between vehicular and pedestrian movements. The once compact walkable streets of the valley have now become a space for housing and facilitating undesirable vehicles. The unmanaged street vendors and haphazard on-street vehicle parking have also contributed to the mismanagement of the narrow streets of the valley affecting the flow of pedestrians and vehicles. The narrow streets are being stretched to extreme edges to accomodate maximum vehicular flow affecting the tangible and intangible aspects of the traditional society. Also, it cannot be omitted that active mobility is looked upon as an inferior form of transport as faster travel and reduced physical effort are seen as synonymous with economic and social progress. This attitude of people has led the transport professionals to devalue walking and cycling and incline towards vehicle-oriented development.

The city of Kathmandu is attracting more traffic as it is an economic and political epicenter of the nation. Most of the open spaces like bahal, chowks, na:ni are used for parking tumbling down the essence of the intangible aspect of the space. The over dependency on fossil fuels has resulted to 1.2times fuel import than total export of Nepal in fiscal year 2076/77 as per Nepal foreign trade statistics along with Rs 116billion of congestion cost in the valley is a huge economic loss for the people of a developing country. Also, a direct impact on health can be seen as an increase in physical inactivity whereas an indirect impact can be seen as an increase in particulate concentration emitted by vehicles [6]. The WHO has highlighted the direct relationship between a sedentary life and the risk of developing cardiovascular and tumor diseases which are seen as a result of technologies taking over human activities. (Wen et. al.2011 c.f. Carnavale C, 2018).

So, in case of Kathmandu, where walking and bicycle carry a long history behind, active mobility can be an ultimate solution to all these problems caused by overcrowding of vehicles. Kathmandu needs to formulate necessary plans and policies regarding historical core transportation master plans which would facilitate and encourage the pedestrians and the regular cycle doers.

2. Objective of the study

The main objective of the study is to analyze the factors affecting active mobility in the historical core city of Kathmandu and identify the ways to improve such factors. The specific objectives of the study are:

- To review the existing mobility of the core area

- To establish the status of AM in the core area

- To recommend the ways of shifting vehicular mobility to AM in the core streets

3. Methodology

The research was based on post positivist and pragmatic paradigm. The research explored the issue on modified dualist with inductive logic to induce a general theory on how to enhance active mobility in the core area. Intense literature review and case study were done to understand the standards for active mobiltiy and different international practices of mobility mangement in historical core areas in global context. Vehicle volume count in the study stretches along with physical measurement of present infrastructures were done to have the general idea of existing condition and to co-relate acitve mobiltiy with road width, road condition and traffic volume. Similarly, questionnaire survey was done for the residents and visitors of the area along with key informant interviews with ward chairpersons and different related government bodies to know their attitudes and behavior towards active mobility management in the core area. Finally all the data collected have been analysed through GIS as well as different analytical graphs and charts.
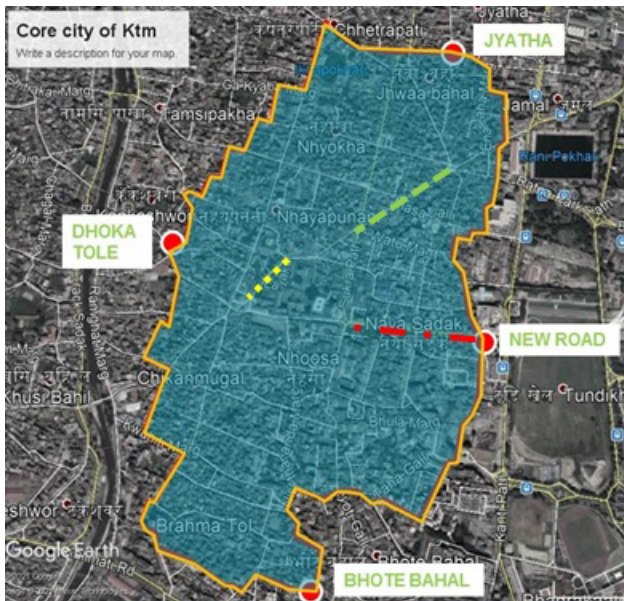
Figure 1: Study Strech

4. Study Area

Kathmandu city is one of the oldest living historical cities of the valley which is changing rapidly its form due to urbanization and commercialization. The city was designed as a fortified city where the city wall can be traced through location of certain temples and ceremonial Upaku routes during Indrajatra festival. The old town area has over 1,000 person/ha population density [7]. The historical core area of Kathmandu has been taken for the thesis research which stretches from Newroad in the east to Dhokatole in the west and chetrapati in the north to Teku in the south. For the detail research, following three different stretches have been chosen as per their mobility characteristics.

Detail study such as vehicle count, pedestrian count, physical measurements etc. has been done in these identified stretches.

• Stretch 1- This stretch extends from Ason chowk to Indrachowk which is characterized by one of the oldest markets of the valley with high pedestrian flow and limited vehicular flow. The stretch caters a high volume of pedestrians. The stretch extends to length of 0.30 km.

• Stretch 2- This stretch extends from Sano pashupati to Shiva Parbati temple and is characterized by complete pedestrianization. The stretch lies in UNESCO World heritage site, Kathmandu durbar square and so carries a significant value. The vehicles are completely banned in this stretch except for the emergency vehicles and police vehicles. The stretch

extends to length of 0.15km.

• Stretch 3- This stretch extends from Newroad gate to Juddha Sumsher Salik which is characterized by heavy flow of vehicles because of being commercial hub. This stretch caters more volume of vehicles than pedestrians and is one of the busiest traffic areas of the core area. The stretch is of 0.35 km in length.

5. Findings and Discussion

5.1 Physical Infrastructure

The streets of core area are well interconnected and devoted to non-motorized mode of transport. Most of the lanes are stone paved that represents the people centric mobility whereas only few stretches are black topped focusing towards vehicle mobility. However, most of the streets cater mixed mobility i.e. both vehicles and pedestrians on the same narrow lane. There are no separate lanes for pedestrians, cycle users or vehicles due to the limited width of the lanes. Footpaths can be seen only in few commercial stretches i.e. around the Newroad areas. The narrow streets are further squeezed by haphazard on-street parking and unmanaged street vendors. The walking zones are encroached especially by motorbike parking and local vendors as a result of which pedestrians and cycle users share the same lane with motorized vehicles creating a high risk of accidents. Also, the footpaths provided in few stretches do not match the standard width and also are discontinuous. These conditions have created conflict between non-motorized and motorized mobility.

5.2 Traffic Survey

In order to establish the status of AM in existing mobility pattern of the core area, vehicle count has been done in the selected three stretches for three weekdays and one holiday. The data clearly shows the mobility share of the three stretches where pedestrians occupy a larger share followed by two wheelers.

Figure 2 shows that Newroad has highest flow of two wheelers and four wheelers being a commercial hub. Similarly hanumandhoka stretch which is a completely pedestrianized area has comparatively higher number of pedestrians than other two stretches.

Though the purpose of visit in all three stretches may be different, it can be observed that if people are provided with facilities for walking and cycling then
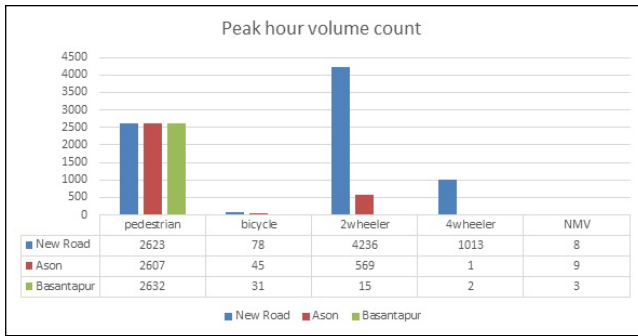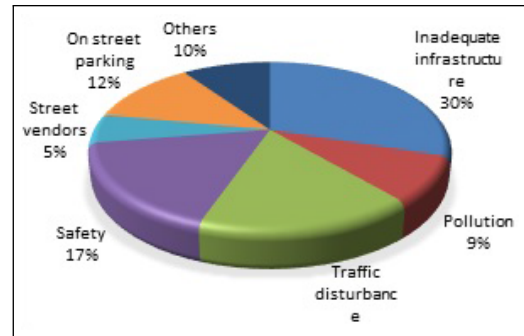
Figure 2: Peak hour volume count

the streets will have the similar mobility pattern. The stretch of Newroad is completely commercial with two lanes for vehicular flow so we can observe large number of motorbikes and four wheelers in the area than pedestrians and cycle users.

5.3 Perception Survey

The questionnaire was circulated amongst the residents and visitors of the core area and were asked different questions related to mobility and present traffic situation of the core area. The result showed that majority of mobility share was owned by motorcycles for work and hospital whereas core area being a market center, the main mode of transport for market visit was found to be walking.
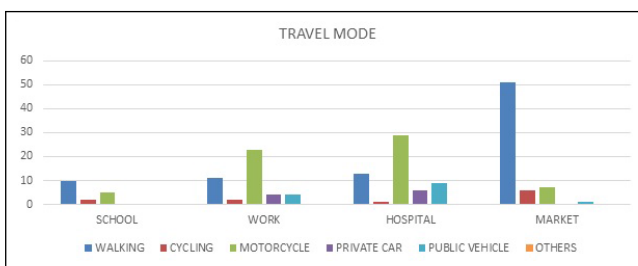

Figure 3: Travel mode of residents

Figure 4: Problems for pedestrians

Figure 5: Problems for cycle users

The main reason for use of private vehicles was found to be convenient and time efficient than active mobility and public transportation. Similarly, the major problems for both pedestrians and cycle users were found to be inadequate infrastructure, on street parking, and traffic disturbances and safety. So the majority of the respondents focused on improving the infrastructures and managing the on street parking and street vendors in order to improve the present condition of active mobility in the historical core area. However few other suggestions for enhancing the walking experience in the core area, such as provision of public toilets, managed solid waste and addition of street furniture were also noted during the survey.
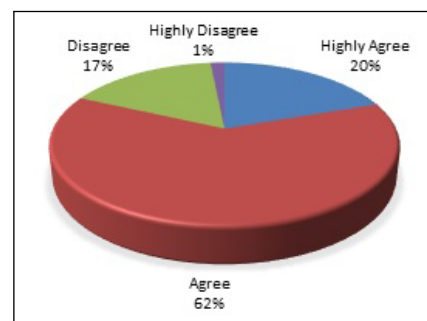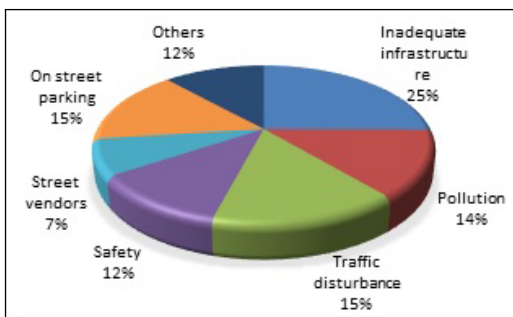

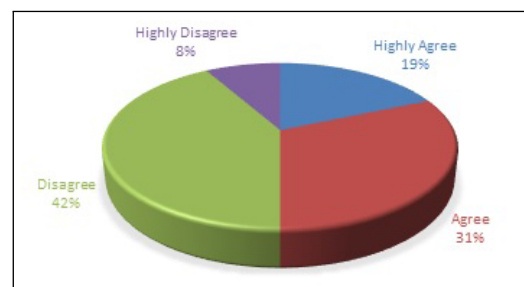**Figure 6:** Banning four wheelers

Figure 7: Total banning of vehicle

There are few stretches in the core areas that bans four wheelers and two wheelers during the office time

which has created a safe and lively walking space in the area. Relating to this issues the interviewee were asked on their perception towards banning the four wheelers and two wheelers in the core area during the office hour. The pre-assumed ontological claim of the research was that active mobility is the most feasible mode of transport in historic core cities. However, from the perception survey, it showed that people are not willing to ban the vehicles in the core area and switch to walking and cycling. Only 31% respondents agreed on completely banning vehicles in the core area whereas 62% agreed on banning four wheelers from 9am-9pm. This clearly shows the dependency of people on vehicles for daily life activities and also the current changing lifestyle of people.

6. Conclusion

The streets of the valley were laid on when mobility was primarily on foot. The increasing number of vehicles has instigated conflict between the motorized and non-motorized mobility creating hassle and chaotic situation in the traffic condition of the core area. The existing condition and infrastructures of the streets are analyzed and concluded that the signage, street furniture, etc. were found to be insufficient whereas most of the road surface was found to be uneven with potholes. Street lights were found to be satisfactory but needs to be maintained at standard interval. Also the major problem observed was inadequate infrastructures like cycle stands, cycle lanes etc. for cycle users. These issues needs to be addressed sooner to encourage more people to use cycle as an alternative to motorbikes for shorter distance. From the survey and key informant interviews conducted, it can be concluded that awareness amongst the people and policy level implication, are the areas that need to be focused on for enhancing the active mobility in the core area. The spatial analysis in the selected stretch reveals the land-use conversion of residential to commercial. Due to this the building's fac¸ade are transformed to concrete look with hoarding boards polluting the visual essence of the traditional core area as of which the traditional architectural identity is slowly fading away in the valley.

The major mode of transport in the core area was found to be motorbikes; convenience and self-reliance being its major reason. So, easy and quick access to the public transportation with well-connected pedestrian itinerary has to be given a foremost priority. Also, the

perception survey shows that people are not willing to give up their comfort of travelling on vehicles for walking and cycling. The on street parking and street vendors needs to be well addressed as these are the inseparable part of the city streets. The street vendors in the morning in the city area makes the place more vibrant and lively but at the same time unmanaged vendors all the day makes the same street congested and chaotic.

Active mobility in the historical core area have high significance in terms of social, economic, environmental, health and visual aspects. The shared street pattern is prevalent in the city core where both the motorized and non-motorized vehicles ply on the same stretch. So, proper management of shared stretch with practical solution to parking and restriction of vehicles in appropriate stretches can be the best option to enhance active mobility in the core area of the Kathmandu valley.

Acknowledgments

References

[1] HiSoUR. Active mobility. https://www.hisour.com/active-mobility-38597/.

[2] Maria Cecilia Rojas López and Yiik Diew Wong. Attitudes towards active mobility in singapore: A qualitative study. *Case studies on transport policy*, 5(4):662–670, 2017.

[3] Jan Gehl. Cities for people island press. *Washington DC*, 2010.

[4] R. Thapa and R. Maharjan. Walkability "making walking preferable".

[5] Bijaya K Shrestha et al. Street typology in kathmandu and street transformation. *Urbani izziv*, 22(2):107–121, 2011.

[6] C Carnevale, E De Angelis, G Finzi, E Turrini, and M Volta. Evaluating economic and health impacts of active mobility through an integrated assessment model. *IFAC-PapersOnLine*, 51(5):49–54, 2018.

[7] Historic city core of Kathmandu. https://ruprama.wordpress.com/?s=historic+city+of+kathmandu, 2011.