

Assessment and Policy Interventions for Neighborhood Walkability Improvement

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Abstract: *One of the most common forms of physical activity is walking which is the mother of all the modes of transport which provides inexpensive and equal transportation options to improve residents' health and quality of life. Due to several associated advantages such as wellbeing of residents and improving health, reducing air pollution, traffic congestion and decreasing energy consumption, walking has become an interesting topic for researchers. To have modern cities with highly efficient transportation facilities which support walking, cities and neighbourhoods are trying to promote a pedestrian-friendly environment. As a result, walkability is a sustainable concept to improve the liveability of growing cities that describes the level of capability of the built environments to support walking for multiple purposes including transport, leisure and exercise purposes. Although measurement of walkability includes several methods and approaches, this research has emphasized on the walkability index as well as neighbourhoods features that influence the willingness of people to walk. Since Lucknow is not considered a walkable city, it is valuable to investigate how this city has tackled this issue. Therefore, for better interpretation, one such neighbourhood in Lucknow was selected to examine the level of walkability and the factors affect that*

Keywords: Walkability, Neighbourhood, Place

I. INTRODUCTION

One of the key global challenges is population growth and rapid urbanization that increases the vulnerability of environment and health of people and influence the quality of life of citizens. It is estimated that the total population of world cities grow from “3.3 billion people in 2007 to 6.4 billion by 2050” (Mitchell, Enemark et al. 2015). Increasing the urban population and tendency for a better quality of living and the expansion of car ownership encourages people to live in suburban areas and develop urban sprawl and city congestion. Such sprawling neighbourhoods also cause more air pollution per person and suffer from more traffic congestions. Unfortunately, this has also changed the travel pattern from the traditional mode of transportation to automobile mode of transportation and walking as the oldest and the most basic form of transportation is now being forgotten. To address numerous problems of human development, resource consumption and environmental footprints, different theories, and approaches were proposed such as sustainable urban development, new urbanism and smart growth in which walkability has been proposed as a key principle to improve the quality of life and reduce the negative environmental consequences of car dependency (Wey, Hsu 2014).

The “Congress for the New Urbanism” was created in 1993 in order to “while protecting the natural environment, provides a high quality of life for all communities by making buildings, neighbourhoods and regions.” It is an approach to promote walkable and pedestrian-friendly neighbourhoods providing easy accessibility to public transportation and workplaces. Moreover, a significant goal of New Urbanism is supporting diversity and mixed-use in neighbourhoods and liveable communities with various types of housing, building densities and land use (Wey, Hsu 2014). Similar to “New Urbanism”, “Smart Growth” focus is in improving the walkable, compact urban centers and avoiding urban sprawl. Bicycle-friendly, transit-oriented, walkable land use and mixed-use development with various kinds of housing choices, also have been emphasised in this approach (Wey, Hsu 2014). Sustainable Urban development is a multidisciplinary approach that is identified by three foundations of environmental protection, social development and economic development. Much consideration of sustainability has been given to environmental aspects and social and economic aspects have been mentioned as the least described pillars. They, also, depend upon each other in specific ways and one of them does not have reason to exist without others. “The foundation of the sustainable city” is walking

which provides environmental, social and economic advantages. The variety of positive effects of walkability on these pillars are worth to be considered (Rogers, Gardner et al. 2013).

Part-A: Issue of Concerns

Nowadays, population growth and rapid urban expansion have increased urban sprawl and use of motorized vehicles for daily basis activities which leads to greenhouse gas emission, air pollution and several negative impacts on the environment. Also, after industrial revolution and invention of the automobile, increasing car-dependency, lack of physical activity and sedentary lifestyle which are recognized as determinants of obesity-related health issues such as cardiovascular disease, diabetes and cancer. The concept of walkability is a multi-dimension approach that connecting urban design and planning to a wide range of issues related to climate change, economic growth and productivity, social cohesion and public health (Dovey, Pafka). It has received increasing attention from urban planners, sociologist, advocates, practitioners, and professionals related to health issues. To deal with the issues of urban sprawl, it is important for policymakers to know about nature and the extent of these problems. Due to popularity, accessibility and affordability of walking, it has been recommended as a holistic solution to a variety of urban issues.

Part-B: Need of Study

Walking is green and low carbon traveling mode which does not pollute the environment and does not consume natural resources. Also, walking is the most common form of daily physical activity which is regarded as an efficient and beneficial activity for health and control weight of individuals. Walkability provides social equity components and environmental preservation of sustainable urban development which reduces energy consumption and provides the opportunity for disadvantaged people who cannot use cars for reasons like income, age or disability. Higher advantages of walkability at the community level is providing social and spatial interactions what has been given more attention in many countries. Firstly, walkability contributes positively to develop a pedestrian-friendly environment which is the principal of the smart growth approach. Secondly, walking as basic mobility, reduces transport costs, provides liveability to communities and improve public health. Finally, the main objective is to find out how access to basic infrastructure such as school, children playgrounds, hospital, shopping centers influence the walkability of neighbourhoods.

Part-C: Scope & Limitations

As mentioned before, the purpose of this study is to demonstrate the influence of social and safety and physical aspects of neighbourhoods on walkability, regarding objective and subjective measures, and relations to build environment, safety, health, and social networks. Several limitations, like every other study, are identified in this study. However, the results of this research cannot be generalized to all the cities and neighbourhoods around the world. Second, for some of the objective measures, a reliable existing data were available from the secondary data of the municipality for all the neighbourhoods of Lucknow that have been used for explaining the triangulation between these data and information gathered from survey about objective aspects of build environment, social and safety features and walkability of neighbourhoods. However, there is a limitation in the generalization of findings for all the neighbourhoods of Lucknow, because primary data with a limited sample are collected only from "One such neighbourhood of Lucknow" and other neighbourhoods are excluded. Third, the influence of climate and weather conditions are not included in this study. While it is known that wind direction is one of the major factors that discourage people from walking. Finally, although the sample size calculation shows a higher number of respondents, because of "resource and time constraints" of the study, the sample size has been limited to 40 respondents in each neighbourhood.

Part-D: Walking & It's Importance

Walking is a physical activity which is done for several purposes that each has specific characteristics and need special considerations: • Health: walking as an exercise to lose weight • Recreation: walk for leisure, for example, meeting a friend or talking to the neighbour • Transportation: travel to another destination, for example, shopping, school, work Although walking can be done for different purposes, sometimes these purposes mixed or have often considerable overlap- for example, people may walk to the shop, because they enjoy it or walking for exercise and leisure maybe

done not only for reducing stress, losing weight and increasing fitness, but also getting out of the house, meeting a friend or a neighbour and enjoy the beauty of a green park (Forsyth 2015).

The relationship between neighbourhood environment and walking differed by walking purposes. When walking for transport, directness and connectivity are important and access to amenities and basic infrastructure in five minutes motivate people to walk to their destinations instead of using their cars. For recreational walking, the attractiveness of the journey maybe as important as the destination, although destinations are often still important. The proximity of destinations is a critical factor for transportation, but for the purpose of exercise, the quality of sidewalks and safety routes are significant. Population density is correlated with both purposes of walking. Recreation walking is positively associated with Hills but in transportation walking, it is negatively correlated. Therefore, it is important to define which kind of walking is going to be measured (Forsyth 2015). In other words, although there are several parameters affect the willingness of individuals to walk, it is also significant to consider walking which is the simplest and the most basic type of mobility, provide a variety of benefits including community liveability, improving health and social equity and reducing external costs and environmental problems.

As mentioned, walking is “the foundation of the sustainable city” providing economic, social and environmental benefits. Looking at the environment perspective, due to recent trends towards sustainability, the level of awareness about protection and conservation of the environment is increased. Walking as a green form of travel and the most basic form of daily physical activity is known as a people oriented transportation mode which has the least impact on the environment (Bilyamin, Wahab et al. 2017). It has, also, low level of environmental impacts, energy-conserving without air pollution and decrease traffic congestions of the cities. From the social point of view, walkable neighbourhoods offer social capital as one measure of social sustainability.

The definition of social capital is related to “the value of networks and the. Dixon defines social sustainability by 10 dimensions and policy areas: “demographic change (migration, aging and mobility), health and safety, identity, skills and education, employment, empowerment and access, social capital, environmental health and housing, participation and sense of place, ethnicity, social mixing and cohesion, and quality of life, happiness and well-being”. Several of these measurements will be realized in the concept of walkable neighbourhoods (Rogers, Gardner et al. 2013). Walking as a physical activity has a positive effect on the health of residents particularly significant for elderly, children, lower-income and disabled people and reduce the risk of obesity and diabetes. These neighbourhoods increase social interactions which affect the quality of life.

Part E-What is Walkability

Walkability is consisting of two parts “walking” and “ability” which means the human-beings ability to walk. Walkability defined as “the measures of how friendly an area is to walking”. Walkability concept has been recently introduced as “the extent to which the urban environment is pedestrian-friendly”. Many scholars and experts have proposed various definitions and they have proved the possibility of assessing the walkability with developed measurements. According to SouthWorth (2005) walkability means “the quality of built environment that supports and encourages walking and it is easy, convenient, safe and desirable to walk to where every daily-used facilities are accessible with minimum distance and time and providing attractive views in the journey throughout the network”. The significance of evaluating or measuring the walkability is that planning professionals and policymakers could address the issues related to the quality of the walkability in neighbourhoods, what may facilitate the progress towards more unified, attractive and walkable cities with high quality of life and towards more sustainable cities (Bilyamin, Wahab et al. 2017).

Walkability is considered as a solution to improve the liveability of urban areas and create lively and sociable places, more human scaled, happier and healthier environments for residents. Walkability has several benefits for human consist of health, environmental and economic and is influenced by the presence or absence and the quality of sidewalks, traffic and road conditions, footpath and other pedestrians right of ways, land use patterns, accessibility, and safety (Moayedi, Zakaria et al. 2013).

Part F-Walkable Neighbourhood

“Walkable Neighbourhood” is consists of two parts, “walkable” and “neighbourhood” which means “the bounded place that is safe, compact, self-service and physically-enticing with comfortable and interesting streets, sidewalks and paths motivating dwellers to walk and increasing the well-being of its residents” (Forsyth 2015). Choosing walking instead of other modes of transport represents the results of an interaction between the person and the walking environment amongst other factors. Jacobs argued that the ideal neighbourhood is designed to facilitate walkability. People show different reactions to what they perceive within the environment. For example, within the same setting such as street block length and sidewalks widths, one individual may perceive the physical walking environment for connectivity, whereas another person may not. What determines walking behaviour, is the individual’s perception of walkability. The walkable neighbourhood is a subject which is interested in transportation planners, sustainability advocates, sociologists, urban designers and those in the health and biological fields (Yun 2019).

Part-G Study Area

There are various parameters on which the selection of the study area depends, some of them are mentioned below:

- Mixed use neighborhood
- Availability of open spaces for walkability interventions.
- Newly developed area would be having ample space for incorporating walkability aspects.
- Presence of public transit for convenient mobility of inhabitants.
- Presence of open spaces for improvement of quality of life and promoting walkability.
- I have chosen Gomtinagar as the study area for my master's thesis due to its distinctive characteristics and potential for research in the field of urban planning.
- Situated in Lucknow, the capital city of Uttar Pradesh, India, Gomtinagar stands out as a mixed land-use area that strikes a balance between the historic essence of Lucknow and the rapidly developing new areas of the city. Its unique position presents an excellent opportunity to propose and implement walkability enhancement policies.
- Gomtinagar's mixed land use sets it apart from other areas in Lucknow. Unlike the older parts of the city that predominantly comprise residential neighborhoods or the newly emerging areas dominated by commercial complexes, **Gomtinagar** offers a diverse blend of **residential, commercial, and recreational spaces**. This combination creates an environment where people live, work, and engage in various activities within close proximity, thus fostering a sense of community and reducing dependency on long-distance commuting.
- The intermediate nature of Gomtinagar, being neither too old nor too new, presents an ideal canvas for research. By studying this area, I can gain insights into the dynamics of an evolving urban landscape and analyze the challenges and opportunities it presents. This will enable me to propose effective walkability enhancement policies that cater to the needs of a mixed land-use environment.
- Walkability, the measure of how conducive an area is for pedestrian movement, plays a vital role in fostering sustainable and livable urban spaces. Enhancing walkability in a neighborhood like Gomtinagar has numerous potential benefits, including reducing vehicular congestion, promoting physical activity, improving air quality, and boosting local businesses.
- By identifying the existing walkability issues in Gomtinagar and proposing policy interventions, my thesis aims to contribute to the overall development and livability of the area.
- The proposed walkability enhancement policies can encompass various aspects, such as improving pedestrian infrastructure, enhancing connectivity, ensuring safety, creating green spaces, and promoting mixed-use development. Through comprehensive research and analysis, I intend to identify the specific challenges faced by pedestrians in Gomtinagar and devise tailored strategies to address them effectively.
- By focusing on Gomtinagar, I hope to contribute to the broader field of urban planning and sustainable development. The findings and recommendations from my research can serve as a valuable reference for urban planners, policymakers, and stakeholders interested in creating more walkable and people-friendly

neighborhoods. Ultimately, the aim is to create a healthier, more vibrant, and sustainable living environment in Gontinagar, and potentially inspire similar initiatives in other urban areas facing similar challenges.

Part-H Recommendations

- This study is an initial effort to clarify the factors influencing walkability in neighbourhoods.
- The main result of this research is that not only the physical environment directly affects the walkability of neighbourhoods, but also social aspects and safety perceptions influence the walkability.
- This result adds to the knowledge of a growing number of studies which have illustrated the impacts of various characteristics of the physical environment on walkability.
- Meanwhile, the results of questionnaires demonstrate that objective variables of all features of neighbourhoods influence the subjective variables.
- For instance, in term of physical aspects, the accessibility and sidewalk conditions affect the sense of comfortability and aesthetic design and green spaces increase the sense of interests in residents.
- Furthermore, the social interaction and liveliness of streets and the presence of public spaces in neighbourhoods create the sense of place in people and higher participation in issues of neighbourhood lead to the sense of belonging to the community.
- On the other hand, what influences the sense of security of residence are the crime report, presence of adequate light and visibility of the streets and for increasing the sense of safety, the quality of traffic lights and intersections are the most important factors.
- As this research is an effort to explore the influence of different characteristics of neighbourhoods on walkability, the following recommendations reflect largely on the need for further study to be undertaken to cover other indices that may also influence the concept of walkability.
- First, because walkability is one of the crucial factors in smart cities and the situation of Gontinagar, Lucknow as the upcoming mixed use hub for future.
- Although, this city has invested a lot in the objective aspects of the built environment and safety by allocating road and footprint paths, slowing traffic speeds and improving the quality of public spaces at an impressive scale to increase the quality of life, happiness and health, there are some neighbourhoods in the city that needs more improvement in social lives and security aspects.
- This research is a small scale study with a limited number of respondents (40 for each neighbourhood) conducted for one such neighbourhood of Lucknow City which supposed a walkable city.
- Therefore, the results are not applicable to other neighbourhoods nor to the entire city of Lucknow.
- For certain results, it is crucial to conduct a study on all the neighbourhoods in lucknow as well as another city with different context and different level of walkability. for example, similar research is recommended to be conducted in developing cities.
- Future research needs to look into assessing the influence of socio-economic status on walkability and the association of these factors on the gentrification of the neighbourhoods.
- The results of the survey show that people in neighbourhoods with higher income population and unmixed ethnic groups show less motivation in walking.
- In these neighbourhoods, higher house prices provide a high demand for those people with higher income.
- Future research should also try to understand differences in perception of security and safety, related to walkability among different ages and genders and find the most significant factors associated with this issue.

REFERENCES

- [1]. Muzamil Rashid, Waseem Akram, Shahid Rasool Tarry, & Department of Civil Engineering, Lovely Professional University, G.T. Road, Phagwara, Jalandhar-Delhi,Punjab-144411,India; (2017). The Study of Walkability Index: A Case Study at Jalandhar City in India. *International Journal of Engineering Research And, V6(04)*, IJERTV6IS040664. <https://doi.org/10.17577/IJERTV6IS040664>

- [2]. Nikumbh, V. (n.d.). *Walkability in Mumbai—A study on drawing a conceptual framework at the neighbourhood level*.
- [3]. Papa, D. E. (2018). *Walkable cities: The study cases of London and Ghent*.
- [4]. Smart Growth Online (Director). (2020, October 22). *Walkinar #3: New Trends and Technologies to Support Walkability and Walking*. <https://www.youtube.com/watch?v=5u9ro8eQikY>
- [5]. *Thornton Place*. (n.d.). Design for Walkability. Retrieved January 4, 2023, from <http://www.designforwalkability.com/caseone>
- [6]. *Walkability Principles*. (n.d.). Design for Walkability. Retrieved January 4, 2023, from <http://www.designforwalkability.com/walkability-principles>
- [7]. Handy, S. (2005). Critical assessment of the literature on the relationships among transportation, land use, and physical activity. *Transportation Research Part D: Transport and Environment*, 10(3), 177-196.
- [8]. Sallis, J. F., & Glanz, K. (2009). Physical activity and food environments: Solutions to the obesity epidemic. *The Milbank Quarterly*, 87(1), 123-154.
- [9]. Frank, L. D., Sallis, J. F., Saelens, B. E., Leary, L., Cain, K., Conway, T. L., & Hess, P. M. (2010). The development of a walkability index: Application to the Neighborhood Quality of Life Study. *British Journal of Sports Medicine*, 44(13), 924-933.
- [10]. Owen, N., Cerin, E., Leslie, E., DuToit, L., Coffee, N., Frank, L. D., ... & Bauman, A. E. (2007). Neighborhood walkability and the walking behavior of Australian adults. *American Journal of Preventive Medicine*, 33(5), 387-395.
- [11]. Ewing, R., Schmid, T., Killingsworth, R., Zlot, A., & Raudenbush, S. (2003). Relationship between urban sprawl and physical activity, obesity, and morbidity. *American Journal of Health Promotion*, 18(1), 47-57.
- [12]. Giles-Corti, B., Timperio, A., Bull, F., Pikora, T., & Understanding, N. I. A. (2005). Understanding physical activity environmental correlates: Increased specificity for ecological models. *Exercise and Sport Sciences Reviews*, 33(4), 175-181.
- [13]. McCormack, G. R., & Shiell, A. (2011). In search of causality: A systematic review of the relationship between the built environment and physical activity among adults. *International Journal of Behavioral Nutrition and Physical Activity*, 8(1), 125.
- [14]. Talen, E., & Koschinsky, J. (2013). The walkability debate in urban design: Toward an integrative discourse grounded in empirical research. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*, 6(1), 57-77.
- [15]. Cervero, R., & Kockelman, K. (1997). Travel demand and the 3Ds: Density, diversity, and design. *Transportation Research Part D: Transport and Environment*, 2(3), 199-219.
- [16]. Besser, L. M., & Dannenberg, A. L. (2005). Walking to public transit: Steps to help meet physical activity recommendations. *American Journal of Preventive Medicine*, 29(4), 273-280.