

Sustaining 'Walkability' in the Future City : with Special Reference to Central Business District of Colombo, Sri Lanka

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Abstract: Colombo was founded as an outpost by Portuguese in 1505. Later it fell in the hands of Dutch and British. This non-organically produced city later became the capital of the independent Ceylon. Throughout the history this colonial structure was in a constant negotiation with the indigenous community. Despite the historical prominence present city existence is at a risk. Streets congested with vehicles affecting the environment, economy, well-being of the community is the most prominent issue of modern Colombo. This situation was once common to most of the developed cities, and they termed this issue as an 'urban crisis'. Main reason behind this urban crisis was cities being oriented on auto mobiles. To overcome this crisis 'Walkability' was the best alternative. This study was basically aimed to find the compatibility of the Walkability concept with the socio-spatial structure of Colombo.

Location specific indicators of walkability identified through a questionnaire survey and universal indicators identified through the literature were used to assess the four selected case studies within the limits of Central Business District (CBD) of Colombo, to list out the prospective and retro-prospective lies in the social-spatial structure of the city. As the number of prospective are greater than the retro-prospective and as most of the retro-prospective are potential to be amended into prospective Walkability can be sustained in the CBD of Colombo. A change in planning conception, innovation to mix the land use and improvement in the physical attributes are the few needs to sustain walkability in the Colombo CBD.

Keywords: Walkability, Colombo CBD, Sustaining

Introduction

The city of Colombo which is the commercial capital of Sri Lanka once was the power hold of Indian ocean, inheriting a rich and sophisticated history. Owing to the emphasis of the ancient port city and due to the economic and defence powers, it reached the point that Ceylon was made what it is in the world because of Colombo (Perera M.C.N, 1994). Colombo is rather a distinguish urbanity in Sri Lanka, as it was the capital which was not an organic production of the local community. The city was elevated up to the city level only by the colonialists (Munasinghe.H), R.L. Brohier (1984/2000; 2) asserts that "Colombo is a city forced on the peoples of Ceylon in spite of themselves. It was never a creation of their own choice or making". Starting as an outpost of Portuguese in 1505, colonial Colombo was ruled by Portuguese, Dutch and British for decades. Modern Colombo after 1948 is a foreign implant with neither a hinterland that produced it nor a history of organic development related to Lankans (Perera, 2002). Therefore, the existence of the city and even its meaning was intimately depended on European metropolises. Yet Colombo was this city which became the capital of independent Ceylon and the commercial capital of present Sri Lanka. Adaptation of this colonial city by the locals was a complicated process, which is a continuous negotiation between the colonial city structure and indigenous Ceylonese. This have ultimately resulted a city into a contested, hybrid and liminal space which led

the modern city planning intervention to transform this ancient city of diversified social ethics into misanthropic community.

Urbanization is a process which takes place in majority of countries in all corners of the world from the beginning of the 21st century (Pacione.M, 2001:67). But the present urbanization process has resulted in an urban crisis. While carrying out researches and studies to control this urban crisis, the urban planning professionals understood that the main factor affecting urban sustainability is urban transportation (Pacione.M, 2001:251). As a solution to this issue of urban transportation, professional came up with the 'walkable city model' as an alternative to sustainable urban mobility, (Turon.K et al., 2017) which led to the urban planning concept, "walkability". Walking is the simplest and the most primary form of transportation and benefits of walking will have a positive effect on all individuals and the public community (Rafiemanzelat et al., 1999). Walkable cities will be the answer to make problems which the urbanized cities are presently facing including automobile orientation, pollutant emission, reduction of greenery, lack of social encounters, people getting diseased and the deflating economy of the country.

Rapid urbanization in the city of Colombo is at a high rate. Since its origin majority of the city users live in dormitory suburbs and travel to the city for work. In migration to Colombo daily and in excess of 250000 vehicles enter the city limits of Colombo. According to Professor Amal Kumara these vehicles get jammed due to the limited streets and parking slots in the city. Gradually the maximum speed permitted within city are decreasing. Engines of vehicles run for a long time resulting in high air pollution. According to statistics, 70% of CO₂ emission in Colombo is emitted from these vehicles. The only way for these pollutants to be filtered is by the greeneries. Presently the green cover in Colombo is decreasing at an

alarming rate of 0.4 km²/year. The general public are not taking any remedial action to minimize this situation but continues urban expansion. It will result in increment of activities. More people will come to Colombo, the number of vehicles coming into Colombo will increase and will worsen the present non-sustainable situation. All around in Colombo, walking has been limited to recreational activities and pedestrian facilities are concerned only on creating perfectly walkable jogging track. Most devastated fact is that the people of dormitory suburbs, wake up early and jog early to save time to spent on traffic while moving to city for work. If these two things could become one, even for a certain extent, Colombo may able to sustain its urban transportation while sustaining the city as a whole. Therefore, the research problem identified is the negative causes of urban transportation at Colombo that lead for unwanted time spent in transportation daily, which inversely cause a higher daily cost while reducing the quality of both physical environment and peoples' psychology and health.

The study was done based on the hypothesis, that sustaining walkability in the city limits of Colombo will reduce the prevailing crisis situation. The study is done to figure the compatibility of social - spatial structure of Colombo when considered with the identified hypothesis. "Walkability" is the independent variable of the study, while the 'User Experience', 'Physical attributes' and 'Land use mix' be the three dependent variables according to literature. The initial part of the study will figure the relationship between the variables in the context of Colombo then the latter part of the study will analyse the compatibility of the city to these variables, as 'walkability' is a complex whole which is not able to assess directly on an urban context. Therefore, the main of the study is to figure whether the future city of Colombo is able to sustain through making it walkable. The

objectives used to achieve the aim are as below,
- to understand the urbanisation process and urban crisis
- to study the sustaining process of urban mobility
- to identify the vitality of the concept: 'Walkability'
- to identify the influential criteria of Walkability
- to assess the criteria of walkability on four case studies

The study have been spanned over, urbanisation process in concern to third world countries and Colombo, urban crisis of modern urbanities, sustaining the urban mobility, sustainable alternative: walkable city model, concept of walkability, assessing criterions of walkability and Colombo city morphology.

Study may not provide any master proposal or design suggestions, but will conclude with the prospective and retro-prospectives of Colombo city to sustain in the future by making it walkable.

'Walkability' as a remedy to modern urban crisis

The historical studies have identified three main transformation which have altered the course of human life. First among them had been the development of Agriculture and Neolithic settlements in 7000BC(Pacione M, 2001). The second one had been the pre-industrial revolution prior to 18th century as in which cities came to be according to Kevin Lynch in 'A Theory of Good City Form. Third and the most influential had been the industrial revolution in the 18th century. Cities are believed to be originated in pre-industrial era and evolved into modern cities in industrial revolution. Italian philosopher Giovanni Botero, in the 16th century (Kostof S, 1992) refers to the city as, "..... An assembly of people, a congregation drawn together to the end they may thereby the better live at their ease in wealth and plenty. And the greatness of the city is said to be, not the

largeness of the site or the circuit of the walls, but the multitude and number of the inhabitants and their power". Later in the era of renaissance, the cities were studied as an art and lead the scholars to identify the urban process underlying the city development which gave rise to jargons such as urbanisation, urbanism and urban growth. The whole evolution of primitive cities in pre-industrial era to initial form of modern cities have been explained well by Wheatley as, With reference to the pre-industrial city, Wheatley described the word, 'Urbanisation' as, "... that particular set of functionally integrated institutions which were first devised some 5000 years ago to mediate the transformation of relatively egalitarian, ascriptive, kin-structured groups into socially stratified, politically organized, territorially based societies". The institutional change that he was referring in the definition is the key element of civilization of modern urbanity which contributed for a major socio-political restructuring of the society. This process is common for both the developed countries and third world countries, yet the degree of visibility may vary with the geographical location and its continent.

Urbanisation is always a result of both natural increase of the urban population and net immigration to urban areas. The utter product of urbanisation is the urbanism¹(Pacione M, 2001). The net effect of this socio-spatial process in changing the city is clearly visible in the change occurred in land use mix. Based on this identification, Conzen (1960), divides the urban landscape into three main factors including land-use, buildings and town plan (or the street layout) to study the urban morphogenesis. Central Business District (CBD)² or the commonly known downtown is the principal element of major urban land use.

This urban development from pre-industrial to postmodernism in Europe is not common to

¹Urbanism is the spread of changed social and behavioral characteristic due to urbanisation

²Key characteristic of CBD is accessibility. High density and land values are the characteristics

the whole world. The process differs based on the specific geographical locations. The high rate of urbanisation seen in every corner of the world now is a relatively recent phenomenon³. For most of these cities, urbanisation is a contemporary and ongoing process (Pacione M, 2001). Urbanisation in the third world countries was almost a direct influence of Britain and other European regions. The most obvious influence of European world in third world countries is the development of new cities, based on their ease of transportation, exporting trades and defence requirements. Most of the times these cities were not only a forceful city implication but a whole new form of complex content, turning their own urban forms and urbanisation patterns. These newly built cities are still the metropolitans in most of the regions⁴ (Pacione M, 2001).

Table 1. Phases of Urbanisation

Chronological phases	Major features of urbanisation
Pre contact	Small organically patterned towns predominant
1500, Mercantile colonialism	Limited colonial presence in existing ports. Trade usually in natural products of local region
1800, Transitional phase	Reduced European interest in investments in overseas. Great profits to be made in industrial revolution
1850, Industrial colonialism	European need for cheap raw materials and food. Colonialism takes territorial form, new settlement patterns and morphology created
1920, Late colonialism	Intensification of European sociopolitical influence. Extension to smaller towns in hierarchy. Increased ethnic segregation
1950, Early independence	Rapid growth of indigenous populations through migration in search of jobs. Expansion of slums and squatter settlements.
1970, New international division of labour	Appearance of institutional cooperation factors. Further migrational growth of cities. Increasing social polarization.

Source - D.Drakakis-Smith (1987) *The Third World City* London: Methuen

As in other regions of the Asia, South Asian cities also reveals the imprint of both colonial and indigenous forces. Michael Pacione in *Urban Geometry*, present two models depicting this hybrid form of urban models which can be identifies in South Asian cities, as colonial-based city and the bazaar-based city.

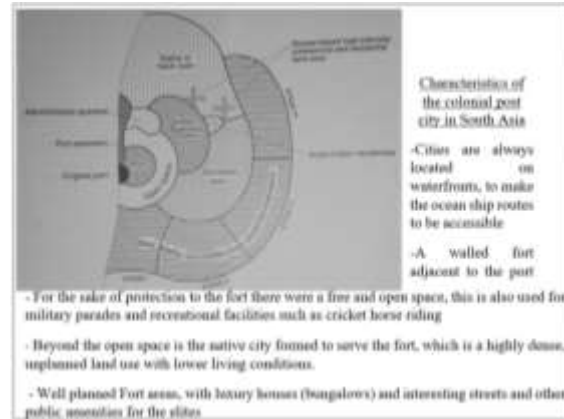


Figure 2. The model of the Colonial based city

Source: M. Pacione (2001) *Urban Geometry*

Still the fort or the colonial city is a well-planned urban settlement with specious urban quarters, tree lined avenues, and other service facilities. Later when the colonial city expands the local elites got residential spaces at the periphery of the colonial city, leading to a gradual process of reorganizing the whole, physical, social and political structures of the ancient administration systems.

Urbanisation in the means of Colonialism: Urbanisation of Sri Lanka with reference to Colombo.

Later in 1420s, realization of the seas as one entity by the Europeanists along with the transformation of world from infinite space⁵ to a finite place that is knowable and controllable. These findings made the Europe to concern on long-distance trading, over the seas and gradually connect the world together (Pacione M, 2001). Early as in the 16th century, Sri Lanka faced these invasions of Europe, commencing with the Portuguese followed by Dutch and British (Perera.M.C.N,1994)

Sri Lanka as a naturally rich country, with a self-sufficient, sophisticated history of about 2000 years had its own urban planning, centralized to the agriculturally rich North

³In mid 1980s only a 3% of world population was urban and except for Europe, urbanisation level is insignificant in the other regions of the world

⁴Examples - Lima, Buenos Aires, Rio de Janeiro in Latin America, Johannesburg, Cape town in sub-Saharan Africa and Calcutta and Bombay in Asia

central province. Development of the new colonial city at Colombo made a clear turning in these ancient town planning patterns.

However, at present Sri Lanka stands at an Urban paradox. In the United Nations World Urbanization Prospect, 2018, Sri Lanka ranked at the 11th least urbanized country on earth with 18.2% urban population. Yet there are considerable evidences proving that the real urban population is greater than what is stated in the above document. As an example, agglomeration index, which uses multiple indicators, Sri Lanka's real Urban population is calculated to be around 35% to 45% (Uchida & Nelson, 2010). Sri Lanka's urban paradox is most clearly apparent in the capital, Colombo, and it is the largest urban conurbation of the island (SoSLC, 2018). Colombo being a small trading post of merchants came from, Arabia, Morocco, and Persia evolved to be the capital city afterwards (Dayaratne.R, 2010). In 1505 Portuguese overtook Colombo, followed by Dutch and British in the 18th and 19th centuries (Perera.M.C.N, 1994). Due to the strategic location on maritime routes, Colombo developed and established as a node in the international trade network in the colonial ruling (Dayaratne.R, 2010). With the destruction of the Sinhalese power-hold Kandy by British to succeed their colonizing attempt (Perera.M.C.N, 1994;97), Colombo became the both commercial and administrative center of the island (Dayaratne.R, 2010). In fact, the attention given to Colombo by colonialists made it centralize in the process of urbanizing the island ever since. This is addressed by Nihal Perera in 'Decolonizing Ceylon' as, 'Colombo made Ceylon but not vice versa' (Perera.M.C.N, 1994;95). Introduction of Ceylon to capitalist economy in the 19th century, formation of the Colombo municipal council in 1865 (Perera.M.C.N, 1994;144) and legislating the House and Town improvement ordinance in

1915 (Weerakoon.K.G.P.K, 2013) were the most influential milestones of urbanisation process of Ceylon.

Centralized emphasis given to colonial Colombo made it way to become the capital of independent Ceylon from 1948. The interest of relocating the seat of government in 1980s, government declared Kotte as the administrative capital (Perera.M.C.N, 1994;449). This made Colombo into the commercial capital and the fort was developed into the Central Business District (CBD) (Perera.M.C.N, 1994;450). In the present Sri Lankan cities are accounted to be expanding in a rate of 6.2%, which is greater than those observed in European countries (SoSLC, 2018). Urban sprawl⁶ is the typical form of urban expansion in Sri Lankan cities which have led its provincial capitals plagued with overcrowding, ad hoc development and failing infrastructure, which is apparent in the commercial capital, Colombo. At the time of independence Ceylon with Colombo as its capital, was an aspiring third world country, yet uni-directional urbanisation for decades have resulted an urban crisis in Colombo followed by other provincial capitals of the country (Dayaratne.R, 2010).

Sustaining the urban built environment

As discussed by many scholars such as M. Graces, Jonathan Glancey, Malgorzata Dymnicka, Joanna Badach, John McArthur and Patrick Sisson the modern urban world is at a crisis, financially, socially, and environmentally. In number of collective efforts sustaining cities have brought into sustaining urban transportation and breaking the sole dependence of automobiles. In this scenario, leading scholar Jeff Speck along with many urban designers have identified the 'walkable city form' as an alternative or as a remedial action to sustain cities as a whole. Jeff Speck in Walkable city; how downtown can

⁶ Urban sprawl is defined as unplanned or uncoordinated low-density expansion, & involves rapid land consumption (Bhatt,2010)

save America (2012) writes clearly about the vital role of Walkability in urban sustainability as, “ after several decades spent redesigning pieces of cities, trying to make them more livable and more successful, I have watched my focus narrow to this topic as the one issue that seems to both influence and embody most of the other.. GET WALKABILITY RIGHT AND SO MUCH THE REST WILL FOLLOW.” (Speck.J., 2012;06).

Walking is generally recognized as a movement which is the simplest form of transportation (Rafiemanzelat et al., 2016) and also has been the oldest form of urban transportation and cities were compacted to support walking till the industrial revolution in the 19th century (Newman et al., 1999)^[1]. Generally, in the urban contexts walking is defined as a short distance movement from one point to another (Razali et al., 2017)^[1]. With the major transformation of transport after the industrial revolution, private individual transportation widespread in the 20th century (Bilyamin.S., 2014) and made public transport as well as walking became less prioritize in the urban planning agendas (Rizali et al., 2017). The recognition of walking have led planners around the world to promote walkability (Su et al., 2017) and recently it has become the focus of sustainable development of cities (Rizali et al., 2017). This centralized concept of urban sustainability has made many scholars to study walkability based on many issues. to identify the indicators to measure walkability of urban environments. Land use mix, land use patterns, street layout, public transport supply, attractiveness, connectivity, proximity and urban design are the indicators to measure walkability (Rizali et al., 2017 &Mustafiz et al., 2018).

Walkability and Physical Environment: street layout, street blocks and land use

None of the element of the built environment is important to walkability as the “Streets’ are

(Ewing et al., 2006). The street ‘is a mere traffic channel, ensconced within the city’s solid mesh, the street is a complex civic institution, culture-specific and capable of dazzling formal variation and calculated nuance” (Kostof.S, 1992;220)^[1]. The streets is both an urban form and also an institution, and the traditional purpose of the street were the traffic, exchange of goods and communication. In urban planning we are only concerned with the urban streets, only when they are in a settlement, defined by buildings (Kostof.S, 1992;189).

Except for the streets the other two main walkability connections of physical environments are the Street block design and land use mix.It is even believed that the traditional urban setting of residential and office work arranged over the ground floor facing shopping street (shop-houses), as it reduces the need for mobility. This evidence the need to reduce the mobility in contemporary cities, street block and land use mix are the two prominent features which determines the mobility in modern cities (Moughtin.C, 1996). It is the size, function and the structure of the street block which gives form to the public spaces and contributes to the vitality of those spaces (Moughtin.C, 1996).

Walkability and User perception:

Man cannot separate himself from the space, from his inner psyche to the physical body he embeds in space. From existential space man creates ‘space’ shaping it to suite his needs and problems, this lead the human in creating a dwelling out of a cave back in the Neolithic era. Starting from that spontaneously evolved place to the sophisticated architectural space of they built today, (Bambaradeniya.R.R.M.C, 2006). Though built or un-built every space have an ability to evoke a sixth sense in human as an emotion or a feeling. The process of man’s emotion change based on the space is

broadly termed as ‘Perception’. In urban environments, perception is not one’s psychological reaction to space but rather a common image in many dwellers mind, this majorities’ perception of urban space is the phenomenon known as, ‘The Image’. The ‘common way’ of perceiving is simply known as the image of the urban space (Bambaradeniya.R.R.M.C, 2006) the city can be perceived in diverse aspects such social, political or economic or physical, but in this chapter it is only discussed the literature on physical perception. Kevin Lynch have done many researches on this user perception and image to identify these perceptible elements. Path, Edges, Districts, Nodes and Landmarks are the five main elements of the city image according to Kevin Lynch in, ‘The image of the city’ (1982).

Table 2. Elements of the Image

Path	Paths are the channels in through which observers, customarily, occasionally or potentially move. The streets, railway tracks, pathways, transit lines and canals can be a path in an image and for most of the observers, this is the most crucial element.
Edges	These are too linear elements as paths, but which are not identified as the walking paths by the observer which is rather a physical boundary between two districts.
Districts	These are the sections of the cities, or specific areas which the observer normally enters ‘inside of’, there are always identifiable from the inside yet used for external referencing.
Nodes	Are the strategic spots in a city into which an observer can get into, which are the focal point to and from which he is traveling. Nodes can be simply a junction, a place of break in transport etc.
Landmarks	Are the identifiable spots, which basically act as a symbol or a sign. Landmarks mostly act as reference point in this cognitive image of the city.

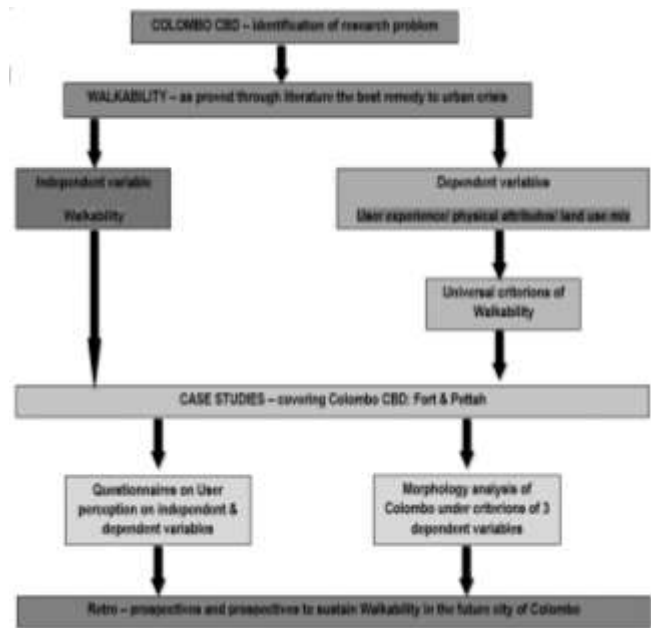
Source: Kevin Lynch, *Image of the City*(1982)

Case Study

The study involves a mixed method as the independent variable: Walkability contains both quantitative and qualitative aspects. The basic aim of the study is to cross check the relationship between dependent variables and independent variable specifically in the context of Colombo. The study will analyse the universal criteria of walkability on Colombo and will conclude with a list of prospective and retrospectives to sustain Walkability in the Colombo city.

Figure 2. The framework of the study

The study is limited to the Central Business District of Colombo. The CBD comprise two



parts as, Fort and Pettah. As these two parts are different from its nature, origin and function, four case studies are selected for the overall study, including 2 from Fort and 2 from Pettah. All the case studies are selected considering few common criteria. The questionnaire survey is conducted for 40 persons from each case accounting for a total of 160. This population was limited visitors but not shop owners or hawkers as they tend to give positive reactions due to their longer engagements with the city. The questionnaire will be structured with two main segments including positive and negative criteria under three dependent variables for the participants who perceive the area as walkable or not respectively. The two types are shown as below.

Table 3. Factors positively influencing walkability

GROUP	FACTORS	INDICATORS (actors/activities/ situations/ walkability)
1	Experiences of pedestrian activities	Trade and other activities
		Storage of window shopping
		Safe walking beside road
		Quick and easy transit access
		Interesting and adequate food stalls
		No obstacles from construction/construction materials
2	Configuration or physical features of pedestrian way	Clean pedestrian ways
		Non-disturbing hawkers' activities
		Adequate pedestrian width
		Manageable road width and vehicular movements
		Continues pedestrian circulation
		Even level changes
		Roadside barriers for safety
		Maintained surfaces
3	Walking for land use mix patterns	Public amenities (shopping, hospitals, restaurants)
		Recreational activities
		Commercial activities (business, banks, office)
		Public transport connectivity

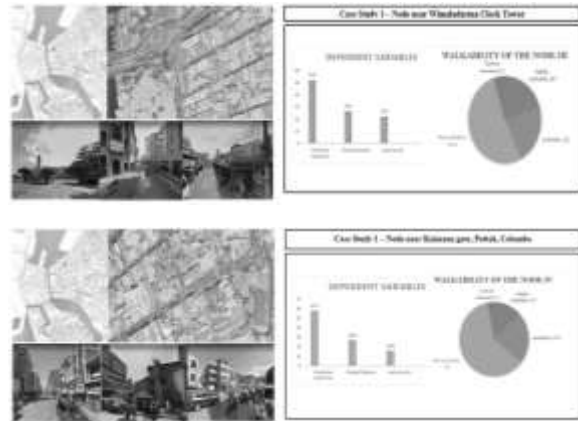


Figure 3. Detailing of the case studies and primary data input

Table 4. Factors positively influencing walkability

GROUP	FACTORS	INDICATORS (actors/activities/ situations/ walkability)
1	Experiences of pedestrian activities	Lack/ disturbing trade and other activities
		Lack of storage of window shopping
		Unsafe walking beside road
		Crowded for quick and easy transit access
		Inefficient and small food stalls/ lack of food stalls
		Obstacles from construction/construction materials
2	Configuration or physical features of pedestrian way	Unclean pedestrian ways
		Disturbing hawkers' activities
		Inadequate pedestrian width
		Non-manageable road width and vehicular movement
		Discontinues pedestrian circulation
		Uneven level changes
		No roadside barriers for safety
		Broken surfaces
3	Walking for land use mix patterns	Unclean pedestrian paths & roads
		Disturbing locating of electric posts and billboards
		Substandard of paving material
		Public amenities (shopping, hospitals, restaurants)
		Recreational activities
Commercial activities (business, banks, office)		
Public transport connectivity		

Questionnaire study will get the overall perception of the participants on walkability and then rating on above criterions to identify the particular relationship between dependent and independent variable in the physical and socio-cultural context of Colombo.

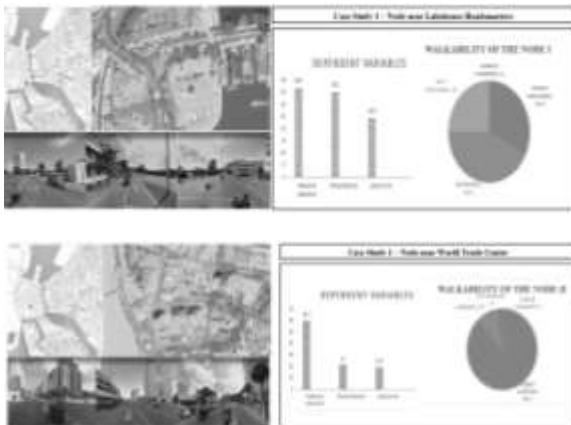


Table 5. Independent variable as perceived in case studies

	Highly walkable (1)	Walkable (2)	Not Walkable (3)	Cannot comment (4)	Total Perceived as walkable (Total= 1+2) (5)	Perceived as not walkable (Total= 3) (6)	Least perception (3 or 4) (7)
CASE STUDY I	32.5	42.5	25	0	75	25	25+0=25
CASE STUDY II	85.7	9.5	0	2	95.2	0	0+2=2
CASE STUDY III	20	22.5	52.5	5	42.5	52.5	42.5+5=47.5
CASE STUDY IV	13	22.5	61	3	35.5	61	32.5+3=35.5

Table 6. Contribution of dependent variables

	CASE STUDY I	CASE STUDY II	CASE STUDY III	CASE STUDY IV	TOTAL (out of 400)	PERCENTAGE
Dependent variable I- User experience	36.7	59.7	51.9	57.4	205.7	51.42 - 51%
Dependent variable II - Physical attributes	24.3	19.3	21.8	15.8	81.2	20.3 - 20%
Dependent variable III - Land use mix	35.1	21	26.3	26.8	109.2	27.3 - 27%

Based on the location specific criterions affecting user perception on walkability, and the universal criterions taken from literature sources, 16 criterions were listed to check on Colombo urban morphology, through which the prospectives and retro-prospectives are identified.

1. Safe walk besides roads for pedestrians
2. Mixed land use pattern
3. Residential uses mixed with commercial, trade & recreational activities
4. Intergration of the streets
5. Smaller street blocks with appropriate connections
6. Streets with manageable width and vehicular movement to match human scale
7. No private vehicles parked on the streets or in any other pedestrian spaces
8. Parking for automobiles
9. Improved public transport/ transit connectivity
10. Promote biking facilities
11. Law & Policy addressing walkability
12. Friendly & Unique streetscapes
13. Identity and character
14. Interesting open spaces
15. Trees shading the streets
16. Lifestyle & culture

Table 7. Results summary of assessing criterions

PROSPECTIVE	RETRO PROSPECTIVE
1. Existing pavements and roadside barriers in the physical context of Fort and some part of Pettah	1. activity patterns at pettah, which does not allow to delineate pedestrian spaces - can make them fully walkable without vehicle for
2. Existing land use mix	2. larger street blocks in the present - occurred pedestrian paths within the street blocks can be developed
3. Existing street block sizes are more walkable than the present expanded ones - the existing pedestrian paths at pettah within our street blocks are a prospectives which can be developed in future	3. wide streets and heavy vehicular movement deferring the human scale 4. Absence of proper parking slots and vehicles parked on streets - these parking can be designed and can mark the vehicle slots to park more
4. integration of existing street layout	3. Lack of public transport services penetrating to Fort and pettah islands - implementing shuttle services into Fort and pettah streets
5. Friendly and unique streetscape in both Fort and Pettah areas	6. No provision for biking
6. Strong identity and noticeable character	7. Lack of law and policy addressing walkability
7. Vegetation cover shading most of the streets of the Fort	8. Lack of open interesting spaces affordable to all the people - can dedicate few spaces in fort and pettah for this function such as parking
5. Friendly and unique streetscape in both Fort and Pettah areas	6. No provision for biking
6. Strong identity and noticeable character	7. Lack of law and policy addressing walkability
7. Vegetation cover shading most of the streets of the Fort	8. Lack of open interesting spaces affordable to all the people - can dedicate few spaces in fort and pettah for this function such as parking

Conclusion

Colombo as solely possesses many potentials that can help to sustain walkability, yet these potentials are not composited to one another due to the lack of appropriate conceptions in planning. Ancient Lankan culture and their urban settlements non doubly influenced the walking and all the settlements were walkable before the colonial invasions and globalization. Yet in modernization of urbanities walkability was withdrawn little by little over a considerable period. None of the planning intervention of Colombo, did use the concept of walkability as appropriate, while the vitality of the concept is proven in many case examples of the world such as, Poland, Neither land, Barcelona, Singapore and Rome. Historical values, rich and strong

identity, tropical weather, colonial structures were influential factors for most of these successful cities, which Colombo do inherit.

This critical analysis on the comparison of four case studies can be concluded as, users of Colombo perceive any given environment of it Walkable only if they are provided with a safe pedestrian path/space accompanied by variety of activities mixed together creating diverse options in one entity. The results of the analysis have shown that it is unambiguous that the potential to sustain walkability in Colombo is greater than the negativities lies against it. When considering the need of Colombo based on its users' perception, the city requires its activities to be mixed in land use strengthening the street activities while the physical attributes of the built environment supports those. This needfulness of Colombo can be supported from the theory by David Canter in his book, 'The psychology of Place' referring to three basic elements of space as shown in below diagram.

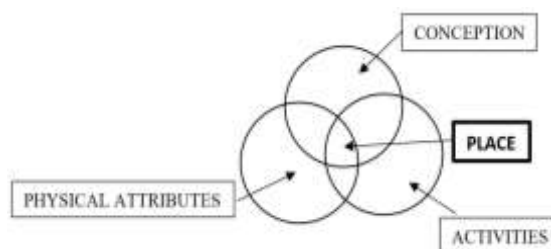


Figure 4. Basic elements of the space

As above if the Colombo streetscapes needed to be reorganized considering the concept of walkability as the strategy of sustaining the city providing mix variety of activities, along with safe and adequate pedestrian paths/spaces. Irrespective to the mean through which walkability can be achieved, the study is intended to prove the higher compatibility that city of Colombo poses with the concept of walkability. 'Sustainability' is a complicated multi-disciplinary whole which is out of the capacity of this study, yet understanding the prospective and retro prospective of Colombo to make it walkable

will lead the way towards a sustainable future city. Historical and strategic values may be reestablished to what it was and people of it will no longer ignore and bypass the city but will be inclined to visit this beautiful city of their own. Walkable city will lead the lifestyle of the new generation and will result in a social development too. This society will be strongly bonded with natural and built environments due to this concept of Walkability which will in return strengthen the economy of the country. If all these social, historical, geopolitical and economical values that Colombo possess in the present reshaped into a walkable future city, Colombo will lack nothing to be the Wonder of Asia.

I. References

- Pacione, M. (2001). *Urban Geography: a global perspective*. London, Routledge
- Moughtin, C. (1996). *Urban design: green dimension*. Jordon Hill, Oxford.
- Kostof, S. (1992). *Then city assembled: the elements of urban form through history*. London, Thames & Hudson Ltd.
- Parker, H. (1999). *Ancient Ceylon*. New Delhi, Jaya, Printpack Ltd.
- Lynch, K. (1975). *A theory of good city form*. London, Cambridge
- Lynch, K. (1982). *The image of the city*. London, Cambridge.
- Relph, E. (1976). *Place and Placelessness*. London, Pion Ltd.
- Brohier, R. L. (1984). *Changing faces of Colombo: covering the Portuguese, Dutch & British periods*. Colombo, Lake house investment Ltd.
- Kaluarachchi, S. (2004). *[Ancient Colombo], Kolamba puaranaya*. Colombo, Sooriya
- Speck, J. (2012). *Walkable city: how downtown can save America, one step at a time*. New York, North point press

Speck, J. (2018). *Walkable city rules: 101 steps to making better places*. New York, Island press.

Jacobs, J. (1961). *The Death and life of great American cities*. New York, Random house.

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