

SPATIAL FACTORS THAT CONTRIBUTE TO THE LEFTOVER SPACES IN CITIES: A STUDY WITH REFERENCE TO COLOMBO

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Abstract

The evolution of urban city in certain instances lead to disturb the quality of city spaces, Spaces of a city play a vital role in treating people with respect in terms of keep the city spaces alive and safe. However in urban areas there are many abandoned spaces which are converted in to leftover spaces within the passing of years. This is one of the main challenges affecting the advancement society while dealing with the congested spaces. Therefore this research aims to identify the reasons for creation of leftover spaces in the Colombo region. Initially a literature review is carries out and based on the literature findings a conceptual framework was developed. Afterwards three case study sites were selected and these were analyzed based on the conceptual framework. Questionnaire surveys, interviews and observations are used for data collection. Finally a detailed analysis was carried out based on the physical, visual and psychological aspects of leftover spaces. Physical aspects are identified as the main reason for leftover spaces within.

Key words: urbanization, city spaces, leftover spaces, city image, landscape architecture.

1.Introduction

Congested urban spaces are a global phenomenon. The reasons are unequal distribution of resources, opportunities, facilities, privileges and even infrastructure. Further, the urban spaces are becoming incapable of fulfilling the human requirements due to poor management of the above mentioned. People used to build up spaces in the city spaces without responding to the context and regulations and even authorities also failed in establishing a proper monitoring and regulating systems. Not only that, the rapid changes in economy, industrial, and political and employment patterns have further lead cities to welcome more and more complex habitation issues. With the population growth and the high dependency of the automobile, the roads directly influenced the creation of neglected spaces through segregation of city space. Afterwards, these neglected spaces which gradually become leftover spaces. (Trancik, 1986)

Colombo being the Commercial capital and the most populated urban area, also faces similar pending issues over decades. According to the observations, most of the city spaces in Colombo area are unplanned, subjected to sprawling and also faced with energy, infrastructure and pollution crisis. As a result of this phenomenon, people tend to reject association with certain city spaces, which are gradually converted into leftover spaces. However, these spaces welcome

antisocial activities. Somehow, it is necessary to note that most of those spaces could be converted back positively to cater for the betterment of the dwellers.

To avoid the creation of leftover spaces in cities, it is necessary to have a thorough study of those spaces to identify the courses for that in an integrated professional approach with Urban Planners, Architects, Designers, Landscape Architects, Engineers, etc. Furthermore the issue should be addressed in a very critical manner. Irrespective of its importance, there is lack of research on minimizing the creation of leftover spaces, especially in populated areas such as Colombo.

2. Related Literature for well-constructed city spaces

“City is a construction in space, but one of vast scale and it is a temporal art.” (Lynch, The Image of the City, 1960) It was further described that the legibility and imageability, are the two main important aspects of a city. (Lynch, The Image of the City, 1960). According to Christopher Alexander city is defined “a hierarchy like a tree; it is a set of landscapes. Every characteristic overlaps a host of other characteristics” (Refer figure 1),

Further, (Alexander, "a city is not a tree", 1965) identified there two types of cities, namely; natural cities and artificial cities. Further, Alexander (1965) illustrated that natural cities arise spontaneously over many, many years and artificial cities are deliberately created by designers. Alexander criticizes the tree diagram that governed the planning of the time, a scheme where each part interacts with the whole through a hierarchical and pyramidal relationship, made up of subassemblies, collected in groups that are connected in units of order gradually larger. In opposition to this deterministic diagram at the base of the “artificial” cities, Alexander proposes the model of the “natural” city. Such a city settles over time and is structured as a “semi-lattice”, an open structure, where the parts are connected to each other by several orders of relationships, and the elements of a smaller scale may interact with others without being subjected to an inflexible hierarchy. This model enhances and facilitates multiple connections and informal levels of relationships between different orders of scale and significant interferences between the parts.

Natural cities formed based upon the landscape elements and its natural characteristics gained mainly by the soft landscape elements. Artificial cities formed basically by the man-made hard landscape elements like buildings.

That distinct character should present in most of the city spaces to convert them to places for individual perceptions. This is mainly because people require those kinds of places to develop themselves, their social life and culture.

(Lynch, The Image of the City, 1960) Has examined the Good City Form (Refer figure 2) having identifiable places. Further according to Kevin Lynch the good cities are imageable and constitute with paths, edges, nodes, landmarks and districts. It is further mentioned that the theories should overlap to create a good city which attracts people and to aliveness.

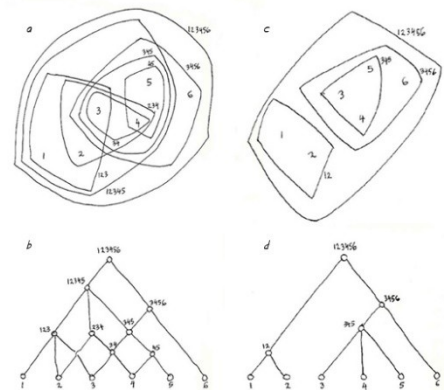


Fig 33: A city is not a tree
Source: Christopher Alexander

(Trancik, 1986) Describes that there are amazing amount of vacant, unused lands in every city. Radical changes in economic, industrial and employment patterns have further exacerbated the problem of leftover space in the urban core. This is especially true along highways, railroad lines, and waterfronts, where major gaps disrupt the overall continuity of the city form.

None of these physical elements exist in isolation. These intermingle to create a coherent network of physical relationship and spatial flow patterns. Different three dimensional arrangement patterns of physical elements create different city forms, which ultimately appear as composition of volumes and masses. (Dissanayaka, 1995)

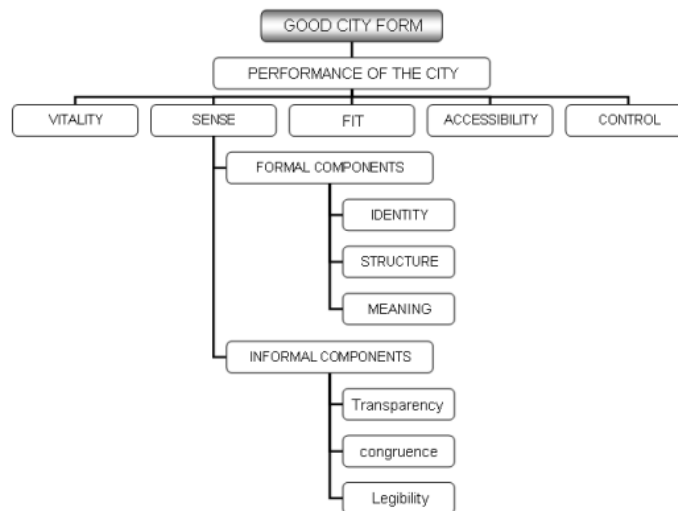


Fig 34: Lynch's theory of good city form
Source: Kevin Lynch Mapping Method

According to (Trancik, 1986) mentioned that, “Undeveloped space was given over to parking lots. Misunderstood social needs poorly conceived public spaces.” Further it is illustrated that the importance of the public spaces in cities as, “Various development and urban-renewable projects are by and large, put together separately, without an overriding plan for and physical space.

Leftover spaces and the related issues

“Leftover spaces are unstructured landscape at the base of high-rise towers or the un-used sunken plaza away from the flow of pedestrian activity in the city. They are the no-man’s lands that nobody cares about maintaining, much less using. E.g. abandoned waterfronts, train yards, vacated military sites and industrial complexes.” (Trancik, 1986)

The city spaces will not response for the dwellers and uses if they are created according to above mentioned requirements and suggestions in literature survey. So it will gradually convert to leftover space. Those space can be a great threat to the Image of the city and the well-being of the people by the unauthorized and non-civic activities. Because they act as the potential spot to origin those activities in cities. This research only focused to the contributing spatial factors for the occurring of leftover space.

Literature findings

According to the literature review, there are three aspects considered in leftover spaces, namely; visual aspects, physical aspects and comfortable aspects. Under each aspect there are three factors. Visual permeability, visual appropriateness and variety focused under visual aspects. Physical aspects are consists with physical permeability, personalization and robustness. Comfortable aspects are enriched with legibility, looping and safety.

- Visual aspects
 - Visual permeability-accessibility: place that easy to get to move through visually
 - Visual appropriateness-attractiveness: a visually pleasing place
 - Variety-functionality: functions well at all times

- Physical aspects
 - Physical permeability-accessibility: place that easy to get to move through
 - Personal interest-personalization: feeling of ownership
 - Robustness-adaptability: stands up well to the pressure everyday

- Comfortable aspects
 - Legibility-indusiveness: a place that is welcoming
 - Looping-connectivity: connections with other spaces
 - Safety-endosure: feels safe from harm

2.1. Theoretical Framework

Based on the literature, the following conceptual framework (Refer Figure 3) is developed

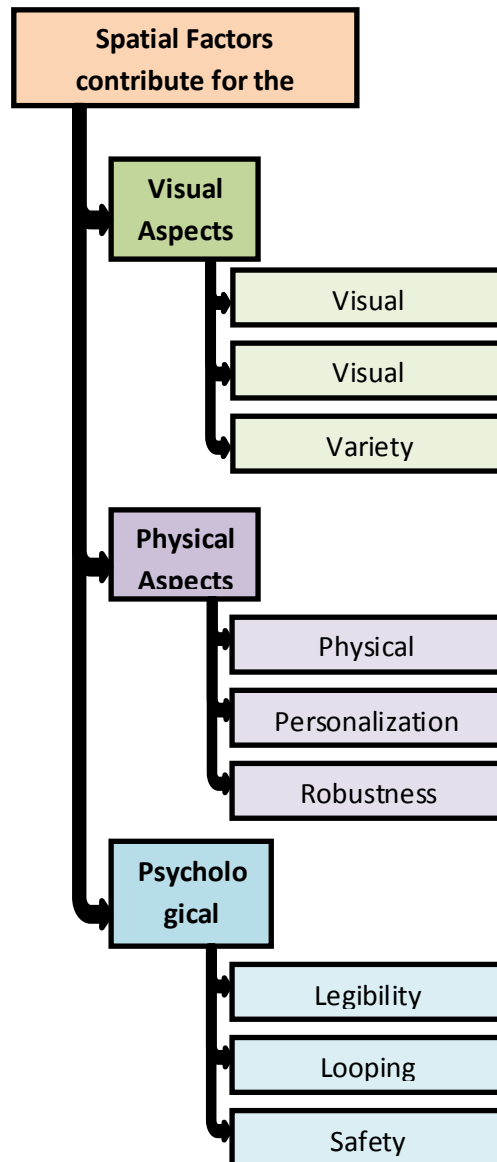


Fig 35: Theoretical Framework
Source: Compiled by Author

3. Research methodologies

This study initially carried out a thorough literature survey to get knowledge about the leftover spaces in cities in a global perspective, familiarize with the reasons to occur of lost spaces in cities.

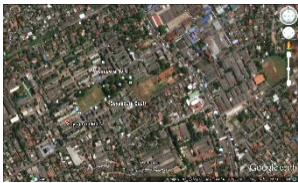


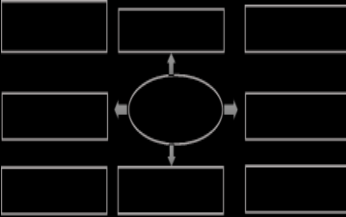
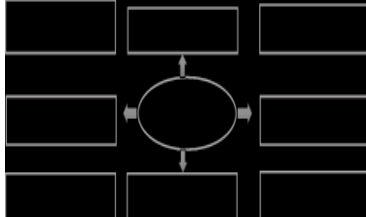
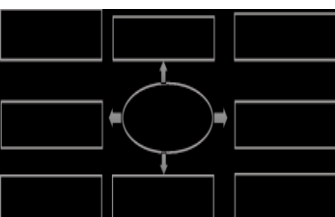
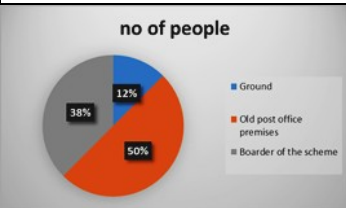
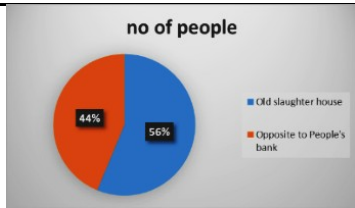
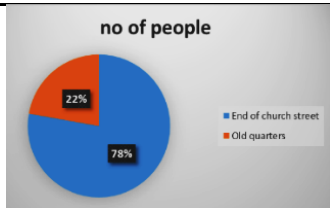






The main aspects for to analyze leftover spaces were identified in the literature.

Case studies were selected according to the selected data collected from the Colombo Municipal Council and Moratuwa Municipal Council to identify under-utilized properties, and from the author's personal observations after conducting pilot studies in many areas including outer Colombo, and the Colombo city area.

There are couple of data collection methods used in this research. Questionnaire surveys, observations, mapping and, interviews were conducted simultaneously to obtain necessary data. Data collection is done in two phases; identification of abandoned spaces was done as the first phase. The second phase was done to identify the factors which are contributing the lost spaces in cities. Then these data were analyzed according to the cases separately coincided according to the sub factors which included in three main aspects as a qualitative analysis. The time frame was limited for only three cases. Therefore, only focus was given to identify the spatial factors. Finally an analysis has been carried out. With the comparison of responses by the people for the questionnaire survey. Three sets of thirty questionnaires were distributed among people from each case study area.

4. Case Studies

This research is based on this conceptual framework and the case studies are analysed based on the categories identified in the conceptual framework.

Case Study	Soysapura	Dematagoda	Slave Island
Location	 <p>Source: Google Earth</p>	 <p>Source: Google Earth</p>	 <p>Source: Google Earth</p>
Surrounding townships	 <p>Source: Compiled by Author</p>	 <p>Source: Wikipedia</p>	 <p>Source: Wikipedia</p>
Participant's responses	 <p>Source: Author</p>	 <p>Source: Author</p>	 <p>Source: Author</p>
Abandoned spaces	 <p>Source: Author</p>	 <p>Source: Author</p>	 <p>Source: Author</p>
Positive spaces and Lost spaces	 <p>Source: Author</p>	 <p>Source: Author</p>	 <p>Source: Author</p>

4.1. Primary analysis

Primary analysis was done from the results of the pilot surveys. Pilot surveys were done to familiarize with the study areas and to get a basic knowledge on distribution of solid and voids according to the uses and the dwellers point of view. After that, secondary analysis was conducted to identify the neglected spaces which have potential to become leftover spaces. Those selected leftover spaces are analyzed under three aspects which is included in the theoretical framework (Refer Figure 3) to evaluate the contribution of these aspects for the spaces to be unresponsive. Each of the cases is analyzed as follows.

Primary analysis on Case studies

Case study	Abandoned space	Observations	Decision on leftover space
Case study 1 - Soysapura	Edge space	<ul style="list-style-type: none"> • Not used for any activity due to the wrong orientation • Area is covered by local plants • Old building is available in the vicinity but not used for any purpose 	Considering the observations this space is identified as a leftover space
	Old post office premises	<ul style="list-style-type: none"> • Situated to the left side of the Soysapura road, from Galle road • Surrounded by many commercial activities • Cannot be seen from the road • Owned by the Government and not utilized • No proper entrance • Anti-social activities are reported • The issues of the layout discouraged the interactions between spaces and links 	According to the interviews from the neighbors and the observations this space is identified as a leftover space.
	Playground	<ul style="list-style-type: none"> • Visually accessible from all around • Dense growth of knee-high grasses from 'P' and 'Q' side. • Give a feeling of no entry • Rarely functioning after the establishment of exercise equipment in 2013. • Jogging track in-between road and ground edge. • Rarely used during weekends. 	Since this space is only abandoned in a period of time cannot consider as a leftover space.

Case study 2 - Dematagoda	Old slaughter house area	<ul style="list-style-type: none"> • Owned by the Colombo Municipal Council. • Isolated and not-utilized after the slaughter house was stopped. • People do not prefer going there because of the ownership problems. • People are scared of going due psychological matters caused by the slaughter house. • Potential space for anti-social activities. • Lack of permeability; width of the space and the thick vegetation coverage. • Peeping in points around the boundary by the fence. • Only a few low income settlements in the same side of this space. • Surrounded by multi-cultural low income community. 	Considering the present situation and the neighbors' responses this space can be identified as a leftover space.
Case study 3 – Slave Island	End of Church street space	<ul style="list-style-type: none"> • Owned by the Don Carolis Company. • Not utilized space for years. • Bordered by the rail tracks, Church Street and the low income houses. • No looping. • Only known by the neighbors. • Long term used for garbage dumping. • An un-friendly and un-attractive. • Large constructions happening nearby. • Neglected for a longer period of time. 	Considering the mentioned reasons and the observations this space can be identified as a leftover space.

Case study 1: Soysapura

Edge space

The edge of the housing scheme is not used for any activity and neglected a long time back, according to the responses of the dwellers. Due to the wrong orientation of the buildings on the

layout the Edge space became isolated. Refer figure 6 for isolated area covered by the C2, C3 and C5 blocks. Over the time this space has covered by area local plants. Further, there is an old building which is just left a side and not using for any activity, and that building is decaying on its own. Therefore this space can be identified as a lost space in Soysapura.

Old post office premises

Old post office premise is situated to the left side of the Soysapura road when entering from the Galle road. It is surrounded by many commercial activity spaces, from small boutique shops to multi storied complexes. It is barely seen from a narrow strip which made by the two boutique shops which placed on the edge of the Soysapura road in front of the old post office space. This space is owned by the government but not utilized for long time. No proper entrance to the space and it welcome the occurring of anti-social activities. The issues of the layout discouraged the interactions between spaces and links. Therefore it has been identified this space as a leftover space in Soysapura, according to the interviews from the people.

Play Ground

Visually accessible from all around, but the dense growth of knee high grasses from the 'P' 'Q' block side give a feeling of no entry and even this was supposed be functioning as a community center after establishing the outdoor exercising equipment in 2013. There is a jogging track in between ground edge and the road, which is rarely used during weekends. Ground space is abandoned only for a period of time. Therefore, according to the participants' point of view that space is rarely abandoned due to nil interest of the dwellers.

Case study 2: Dematagoda

Old slaughter house area

This space was owned by the Colombo Municipal Council, isolated and not-utilized after the slaughter house was stopped due to many reasons in the past. According to the interview with the dwellers, it was found that the people do not prefer going there because of the ownership problems, and also people are sacred of going due psychological matters caused by being it a slaughter once for ages. It was believed that the place is cursed and people avoid visiting that area and increased the potentials for anti-social activities.

Among the above-mentioned social factors, the usage of this area is discouraged due to lack of permeability; width of the space and the thick vegetation coverage. Peeping in points around the fence created the entrance for the unauthorized activities. There are only a few low income settlements in the same side of this space. The other part of the community is separated from the Dematagoda canal. There are some buildings still standing and decaying on their own. That space is surrounded by multi-cultural low income community. Therefore, according to the primary analysis this space can be identified as a leftover space in Dematagoda.

Case study 3: Slave Island

End of Church Street space

Owned by the Don Carolis Company and not utilizing for years. That space is bordered by the rail tracks, Church Street and the low income houses. There is no looping for that space, due to that, this space is only known by the neighbors. This is long term used for garbage dumping. Due to the garbage dumping by some people, this space has become an un-friendly and un-attractive. There are large constructions happening nearby, but no one prefers buying this land due to that above reasons. As a result of that this space is being neglected for a longer period of time.

4.2. Secondary analysis

This is based on the observations of the primary analysis. The spaces which are selected as neglected spaces filtered from the primary analysis to find out the leftover spaces, to carry out the next stage of analysis. This analysis was done under three categories (Visual, Physical, Psychological aspects) which were taken from the conceptual framework. Then the case studies are separately discussed under those aspects.

Visual Aspects, Physical Aspects and Psychological Aspects.

This includes the effectiveness of visual and Physical permeability, visual appropriateness, variety, Personalization, Robustness, Legibility, Looping and safety of a city space.

Old post office premises

Visual permeability

This space does not have visual links to that space because this space is covered by the two boutiques.(Refer Figure4).The people, who pass there, are not aware of that space except for the boutique owners. According to the point of view of the boutique owners, due to the thick vegetation the whole space is not visible and the edge is only used for the activities of the vendors. Further it was mentioned that the space is owned by the National Housing Development Authority (NHDA) and necessary attention is not given to that space for years leaving it to a leftover space.

Visual appropriateness

Only two vendors had the access to this place and therefore it was not possible to get an evaluation on the visual appropriateness of the space(ReferFigure5).According to the vendors this space had a thick vegetation patch which had grown on its own due to neglecting of the space.



Fig 36: Surrounding commercial and administrative activities

Source: Captured by Author

Variety

The surrounding landscape of this old post office space is fully filled with a variety of commercial and administrative activities. However, the post office space looked dull and neglected as this is not used for any function.

Physical Permeability

As per the Figure 5, there is no proper physical entry to that space and it is only accessible from in-between two boutiques. The shop owner only has access from that narrow area. Public do not have proper access due to the coverage by the boutiques. Therefore, this space can be considered as a space without physical access.

Legibility

People who pass there are unaware about the activities happen beyond the boutiques. (Figure 5) because the space is covered. According to the interviews, only people who live and visit there for more than five years have an idea of this place and the rest is unaware of that space.

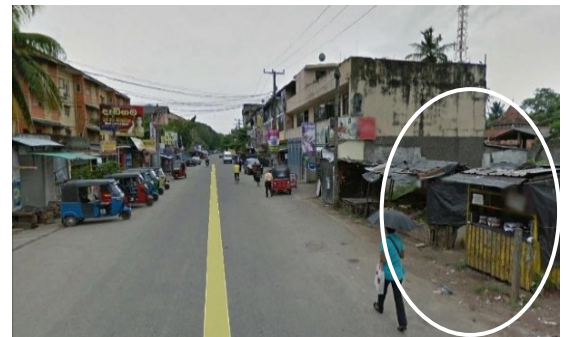


Fig 37: Legibility of the old post office premises
Source: Google

Edge of the Soysapura housing scheme

Permeability (Visual and Physical)

The visual links to this space is indicated in the Figure 6, it has links through blocks B7-C1, C1-C4, C4-C6, and C6-C29. (Refer Figure 6). However, there is a thick vegetation patch of plants are visible. This space does not have the capacity to welcome people or to provide access to any other space and a dead end has been created. That had happened because of the buildings are not designed to be responsive to the immediate surroundings.



Visual appropriateness

When considering visual appropriateness, the scale of the buildings to the area of the edge space is too small. This is not considered because the spaces in between two blocks are too large for the dwellers to maintain. Therefore, people do not give attention to this space.

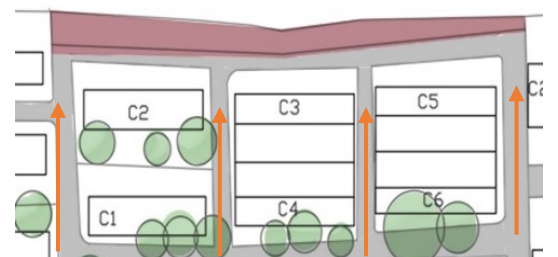


Fig 38 Visual links to the edge of housing scheme

Variety

The space is not used for any function and neglected for years and has no variety to consider. Just a thick plant patch with a decaying shed. The surrounding of

this space is the block with the dwellers in it, and people using their neighboring spaces for their livelihood activities.



Legibility

This space is known by all the participants of the questionnaire and interviews. The neighbors and the other dwellers knew this space well although this was neglected for a long period of years. Therefore, legibility is not a reason for this space to be Leftover.

Looping

This space has access from four by roads which runs around the blocks (Refer lower picture in Figure 6). Therefore, lack of access/looping is also not a reason for this space to be lost.

Safety

From the participant's responses and the knowledge of the author that space has so many prickles from the "endaru" plants. Therefore, it can be a reason to avoid using this space. Safety factor have an impact for this space to be leftover.



Fig 7: Leftover space in Jayawardena gardens
Source: Compiled by Author

Dematagoda

Old Slaughterhouse Property

Permeability; Visual and physical

When entering from the Base Line road to the Jayawardena Gardens road, to the right side a thick forest patch can be visible (Refer Figure 7). The people who travel in the Base Line also can see this space as a thick vegetation patch. No visual links can be seen from the Base line, but when going down from the by-road a broken fence can be seen with a group of demolished buildings. That is the one and only space through which the inside is visible. Due to the density of vegetation the inside cannot be seen and therefore it is not possible to get an idea of what is happening inside and not welcome for their civic activities.



Fig 39: Surrounding shanty community
Source: Capture by Author

The physical access to this space is from the area where the demolishing sheds are located (Refer Figure 7). The other boundaries are covered with the thick vegetation line.

Visual appropriateness

This space does not have visual appropriateness according to the participant's point of view. This is mainly because it consists with demolished sheds and thick vegetation patch only serving the area by adding green to the surrounding. Apart from that, this space gives no meaning.

Variety

The range of activities that the environment provides to people is known as the Variety of the space. Since there is no activity happening, the variety factor is zero. The below photos (Figure9)clearly illustrates the neglected slaughterhouse dull and dead due to lack of activity taking place in that space.

Legibility

This space was known by the majority of participants as per the questionnaire and interview survey. Only few did not know and that is because those respondents were new to this area. Therefore, legibility is not contributing this space to be leftover.



Fig 40: Old slaughter house space
Source: Captured by Author

Looping

Entering from the Base Line to Jayawardena garden road it connects with Sri Nigrodharama Mawatha, and it meets again the Base Line near, Sri Gnaseeha Meaththree Nikethana Viharaya (Figure 7). Lack of looping, space is not a contributing fact for this space to be leftover.

Safety

According to the mythical believes of the neighbors, prevent them visiting that space and also since it has a thick vegetation cover serpents can be there. Due to these reasons people avoid going to that space.



Slave Island

End of Church Street space

Permeability

That space does not have a single visual link from a distance, so that it can only be seen when visiting there. Due to that, the people who are new to the Church Street have no idea of that space (Refer map in Figure 12)



Fig41: Photographs of the space in the end of Church Street
Source: Captured by Author

There is no access to this space from all around its boundary, because it is covered with a prickled steel wire and boundary to the Church Street side is covered with a broken wall. The surrounding people do not enter that space because there is no proper entry

Visual appropriateness

That space was used to dump garbage from years back, since eyes could easily avoid seeing the negative aspects of the context. Therefore, that space has led to be detached by the peoples' sight.

Variety



Fig 42: Photos of the End of Church Street space

There are no social activities happening in this space due to the designation of a hidden space to accept garbage so variety is irrelevant.

Personalization

People are not interested in going into that space because it is being used for garbage dumping. Surrounding of this space is low income settlements since there are many children under the age of ten years, adults do not let them get into that space either, because this space is too close to the railway line and it is not safe to stay there.

Robustness

Likewise the other space which discussed earlier, this is also not used for any activity or function because convertibility can be considered when there is any activity or functions taking place.

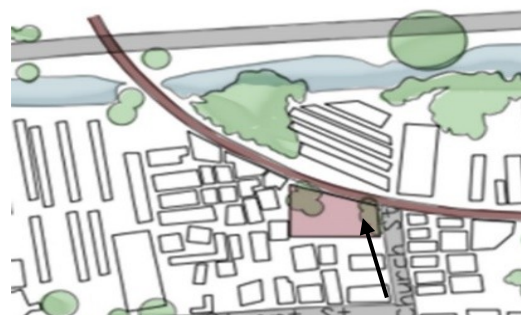


Fig 43: View of end space from Church Street
Source: Compiled and captured by Author

Legibility

This space is not visible from the beginning of the Church Street and therefore it is necessary to come all the way to the end of the street to see the space. Therefore, majority of people who participated in questionnaire and interview survey were not aware of this space. The neighbors only have an awareness of this space. Therefore, legibility can be considered as a contributing factor to this space to be leftover

Looping

Church Street is the only road to reach the particular space because other road is too narrow and the movements of vehicles are rarely seen. Only the three wheelers and the bicycles can be seen because the large vehicles cannot go flexibly in that road. Therefore, lack looping also can be a contributing factor for this space to be a leftover.

Safety

This space is located adjoining the railway tracks making it unsafe to visit. Therefore, adults do not allow their children to go that space, and also it has many spiky plants. Further, this space is surrounded by steel wires making it more difficult for people to enter.

As illustrated above, all the three case studies are analyzed in terms of the main factors. The summary of this analysis is presented in Table 1 below.

Table 5: Summary of aspects leading to spaces to be lost
 Source: Compiled by Author

Case studies	Visual aspects			Physical aspects			Comfortable aspects		
	Visual Permeability	Visual Appropriateness	Variety	Physical Permeability	Personalization	Robustness	Legibility	Looping	Safety
Soysapura 1	✓		✓	✓	✓	✓		✓	
Soysapura 2		✓	✓	✓	✓	✓	✓		✓
Dematagoda	✓	✓	✓		✓	✓			✓
Slave island	✓	✓		✓	✓	✓	✓	✓	✓

Soysapura 1

referred to old post office space in Soysapura,
 Soysapura 2 referred to edge space in Soysapura,
 Dematagoda referred to old slaughter house space,
 Slave Island referred to end of Church Street space in Table 1

1.7 Overall Analysis of Case studies

The below charts are the final results which gathered through the questionnaire survey, to measure the effectiveness of spatial factors for a space to be leftover. Two spaces from Soysapura, one from Dematagoda and Slave Island are taken into consideration as per the primary analysis.

Case study 1 - Soysapura

According to Figure 13 (Y axis indicate the percentage of people), physical aspects are the dominant factors for both spaces. In both the case studies the physical factors signifies as the major reason for this issue. Further, according to Figure 13, it can be analyzed that lack of psychological aspects has the least impact compared to the other two aspects in consideration. The second focus is on the visual aspects for both the spaces to be leftover.

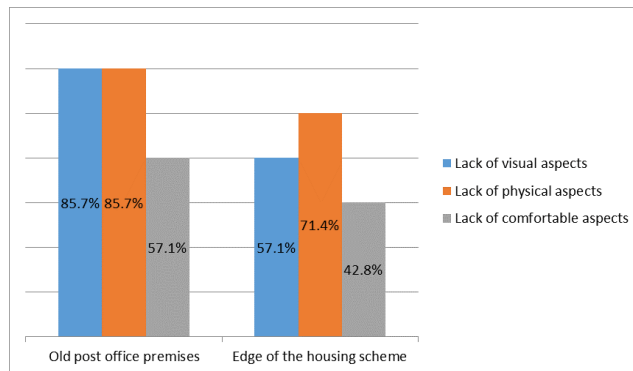


Fig 44: Comparison of factors in Soysapura Housing Scheme

Case study 2 - Dematagoda

Figure 14 (Y axis indicate the percentage of people), clearly illustrates that physical aspects are the main causes for the Jayawardena garden site to be leftover. Further, psychological aspects gained the least priority compared with the other two. However, it is necessary to note that visual aspects also have an impact on making a space leftover to a considerable extent.

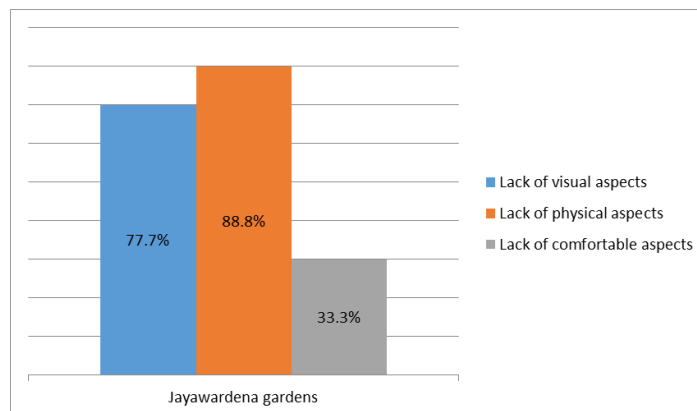


Fig 45: Comparison of factors in Dematagoda
Source: Compiled by Author

Case study 3 - Slave Island

In this area also the most effective factor is significantly shown as the physical factors to the spaces being leftover (Refer Figure 15, Y axis indicate the percentage of people), Psychological aspects are also acting a major role in neglecting of the space which situate in end of Church Street.

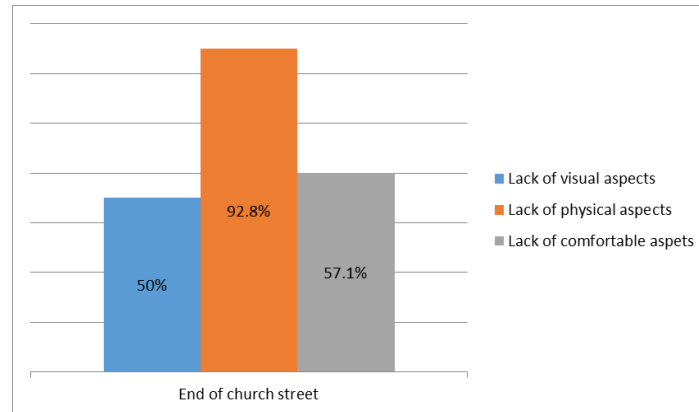


Fig 46: Comparison of factors in Slave Island
Source: Compiled by Author

1.8 Research Findings

With respect to the pilot studies, it is found that there are many neglected spaces in Colombo city. Further, with over time these spaces have had a higher tendency to become leftover spaces. To a space to be public, user friendly, the quality of that space is to be responsive to its user, activity as well as to the context and intermingle with them. Lack of responsiveness in many ways lead the spaces to be abandoned, then those neglected spaces leads to leftover spaces.

In all the case study areas, the main reason for left over spaces is the physical aspects. Around 85.7% in old post office area and 71.4% in edge of the housing scheme space, of respondents identified physical aspects as the reason for leftover space in case study 1. Further this is supported by the data analysis of case study 2 and 3 with a majority of respondents identifying physical aspects as the major reason. According to the case study data, it is possible to conclude that the highest impact is from the physical aspects. The main reason for this can be the present human search for the tangible facilities and utilities on the surrounding other than the other aspects. Further, minimum impact is from psychological aspects. However, visual aspects also have a considerable impact over the space to make it a leftover space with 85.7% in old post office premises and 57.1% in edge space, in case study 1, 77.7% in case study 2 and 50% in case study 3.

1.9 Conclusions and recommendations

This paper investigated on the leftover spaces in Colombo area and the reasons for the very issue. Initially a pilot study was done to identify the neglected spaces and from which the case study spaces were selected. Based on the analysis of the left over spaces and the reasons, it was evident that most of the spaces were converted in to left over spaces due to physical aspects

such as [Physical permeability, personalization and Robustness]. Further, visual aspects are considered as the second reason for those spaces to be leftover spaces. Therefore, to avoid or to minimize the development of left over spaces, it is necessary to introduce rules and regulations on the bare space to be given away for the public use till it to be used on its appropriate function. All the spaces should be kept permeable to avoid generation of anti-social activities within the cities.

This research only focused on the contributing spatial factors for the Colombo city spaces to be leftover. However, there are certain factors such as economic, political, regulatory etc. to be considered. Therefore, future research can be directed focusing on these aspects as well. Due to the time limitations, only three case study areas were identified. However, this study can be further developed by analyzing case studies from different other locations within the Colombo area.

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