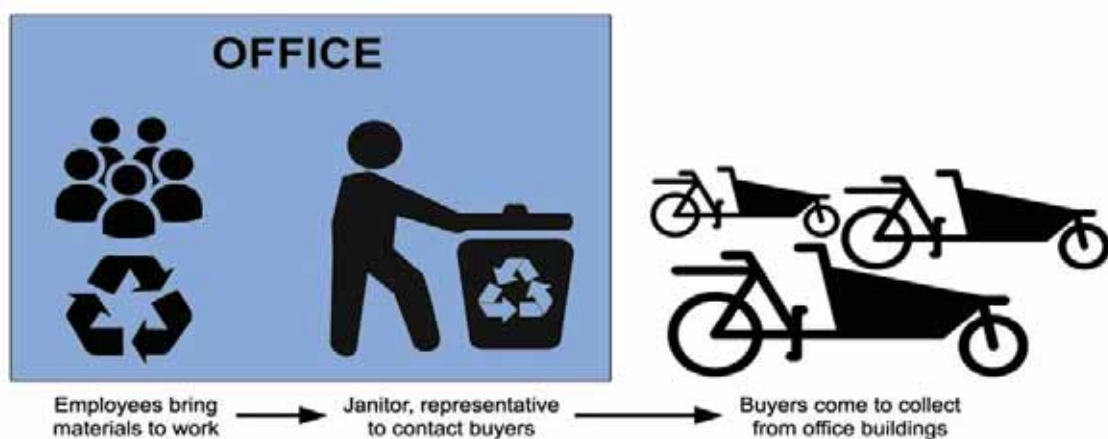


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JOURNAL OF RESEARCH IN ARCHITECTURE AND PLANNING

Introduction

Focusing on research works relevant to the fields of architecture and planning, the Journal of Research in Architecture and Planning (JRAP) explores issues of relevance to both scholars and practitioners in the field of architecture, urban design, urban planning, built form heritage and conservation. JRAP was initiated in 2000 as a peer reviewed journal, initially published annually, however, since 2011 its frequency has increased to biannual. In addition to the papers received through our regular submission process, the two volumes also include papers selected from those presented at the annual Conference of Urban and Regional Planning, hosted by the Department of Architecture and Planning at NEDUET. Contributions to the journal on general topics are accepted any time of the year, and incorporated in upcoming issues after going through a peer review process. A post conference review is also undertaken for the selection of conference papers, before their publication. JRAP holds the privilege of being the first, and perhaps the only peer reviewed journal in the discipline of architecture and planning, published from Pakistan. Contributions are received from across the globe and on average half the papers included in JRAP are from international scholars.

As of 2018, a new category entitled 'Young Scholar's Contribution' has been included in the Journal. In this category, papers from young faculty and early career scholars are accepted and editorial assistance and peer review feedback is provided to improve the research papers. One such paper is published under the head 'Young Scholar's Contribution' within each issue of JRAP.

Aims and Scope

The primary objective of JRAP is to provide an international forum for the dissemination of research knowledge, new developments and critique in architecture, urban design, urban planning and related disciplines for the enrichment and growth of the profession within the context. The journal focuses on papers with a broad range of topics within the related discipline, as well as other overlapping disciplines. JRAP publishes a wide range of research papers which deal with indepth theoretical reviews, design, research and development studies; investigations of experimental and theoretical nature.

Articles are contributed by faculty members, research scholars, professionals and other experts. The Editors welcome papers from interested academics and practicing architects. Papers published so far have been on topics as varied as Housing, Urban Design, Urban Planning, Built Environment, Educational Buildings, Domestic Architecture, Conservation and Preservation of Built Form. All back issues are free access and available online on the Journal's official webpage: http://jrap.neduet.edu.pk/online_journal.html.

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EDITORS' NOTE

The five research papers included in this volume cover various themes related to housing, solid waste management, heritage and conservation and provision of infrastructure within cities. The first paper is based on research in Lagos, and examines differentials in housing quality in Lagos peripheral settlements and the factors responsible for the quality of housing.

The second paper included in this volume was presented at the Third Conference of Urban and Regional Planning, having the theme, 'Innovation in Planning', organised by the Department of Architecture and Planning, NED University of Engineering and Technology, in March 2019. This paper explores the viability of a virtual waste market in Bangkok, by connecting the supply and demand of recyclable waste materials through a mobile application, within the nexus between government institutions, informal systems of waste recycling and different population groups.

The third and fourth papers are based on research conducted in Lahore, Pakistan. The third paper focuses on the provision of public toilets and the relation with the quality of the cityscape. It also sheds light on the dignity and comfort of the public, when using public spaces. This research suggests that the provision of well-designed, clean and maintained public toilets can contribute towards healthy and accessible environment for all.

The fourth paper is a presentation of a research project that was initiated with the aim to understand the complexities of *Katchi Abadis* (informal settlements) in Lahore, through the study of their existing realities, by employing tools of community based participation.

The last paper which is included under the 'Young Scholar's Contribution', focuses on documentation and analysis of a heritage building in Karachi, that has fallen prey to neglect, and suggests various conservation strategies that if implemented, can lead to better preservation of the structure having tremendous heritage value.

This volume also includes a book review on 'The Seven Lamps of Architecture', authored by John Ruskin. Although this is an old publication, but it has been included in this volume because of two reasons. Firstly because this is a timeless publication and the issues raised in this book still apply to the current practice of architecture, and the second objective is to ascertain the importance of this publication to the newer generation and to current research scholars, who at times disregard the publication because of it being old.

Editorial Board

EXPLORING THE VIRTUAL MARKET OF RECYCLING: A CASE STUDY IMPROVING WASTE REUSE AND RECYCLING IN BANGKOK

*Mansoor Ali**
*Sutima Paaopanchon***

ABSTRACT

Increasing quantities of solid waste is a global challenge for many urban areas in industrializing countries, such as Thailand. United Nations Sustainable Development Goals (SDGs) set clear targets and indicators to improve the waste situation globally. These targets include higher collection rates, safe disposal practices and enhancing the rates of waste reuse and recycling. Bangkok, with a population of 9.5 million (Population of 2018) is facing a number of challenges in solid waste management. These challenges include an increasing quantity of waste, a shortage of waste disposal sites, and reduced incentives to reuse and recycle waste. While at the same time, 80% of the population has active internet and phone connections (Internet World Statistics, 2018).

This paper explores the viability of a virtual waste market in Bangkok by connecting the supply and demand of recyclable waste materials through a mobile application. Particularly, its viability is explored in the nexus between government institutions, informal systems of waste recycling, and in Bangkok population groups. Behaviors and attitudes towards the use of virtual markets to enhance recycling rates have been studied, while key actors (especially those who directly deal with the waste generators) in the recycling chain are also interviewed.

The paper concludes that the concept of a virtual market through a mobile application offers the potential to enhance connection between supply and demand. A virtual market offers the advantage of real time information regarding the material's quality, quantity, prices and locations. It also offers faster and reliable transfer of money. Buyers and sellers can even rate the quality of each other's services. However, to achieve the full advantages and to build a system, all the actors in the chain need to be connected. The study found that itinerant waste buyers and waste pickers directly access

the waste and deal with the waste generators. While these groups are the most important links in the chain, they have a low connectivity to mobile phones and hence could not acquire full benefits of the virtual market. Virtual market works well when the connectivity is available to all the relevant groups. The paper concludes that recycling and reuse rates of waste materials can be increased through virtual market if the support is targeted to connect all.

Keyword: Recycling, Waste Reuse, Bangkok, Virtual Market

INTRODUCTION

Solid Waste Management (SWM) is one of the most crucial and challenging issues for developing countries to solve as highlighted by the United Nations Sustainable Development Goals 11 and 12 (SDGs, 11 and 12). Human activities inevitably generate waste and the method of managing it (i.e. storage, collection, handling and disposal), poses grave risks upon the environment and public health. These risks are further exacerbated by the exponential increase in populations, income levels, industrial activities and unstoppable urbanizations in the twenty first century. Present constantly in the public media, the endangerment of the marine ecosystem caused by lifestyle changes with ever increasing demands and the spiralling increase in plastic packaging to satisfy these demands. Additionally, the lack of adequate planning for environmental measures to tackle these changes, results in ineffectively managed systems.

Issues arise as environmental degradation occurs due to lack of land for the final disposal of municipal solid waste (MSW) and poor management of the waste being generated (Shapkota et.al., 2005). MSW waste stream is naturally more complex as compared to other sector-specific industries due to its heterogeneous nature. Poor SWM consists of odour generated from landfills or open dumpsites, risk of ground and surface water contamination from leachate, as

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well as public health issues caused by vector-borne diseases, originating from solid waste. To overcome this, a strategic approach known as integrated solid waste management (ISWM) is required to move towards sustainable solid waste management. The ISWM approach addresses the causes of the challenges by prioritising the minimisation of waste generation through recycling, reusing and reducing of waste towards traditional downstream methods of landfilling, incineration and waste-to-energy processes.

Conversely, technological advancement present in modern society offers strong opportunities from a business perspective. Devices such as mobile phones are gaining popularity in both developing and developed countries. Significant investments are made by leading global companies to capture and expand this opportunity. This technological advancement opens a new gateway to potentially improving the SWM systems -offering a low cost two way communicating system leading to other advantages. Bangkok, the capital city of Thailand is located in South-East Asia (Figure 1). The capital city has achieved consistent economic development in recent years, shifting from a heavy dependence on the agriculture sector to manufacturing and

services, as it becomes an upper middle income country (Chinprateep, 2013). Evidently, the country has experienced rapid export growth, from increases in merchandise exports and tourism resulting in economic growth of 3.9 percent in 2017, the fastest growth rate since 2012 (Nair, et.al., 2018). Based in the city of Bangkok, the aim of this paper is to determine the viability of improving the recycling rate in the city, by creating a virtual market, using mobile applications using mixed methods.

RESEARCH MATERIALS AND METHODS

To achieve and answer the aim of this research, the researcher sought to:

- Determine the potential issues with low rates of recycling;
- Identify the existing barriers to improve recycling rates;
- Investigate the possibility of overcoming these barriers with the use of virtual markets; and
- Determine the viability of a virtual market.

Hence three research methods consisting of literature and situational review, online questionnaires and semi-structured and unstructured interviews were used to collect data and information.

A literature review illustrated that the topic of SWM and recycling has been thoroughly researched and published in the past, as there lies significant interest to improve the situation. However, available literature has mainly focused on either topic (waste or technology) exclusively instead of the interplay between recycling and mobile applications - thus indicating a need for further research. More specifically, the literature that focuses on gathering the public's perspective on using mobile applications to increase recycling rates in Thailand is not there. Literature investigating SWM instead, mainly focuses on market, policies and drivers to encourage society's behaviour and attitude towards waste, recycling and source segregation (Matter, et.al., 2015).

Bangkok has an estimated population of nine million people. The official waste sector is managed by the Bangkok Metropolitan Administration (BMA). The BMA is responsible for and provides the collection service for citizens in Bangkok, which accounts for sixteen percent of the total waste production and with a generation rate of ten thousand tons of municipal solid waste per day. For Bangkok, this is equivalent to approximately 1.14 kilogram per person per day (PCD, 2017). With this high generation rate, challenges in solid waste management arise. This is due to the many



Figure 1: Map of Thailand, illustrating Bangkok
Source: www.googleimages.com

policies and infrastructure that has not been planned and implemented to ensure sustainable waste management. The key barriers and opportunities that have been identified for improved SWM are technology, economics and social and institutional barriers (Sukholthaman and Shirahada, 2015).

Technological

Collection and Transport: Provided by the BMA and the Department of Public Cleansing, waste services do not cover the entire urban population because of the growing amount of waste, thus some households are not fully aware of the service provided, resulting in uncollected waste (Sukholthaman and Shirahada, 2015). In addition, formal waste collectors supplement their incomes through scavenging waste, through this the waste collection efficiency reduces. It is reported that crews spend up to forty percent of their time collecting recyclables (Muttamara, Visvanathan and Alwis, 1993). Poor collection service is reflected by the inadequate resources provided by the government (Shapkota et al., 2005).

Economic and Social Barriers:

Insufficient funds to cover for high capital costs and collection fees: It is difficult to increase tipping/collection fee on public services. To provide effective waste management, twenty to fifty percentage of the municipal budget is used (World Bank, 2018a and 2018b). With fees collected not being sufficient, combined with social opposition, by increasing the collection fees effective solid waste collection service cannot be provided. High percentages of organic refuse in the composition requires regular collection cycle, causing the cost of collection to escalate further.

Public awareness and participation: The public has a negative attitude towards waste sector; therefore, involvement and interaction levels are low. This relates to the education and campaigning programs for separating, reusing, reducing and recycling waste.

Institutional:

Lack of policies and laws: Generalized and outdated laws and regulations, further complicate the situation. There are taken directly from developed countries without any adaptation. While laws implemented promote the 3R program; yet, fines for litter and open dumping, or charging for plastic bags has not been implemented.

Lack of awareness: Proper waste separation is still not

practiced, this links back to the technical factors, and lack of awareness and education.

As mentioned above, the formal waste collectors spend a large portion of their time separating valuable waste. PCD reported that there are high utilization rates (89.5%) for the recycled waste collected (PCD , 2017), however this is calculated to only account for 18.5% of the total waste generated. This is due to the multiple recycling barriers which still prevent the increase in recycling rates. The fundamental reason for low rates of recycling are the uncommon practice of source separation and prohibiting the high rates of recycling as the quality of material is low. Furthermore the following point affect source separation:

- Attitude of households towards environment and climate change.
- Level of awareness of the consequence and economic benefits/ incentive that can be achieved through recycling.
- People's behaviours- as users may act automatically without thinking about the problems associated and revert to their old habits of throwing away waste. This may be the result of busy lifestyles and not giving enough attention to this problem.
- Perceived convenience- some users may think that recycling requires high amount of effort. In addition, the convenience to accessing recycling facilities would also affect the rates.
- Having trust in the waste management infrastructure provided by the responsible agency (in this case the BMA). Policies for recycling schemes must also be clear to ensure high response rate.
- Lack of incentives for recycling- incentives provided by the government to increase the rate of recycling are not yet implemented. Taxes on recycling companies are not put in place to help motivate this positive action.
- Lack of knowledge for proper waste separation- the public is only able to separate easy materials such as glass and plastic bottles, paper and cardboard. Other materials are thrown mixed together creating a low-quality waste.
- Lack of space for storage may also result in less recycling (Ittira Vivongs, 2011), as recyclables are large in volume although they weigh much.

Due to the reasons mentioned above, there is a need to innovate new platforms and tools to increase the rate of recycling. In a market system, there are always two sides to be analysed: demand and supply. This can be applied to the recycling sector also such that households represent the

supply side where waste (or ‘goods’) is generated. Manufacturers or companies requiring the ‘goods’ for recycling represent the demand side.

Primary data for this research was collected using online questionnaires and interviews. The convenience of online questionnaires (versus manually administered ones) allowed large numbers of surveys to be administered quickly, as well as information to be gathered from difficult-to-access groups. The main purpose of this method was to identify the viewpoint of the sampled households in Bangkok, determine the current practices and satisfaction levels, and examine the availability of mobile phones with internet connections, to understand the possibility of introducing mobile applications for improving recycling.

The definition of virtual market in this paper is the market or area in which sellers and buyers can connect using information communication and technology media (ICT). Accessibility to mobile phones has significantly increased from a few privileged users to the mainstream technology. In 2001, the number of mobile phone subscriptions was at six billion, which equates to 86% global mobile penetration (Mavropoulos et.al, 2015). Moreover, as agreed by World Bank, a publication states “more households in developing countries own a mobile phone than have access to electricity or clean water”, which highlights the accessibility of mobile phones to rural areas also (World Bank, 2016). Statistics have shown that the number of internet users have tripled within a decade, from one billion users in 2005 to three and a half billion in 2017 (Statista, 2018). With the mobile phone industry experiencing a dramatic growth the connection

between virtual market and business, people and government is stronger. Due to the digital revolution, this has radically altered the way information is disseminated (Hays, Page and Buhalis, 2013).

A related example that adopts this model is Uber. Uber uses the “on-demand” concept of being available anywhere at any time. This concept hence is to be adapted for recycling in the form of application features, including financial transactions and online receipts, as evidence for the users. This is one of the benefits for having a recycling mobile application and creating a virtual market.

Secondly, semi-structured and unstructured interviews were used to gain greater breadth and understanding from stakeholders and experts. Primary data was collected from representatives of different stakeholders involved in the supply chain of the solid waste management and recycling sector in Thailand. These stakeholders comprised of local junk shops, municipalities, itinerant recycle buyers, waste organizations, researchers and an environmental group. The relationship of these stakeholders can be seen in (Figure 2). Global experts in the waste sector were interviewed to validate findings from the questionnaires and stakeholder interviews.

Social Factors

Perception and attitude of the public

The interviewees expressed a commonly shared negative perception towards the waste sector. Whether they were in

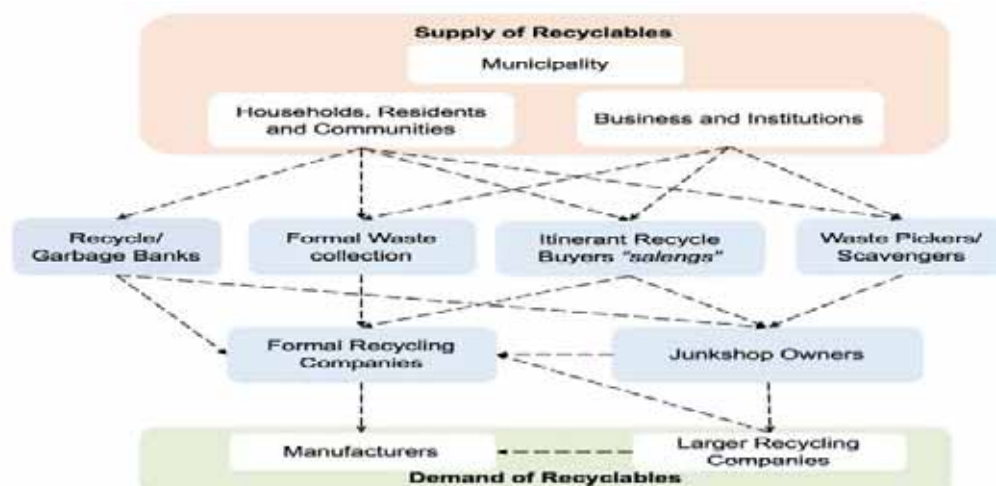


Figure 2: Interaction between stakeholders in waste sector
Source: Author adapted from Vassanadumrongdee and Klitpongives, 2018

Table 1: Summary of the Total Number of Informants

Informant	Data Collection Method	No. of Informants
Group A Household	Questionnaires	175
Group B Household	Questionnaires	65
Group C Household	Questionnaires	77
Stakeholders	Semi-structured and unstructured Interviews	8
Experts in Field	Semi-structured and unstructured Interviews	5
Total		330

Table 1 illustrates a summary of the total number of informants for each method used.

Table 2: Stakeholders and Experts Engaged in the Recycling Industry

Stakeholders	
Junk shop 1	Female junk shop owner, taking on the family business.
Junk shop 2	Male junk shop owner, who was trained to be a construction engineer but decided to start his own business.Female junk shop owner, taking on the family business.
Municipality 1	Employee in the waste minimization sector at the Pollution Control Department and has been working in this sector for over twenty five years.
Experts in the Waste Field	
Expert 1	Has experience in working in developing countries and focuses on waste strategies.
Expert 2	Currently working as a consultant in urban development, but has experience in developing countries.
Expert 3	Currently working in a waste related non-profit organization, focusing solely in developing countries.

Following this in the results section, informants are referred either as stakeholders or as experts in the field as shown in Table 2.

Results:

The feasibility of the innovation investigated was evaluated using six main groups of factors: 1. Social 2.Health 3.Technological 4.Economic 5. Financial and 6.Institutional

developing countries the South-East Asia, Sub-Saharan Africa, or in a developed country like the United Kingdom, there was a negative perception to waste and people involved with waste. It seems to be a sector that generally people do not want to get involved in, because it is “not well accepted”. According to the junk shop 1 owner, “public thinks it is dirty and that you don’t need high education to be in this field” and “the public see people working in the waste sector lower class and with lower education, even family and friends around me said that you (junk shop owner) graduated with an engineering degree why are you going to sell rubbish?”. According to the junk shop 2 “it is the job for the lowest of the low”. According to Expert 3, “with this negative perception strong in Thailand, trying to change and increase the interaction between the households and the waste sector will remain a challenge.”

Nevertheless, perceptions can change with influence from outside. A similar response was made by Municipality 1, where they pointed out that they have been trying to implement change in Bangkok for a long time but have always struggled. As the public did not accept changes or were even aware of the problems associated with waste. It must be noted that addressing a behavioural issue, such as waste, requires time. However, very recently due to the publicity of plastics in the oceans negatively affecting sea animals and killing a whale in Thailand, public awareness of the dangers of plastics has increased. This illustrates that perceptions and awareness can change if the right tools are used. Results from the questionnaire showed that ninety eight percent of the households realized that waste is a problem.

Population Distribution

The new generation, aged thirty years and below, are the most feasible group for this innovation as they are attached to technology and are familiar with using other service applications in their daily life. Ninety nine percent of the respondents had access to a mobile phone with internet connection, ninety four percent were familiar with using a mobile application and ninety percent used these applications for basic services, such as transferring money and calling for transport services, which are key features for a recycling application. Therefore, even though the application seems to be useful for households’, further investigation revealed that the application seemed more suitable for other stakeholders as well.

Relationship with Salengs (waste pickers) and Households

While most of the households did not interact directly with *salengs* through mobile phones, there was a social bond that households had with *salengs*. Since *salengs* regularly collect waste in the local areas, they are most likely to meet with the same households every time, thus building a personal connection. Expert 1 stated “I would think that they are used to dealing with the same person, so they will have a personal relationship with the purchaser”. However, the introduction of a mobile application risks replacing the human relationship which already exists, thus reducing the viability of this innovation.

Health Factors

Waste related diseases

Having a mobile application to provide an on-demand service, helps to solve the issue of a lack of storage space as users can choose when the materials are to be collected, thus directly reducing risks associated with waste-related diseases. However, safety equipment need to be provided to prevent the collectors from being in direct contact with waste. Moreover, protective safety gear creates a professional branding image for the organization, creating trustworthiness, and leading to a larger customer database which could lead to broadening the service and increased recycling rates. Combining this with mobile applications and interaction with existing customers can improve and attract new customers, as negative perspective would decrease.

Technological Factors

Existing collection method and proposed plans with regards to recyclable materials and collection was commonly done by the informal sector represented by the *salengs*/ IRB’s and junk shops. Expert 2 mentioned that in some cases “the informal sector filled in the gap left by the formal sector”. With a strong informal sector already in place, Municipality 1 stated that the recyclable materials recovered were already at a high percentage, thus the market for recovering was already saturated, leading to think that proposing this innovation would not be as useful. Moreover, sixty one percent of the respondents were already satisfied with the current practice, which may be a resistance to change. Some respondents noted that the system should not be interfered with, if it is already working.

Quality and quantity of waste collected

A significant factor affecting the quality and quantity of waste collected was source separation. When recyclable materials are contaminated by other materials such as organic waste, the quality declined, directly affecting the price of the materials. There were mixed views regarding source separation in Bangkok. The data collected at household level stated that separation was widely practiced, whilst data collected from the interviews did not corroborate with these results. Junk Shop owners expressed that it was normal for households not to separate the materials properly. Only larger, easier-to-separate materials, such as plastic bottles, cardboard and cans, were separated out of the stream. With households not separating, the viability of the innovation was directly affected, as it would not improve the recycling situation.

Levels of smartphone and mobile application usage

The main technical factor which affects the feasibility of the innovation is the level of mobile application usage in the area. The *saleng* interviewed did not own a mobile phone with internet connection or had used mobile applications before, thus suggesting that the innovation is not viable. This may be because, *salengs* are of a much older age, as the owner of Junk Shop 2 stated, that commonly they are aged between thirty and fifty years, and have never been exposed to the technology. Generally, as people collecting these wastes are often from a lower income group, having to purchase a mobile phone to operate this innovation may not seem attractive to them.

Shifting down the supply chain, other stakeholders with potential were also examined. Owner of Junk Shops 1 and 2 stated that when they are purchasing or selling materials they transfer money through banking applications when sums are higher than ten thousand Baht (equivalent to approximately £220 GBP, where 1 GBP= 44 baht) due to its convenience and digital evidence provided. As these stakeholders already own the device and are familiar with the technology, it seems more viable to implement the application, especially for the supply side, to improve networking and flow of materials.

Economic

Market demand for recyclable materials

Materials, including plastic, paper, cardboard, glass and metals, have value in the waste stream and are in demand

in the market, but they are already recycled at a high rate. Encouraging the market to increase the recovery of these materials is difficult as the “market is already saturated” according to an official Municipality 1. TIPMSE organization, that works as a link between different stakeholders to improve the waste problem in Thailand, stated that there is high demand for raw materials for the use of manufacturing, and that there is a market demand for the material but it is not being met.

On the other hand, an opposing opinion received from an interview was that from the perspective of working in other developing countries like Africa, Expert 3 stated that some companies believe that working with virgin materials are “easier and cheaper”, causing a barrier to recycling.

Mobile money in developing context

Mobile money has become a new method of transferring capital. For Thailand, this is also widely used, as shown by the results from the household questionnaires, as over ninety percent of the respondents use mobile applications for basic services such as transferring money. However, when junk shops interact with *salengs* most of the time they pay cash, since each transaction of the waste was relatively less, transactions are often for £11 (approximately 500 Baht) or much less, at around £2-3, which makes *salengs* prefer cash transactions. This observation suggested that *salengs* would unlikely be in the position to own a mobile phone, with such features as they are living hand-to-mouth and thus prefer cash.

Financial

Financial status of user

As the feasibility of using the mobile application to generate a virtual market between households and *salengs* may not be very high, due to access to restriction to technology, creating interactions between office workers and recycling companies could be more suitable. Since offices generate valuable waste at high quantities and have access to this technology, connecting them directly to junk shops or recycling companies could be an option. Yet, finding alternative jobs, and supporting *salengs* is required, as cutting them from the loop would result in loss of source of income, and further entrap them in poverty.

Using money as an incentive to increase recycling rates

The effectiveness of using money as an incentive, depends

highly on the income level of the user. In this case, as the questionnaire was sent to middle income groups, the dominant response showed selling the materials for environmental instead of monetary purposes. As stated in an existing research, 43.6% of Bangkok residents recycle for economic incentives, (Vassanadumrongdee and Kittipongvises, 2018). However, when this opinion was compared with other specialists in the field, they felt that money can be the main economic incentive. The experts interviewed felt that when money is involved, the results become more immediate.

An alternative option to mobile money is a rewards program - allowing the use of money to act as an incentive as well as providing flexibility for the reward. Users are thus not bound solely to money or cash, as it may be exchanged for other goods which will help solve the issue where mobile money is still not being commonly used in Thailand currently. Additionally, points can be exchanged for internet credit which helps to overcome the issue of requiring IRBs to purchase internet credit to operate. Nevertheless, such a program would be more practical in low income communities compared to the capital city of Bangkok, since economic drivers are stronger and can be managed properly in those areas.

Institutional

Legislations/ policy/ regulations referring to recycling rates

When compared to economic incentives, policy incentives are difficult to implement as they take longer to implement and update. The core regulation that municipalities work towards and were mentioned constantly in the interview was the 3R policy. Municipality 1 viewed that strictly implementing ban on plastic bags like Thailand's neighbouring country, Cambodia, could be too aggressive and thus not be accepted by the society. However, introducing a policy which charges single use plastic bags are more popular methods, however, there are concerns that the government will then receive a backlash.

Coloured PET bottles (Figure 3) are one of the main problems in the waste stream. They do not have a demand in the market, as they cannot be recycled causing an abundance of this material in the landfills. Private companies that have cultivated their brand image using these colours are reluctant to change, due to the fear of losing their consumers. Without legislations put in place to prevent the manufacturing of these products at the source, the problem



Figure 3: Examples of recyclable PET bottles
Source: Author, adapted from Sermsuk, 2018

is unlikely to be solved. Thus, with or without the virtual market, the waste situation would still be an issue. Furthermore, small sachets bags used to package products, such as detergent, also bring complication. Made from multi-layered plastics, this product again cannot be recycled, yet is used widely. Specifically, in low income households where purchasing in large quantities are not possible, expert 3 pointed out that the concept of small sachets further exacerbates the poverty traps, when the price is compared per kilogram of product, as small sachets are drastically more expensive. While preventing the purchase of these materials may not be possible, promoting research of new innovations to solve this problem may be beneficial.

Political corruption

A strong determining factor, which appeared several times during the interviews, was the presence of corruption. This issue was mentioned not only in Bangkok, but also generally in other developing country contexts. As waste is seen to have many economic benefits, politicians involved in this sector tend to neglect solutions proposed which may help the situation.

Municipality 1 voiced their concern about the levels of political corruption which was preventing the improvement of the recycling and waste situation. The interviewee stated that the norm in Bangkok is that the waste collection is sub-contracted to a private company. Therefore, when auctioning the contract, a fixed amount is already set aside, hence although the amount of waste generated in Bangkok is reduced, the government still has to pay for the agreed price. This links back to the quality and quantity of waste, as well as the separation of waste, since whether waste is separated

or not, the set amount of collection has already been agreed to. This illustrates that there are no incentives for the government to promote recycling or other means of reducing waste, as it does not affect their contract with private companies. With a strong link for potential political corruption in this sector, trying to improve the situation will take time and effort to create changes. This also restricts the feasibility of implementing an application.

Conclusion and Recommendations

Mobile Application as a tool

Most importantly, the data collected shows that the creation of a virtual market to improve recycling rates is not feasible. The core mechanisms in the supply chain, *salengs*, do not yet, have access to the technology, due to their economic status, age and habits. In addition, the recycling market for these materials (glass, paper, cardboard, metal, plastic containers) is said to be already saturated. Recycling rates hence, would not increase as these materials already find their way into the market.

Interaction in supply line

Although the mobile application may not be suitable for *salengs*, it would be now a useful tool for junk shops to communicate with factories where the technology already exists, hence more opportunity is present here (Figure 4). Developing a specific application may provide ease for factories to communicate. Since there are already other applications specific to communicating and transacting money in use, the developed application must prove itself to be simple and efficient for users to accept and change.

Education about proper waste separation

Transferring money through the application or mobile money would not be suitable, as *salengs* come from low income

households, making a small living from selling material scraps. Hence, cash is still preferred over mobile money. Instead, considering a reward-based system could be more feasible, as it still provides incentives to promote recycling as well as flexibility. Users should be available to select the reward depending on their preference and needs. Yet this implementation is most suitable in a community context or potentially lower income areas, where monetary drivers are strong.

Reward Base Scheme

While the public is generally aware that waste is a problem, interviewees stated that they were not knowledgeable on how to separate waste correctly. Existing practices only consists of separating out easy materials, such as paper, cardboard and larger materials such as plastic and glass bottles. This shows that educating the public how to separate waste is essential. Not only will it help to increase recycling rates, but will also allow higher quality material and will result in easier management. Recycling should be taught and emphasized at school level, so that children bring back the knowledge they have learnt from schools to practice at home, creating a knock-on effect. Changing the older generation habits may be more difficult, educating the younger generation will instead lead to a change in the future.

Promotion of recycling campaigns in offices

On the opposite side of the spectrum, as majority of the people in Bangkok spend a large portion of their time outside the household, most likely in offices, thus the promotion of recycling in offices, organizations or work places can also be a focus. Possible campaigns could include encouraging employees to bring in their waste from home, or separate waste generated within the offices. Since waste is sold based on the weight of the materials, joining together within work places, can result in better prices negotiated,

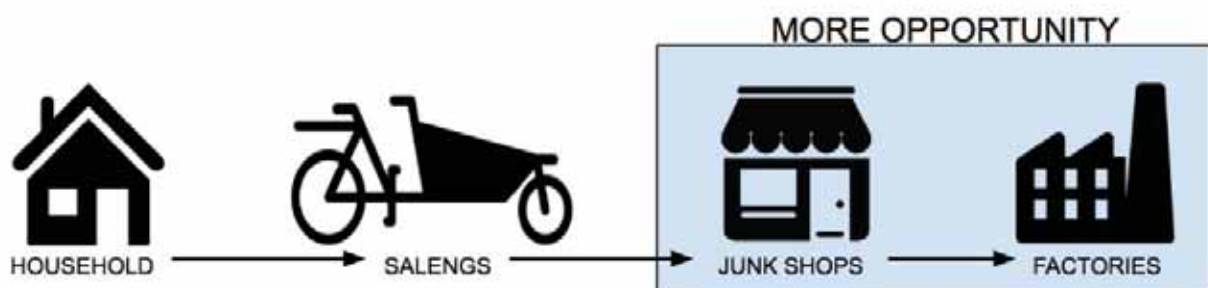


Figure 4: Opportunities in the supply line
Source: Author

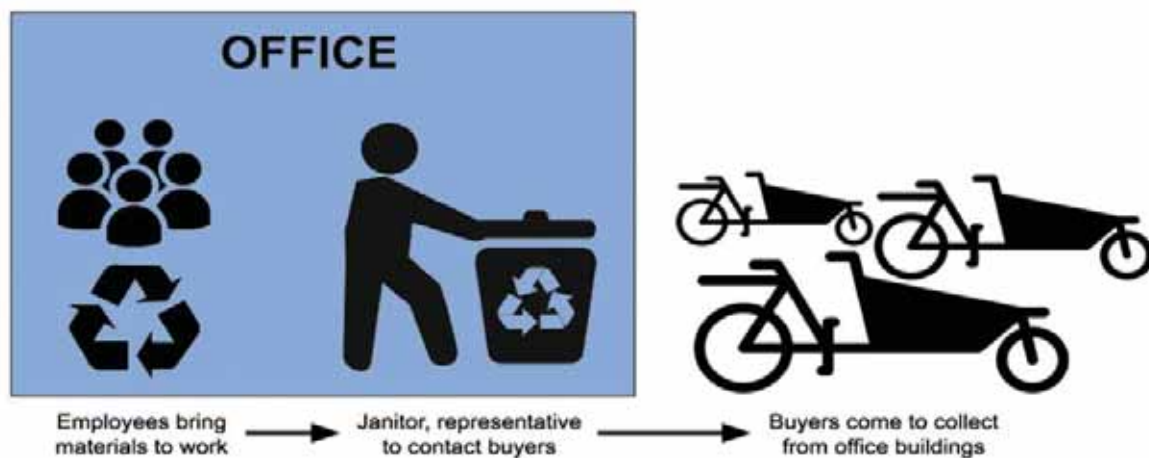


Figure 5: Proposed recycling scheme in offices

as the volume is larger. Offices therefore may wish to build strong connections with buyers in local area to help promote such scheme. This solution would not require the use of applications, but would require the cooperation of different stakeholders. The flow of this process can be seen in (Figure 5).

Focus on Reducing and Reusing

Following the existing 3R policy of reducing, reusing and recycling, through the analysis of these methods, recycling materials have been said to be “saturated”. Since the

recycling rates of materials are already high, the focus should be on reducing and reusing. Simple methods of finishing up all the food ordered at cafeterias or minimizing food waste from groceries, can be small lifestyle changes that people can easily adjust to. Regarding these methods, it will require the users to carry additional item with them, whether it is a food container, a reusable water bottle or a cloth bag. Having influencers to promote the cause and highlight the danger of plastic waste may be an aid, but would require cooperation from all stakeholders. Globally, the danger of plastic waste is constantly publicized, hence vocalizing the different approaches to tackle this issue wouldnow.

References:

- Chinpra Teep, A., 2013, “Agricultural Based to Manufacturing Oriented Growth?: In the Case of Thailand”, NIDA Case Research Journal, 5 (1): 101.
- Hays, S., Page, S.J., and Buhalis, D., 2013, “Current Issues in Tourism Social Media: Its Use by National Tourism Organisations”, Current Issues in Tourism. 16 (3): 211–239.
- Ittiravivongs, A., 2011, “Factors Influence Household Solid Waste Recycling Behaviour in Thailand: An Integrated Perspective”, WIT Transactions on Ecology and The Environment, 167: 437–448.
- Matter, A., Ahsan, M., Marbach M., and Zurbrügg, C., 2015, “Impacts of Policy and Market Incentives for Solid Waste Recycling in Dhaka, Bangladesh”, Waste Management, 39: 321–328.
- Mavropoulos, A., Anthouli, A., and Tsakona, M., 2015, “Recycling, Personal Behaviour, Logistics”, Mobile Applications and Waste Management, May: 4–41.

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- Muttamara, S., Visvanathan, C., and Alwis, K.U., 1993, "Solid Waste Recycling and Reuse in Bangkok," *Environmental Systems Reviews*, 33: 31–35.
- Nair, A., Lathapipat, D., Reungsri, T., Mohib, S., Murciego, G.M., Mishra, D., Shetty, S., Nguyen, H., and Vashakmadze, E., 2018, "Thailand Economic Monitor: Beyond the Innovation Paradox PCD, 2017", Thailand State of Pollution Report 2016.
- Sermsuk, 2018, เอส | บริษัท เสริมสุข จำกัด (มหาชน). Image Online, viewed 16 Aug 2018, from <http://www.sermsukplc.com/th/product/detail/est>.
- Shapkota, P., Coowanitwong, N., Visvanathan, C., and Traenkler, J., 2005, "Potentials of Recycling Municipal Solid Waste in Asia vis-à-vis Recycling in Thailand", Thailand.
- Statista, 2018. "Number of internet users worldwide 2005-2017 [online]", Available from: <https://www.statista.com/statistics/273018/number-of-internet-users-worldwide/>.
- Sukholthaman, P. and Shirahada, K., 2015, "Technology in Society Technological Challenges for Effective Development Towards Sustainable Waste Management in Developing Countries: Case Study of Bangkok, Thailand", *Technology in Society*, 43: 231–239.
- Vassanadumrongdee, S. and Kittipongvises, S., 2018, "Factors Influencing Source Separation Intention and Willingness To Pay For Improving Waste Management in Bangkok, Thailand", *Sustainable Environment Research*, 28: 90–99.
- Walker Smith, J., 2016, "The Uber-All Economy of the Future", *The Independent Review*, 20 (3): 383–390.
- World Bank, 2016. "Digital Dividends", Washington DC: International Bank for Reconstruction and Development.
- World Bank, 2018a. "Solid Waste Management" Understanding Poverty", viewed 29 Jun 2018, from: <http://www.worldbank.org/en/topic/urbandevelopment/brief/solid-waste-management>.
- World Bank, 2018b, "The World Bank In Thailand: Where we work", [online], viewed 12 Aug 2018, from: <http://www.worldbank.org/en/country/thailand/overview>.

DIFFERENTIALS IN HOUSING QUALITY IN LAGOS PERIPHERAL SETTLEMENTS

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ABSTRACT

Housing quality differs within neighbourhoods in Lagos peripheral settlements, due to internal and external factors. This study examines differentials in housing quality in Lagos's peripheral settlements and the factors responsible. Primary data was sourced through structured questionnaires, interviews and observation schedules administered through field survey in study areas. Two stage cluster sampling techniques were adopted for determining the sample size. Firstly, using a purposive sampling, to reduce cost and avoid repetitions, clusters of sixteen and eighteen settlements in Ibeju-Lekki and Ikorodu peri-urban settlements were selected respectively. Secondly, three hundred seventy and three hundred eighty four housing units were selected randomly from the selected housing clusters in Ibeju-Lekki and Ikorodu peripheral settlements respectively. Data analysis was done using statistical analysis to generate frequencies and percentages of responses on socio-economic profile, access to services and households' perception on neighbourhood quality, internal dwelling quality, external dwelling quality and building materials in the study area. Data processing and analysis for this study were carried out using the Statistical Package for Social Sciences (SPSS) for analysis of the quantitative data. Findings show differentials in the housing developments in the study areas due to various socio-economic attributes, building materials used and the state government policy on infrastructure development. It is recommended that a data base of demography and the socio-economic composition of the residents is needed, as this may help to know the infrastructural demand and also, to create balanced distribution of services in the study area in order to eliminate disparities.

Keywords: Housing quality; neighbourhood quality; locational quality; infrastructural services; differentials; peri-urban settlements.

INTRODUCTION

Housing quality embodies not only the physical attributes and structural design of a building, but it also involves the neighbourhood prestige, locational quality, mobility control, user value and living convenience (Kain and Quigley, 1970). Housing quality is not limited to physical components of construction. It embraces human satisfaction with urban attributes and facilities, and entails the quality of the built environment, both in rural and urban areas (El Din et al., 2013). The quality of housing should satisfy minimum health standards, good living conditions and affordability for all categories of income earners (Amao, 2012). Housing quality is a function of geographical and ethnographic composition of the residents (Rapoport, 2001). There exists a varying degree of housing quality in the Lagos peripheral settlements due to many factors, among which some are resident-induced, while others arise as a result of state government's response to planning and infrastructure needs. In consonance with earlier findings by Allen (2010), a pronounced differential in environmental quality in Lagos peri-urban settlements in terms of disparity in distribution of public services should be addressed.

Three housing quality components as identified above are neighbourhood, locational and dwelling quality. Neighbourhood quality is attributed to the environment that a house is located in. This then brings into consideration the relationship between streets, open space and general settings in the neighbourhood (Rapoport, 1998). The quality of housing in peri-urban settlements is negatively affected by environmental factors like traffic congestion, lack of open space, pollution, inefficient water supply, poor sanitation and solid waste disposal management (Dutta, 2012). In addition, environmental quality has to do with cleanliness, sanitation, parking space, accessibility, light, drainage and security. Locational quality of housing is the spatial position

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occupied by the housing relative to the central business district. But, there is usually a gap in services delivery in African peri-urban settlements, which gives room to infiltration of irregular and high cost informal service providers (Chirisa, 2010; Allen, 2003). This is further emphasised by Simon (2008) that low housing density peri-urban settlements in developing countries is increasing commuting time due to poor condition of the roads.

Socio economic strength of the residents play a vital role in the type and level of housing quality that they can access. Household income level is significant for housing quality (Boamah, 2015). The poverty of urban poor undermines the quality of housing that they can enjoy. Housing quality is also, greatly influenced by socio-cultural setting (Fiadzo et al., 2001). The quality of peripheral settlements in Lagos is impaired by the great influx of low income urban immigrants (Lawanson et.al., 2012). Usually, the low income groups inhabit peri-urban areas which are prone to environmental hazards and lack good environmental quality (Allen, 2010). This however, is not the case in the districts or neighbourhood occupied by middle income earners or government-led housing in Lagos peripheral settlements, thus establishing social differentiation and service inequality among the indigenous residents and the immigrants (Simon, 2008; Ibem and Aduwo, 2015). Poor residential areas in most peri-urban settlements are associated with poor physical conditions, illegal development, limited or no access to water and poor sanitation (Fiadzo et al., 2001).

Prior studies in Nigerian peripheral development have been limited to land use and linkages. None have captured the causes of the varying degree of housing quality in terms of the relationship between the three components of housing quality. To fill the gap in Nigerian housing research, this paper examines the causes and effects of differentials in housing quality in Lagos's peripheral settlements. With peri-urban settlements in Lagos accommodating a substantial size of urban population, it is vital to examine the challenges of housing quality not only for a sustainable built environment, but also to enhance the liveability of metropolitan peripheral areas and in turn ameliorate the impact of poor housing quality on residents' health and wellbeing. Therefore, the aim of this study is to examine the causes of differentials in housing quality in Lagos peripheral settlements and the overall effect on the people and the environment. Detailed studies in housing quality are

needed to inform policy decisions in the emerging Nigerian new towns.

LITERATURE REVIEW

Indicators for measuring housing quality should embrace the physical characteristics of the dwelling and the broader environmental characteristics of the area under consideration (Cook and Bruin, 1994; Štreimikiene, 2014). Housing quality can be influenced by the building materials used, method of construction, poverty and land location. Critical also to housing quality is structural stability and durability, provision of basic services, good accessibility, security of tenure and limited crowdedness (Adebayo and Aliu, 2010). Further enumerated to contribute to housing quality are aesthetics, ornamentation, sanitation, drainage, age of building, access to basic housing facilities, burglary, spatial adequacy, noise level within the neighbourhood, sewage and waste disposal, air pollution and ease of movement (Anofojie et. al., 2014; Štreimikiene, 2014).

The quality conferred on a building as a result of internal and external designs is regarded as structural or dwelling quality. This is further emphasized by Amao (2012) stating that the role of spatial units and layout of the building play an important part in housing quality. Structural or dwelling quality is attributed to housing type, design, age of the building, aesthetics, lots size, windows, burglary proof and patio. It is generally believed to be influenced by income, family size, education and race (Goodman, 1978). Deficiencies of basic sanitary facilities, leaking roof and poorly lit buildings can also be used for assessment of dwelling quality. It also has to do with number of rooms per household, tiled toilet, tiled bath, tiled kitchen, light and water (Fiadzo, et. al., 2001). In addition, methods of construction, materials for construction, spatial arrangement, services and facilities functionality are also instrumental in defining the quality of a dwelling (Bradley and Putnick, 2012). Another major element of housing quality is population density, which is the availability of sufficient space in the dwelling both internally and externally (Štreimikiene, 2014). Space is associated with the overcrowding rate in a building and it can be measured by number of rooms per household, the household size and the family members' age (Aderamo and Ayobolu, 2010). Dwelling quality shows the intrinsic values of houses and it is typified by poor quality in developing countries (Aluko, 2010).

Theoretically, factors that contribute to urban quality of life are physical urban quality, mobility urban quality of life, social urban quality psychological urban quality economical urban quality and political urban quality (El Din, et. al., 2013). Urban quality of life refers to the natural attributes of the neighbourhood, and it is the relationship that exists between different physical features of housing (Hamam et al. 2013). It entails the quality of the built environment both in rural and urban areas (Boamah, 2015). Neighbourhood quality is conferred on a residence as a result of the environment it is located in (Cook and Bruin, 1994; El-Hadj, et. al., 2018). It focuses on the relationship between housing streets, open space and general settings in the neighbourhood (Rapoport, 1998).

Peri-urban settlements in developing countries are mostly associated with pollution of diverse kinds like refuse dumps and broken sewage plants thus imposing negative impact on the wellbeing of residents (Allen, 2003; Chirisa, 2010). Notable diseases with such environmental pollution in the African rural settlements are skin diseases, diarrhoea and Buruli ulcer (Boamah, 2012). Prior study by Boamah (2012) stated that housing conditions have an impact on the general and mental health of rural residents in Accra, Ghana. A study carried out on housing quality in peri-urban settlements in Akure, a Nigerian city, emphasized on the role of frequency of collection of waste on quality of housing in peripheral settlements. According to his findings, spread of an epidemic is prevalent with infrequent waste disposal (Anofojie, et.al., 2014)

Investigation by Allen (2003), identified categories of drinking water in most African peri-urban settlements as unimproved, improved and piped. Categories of toilet facilities were open defecation, unimproved, shared improved, shared toilet facilities. Unimproved category of drinking water includes pit latrines without slab or platforms, hanging latrines and bucket latrines. Shared improved toilets were flush toilet, flush latrines and ventilated improved pit (VIP). Categories of dwelling floor were divided between natural, rudimentary and finished flooring (Bradley and Putnick, 2012). Building materials in poor areas of the peripheral settlements included wood, reeds, grass for construction and roofing (Simon, 2008).

Locational quality of housing is the spatial position occupied relative to the central business district. Housing located close to facilities such as place of work, market, road, recreational facilities, schools, health facilities possesses higher locational benefits (Adebayo and Aliu, 2010). Good locational position brings ease in travel time to work and

gives a higher satisfaction to residents (Cook and Bruin, 1994). Housing locational quality is also a function of accessibility to public transport. It is regarded as the living convenience and mobility control, which has to do with ease of commuting (Adebayo and Aliu, 2010). Housing location contributes to the socio-psychological development of children, and also affects the quality of education that can be accessed (Boamah, 2015). Furthermore, location of settlements is pivotal in the provision of employment and for support of services for housing (El-Hadj, et. al., 2018).

Housing quality cannot be discussed outside urban locational mobility. This brings to bear the influence of accessibility, traffic and transportation. In African peripheral settlements, there is high cost attached to daily travels and also slow traffic movement, because of the poor conditions of the access roads and the main arterial routes linking settlements (Lawanson et. al., 2012; Acheampong and Anokye, 2013). Commuting in peri-urban settlements of developing countries can often be burdensome. Poor transportation translates to road congestion, reduced productivity and lesser quality of life in the periphery of developing nations (Lawanson et. al., 2012). Therefore, locational quality refers to positional attributes while neighbourhood quality is associated with the extrinsic values of the neighbourhood (Aluko, 2010). The role of socio-economic and socio demographic attributes of residents cannot be overemphasized in the analysis of housing quality in transitioning towns like peri-urban settlements. Investigation by Allen (2003, 2010) shows that waste disposal is predominantly through landfill and incineration in the peri-urban areas. There exist indiscriminate disposal into canals and drainage channels (Puttal and Ravadi 2014). There is also pollution of water bodies by the toxic industrial waste, raw sewage and chemical affluent. According to Boamah (2012), the poorest households in most African peripheral settlements are subjected to these water sources which contributes to health hazards. In conclusion, the practice of building African urban and rural cities from back to front, that is, allowing spontaneous development before planning for services is the major cause of lack of basic social services like water, regular electricity, efficient sanitation services and transport systems (El-Hadj et. al., 2018).

CONTEXT OF THE STUDY

The selected cases for this study are Ibeju-Lekki and Ikorodu peri-urban settlements in Lagos State. Both are Local Government Areas in Lagos State, Nigeria (Figure 1). The two municipalities are outside the metropolitan region. It was decided to choose these areas because both regions

have different dynamics of urbanism in terms of demographic composition, infrastructural development and locational potentials. While Ibeju-Lekki serves the housing needs of migrants from Lagos Island and its environment, Ikorodu absorbs people from Lagos Mainland and the surrounding. Also, Ibeju-Lekki represents the least urbanized peri-urban area in Lagos, in terms of population growth and housing development, while Ikorodu represents the highly urbanized peri-urban settlements in Lagos, in terms of residential development and population growth. Ibeju-Lekki Local Government Area has a land area of about 646 kilometres square, which equals to one quarter of the total land mass of Lagos state. According to the National Population Commission (2006) census, Ibeju-Lekki had a population of 117,481 out of Lagos State's total of 9,113,605. Ikorodu is located in the North East of Lagos State, along the Lagos lagoon and located at a distance of approximately 36km north of Lagos. It occupies a land area of about 345 kilometres square. Ikorodu had an enumerated population of 535,619 in 2006 (National Population Commission and ICF Macro, 2009).

METHODOLOGY

This study employs a case study methodology based on a field survey. Case study approach was applied by conducting field research covering different types of housing development in the study areas. Primary data was sourced from the questionnaire instrument and on observation schedule through a field survey of the study areas. Two-stage cluster sampling technique was adopted in selecting the sample size which

consisted of three hundred and seventy housing units in Ibeju-Lekki and three hundred and eighty four housing units in Ikorodu peripheral settlements. Housing types under self-built, developer built and government housing were adequately represented in the sample size which was randomly selected from clusters of purposively selected sixteen settlements in Ibeju-Lekki and eighteen settlements in Ikorodu respectively. Purposive sampling was adopted to reduce costs and to eliminate repetition in responses. Six trained field personnel were engaged in the field survey that lasted for eight consecutive weekends. An approximate 98% and 98.6% return rates were achieved in Ibeju-Lekki and Ikorodu respectively. This was made possible by administering the questionnaires during non-working days and hours. Closed and open ended questions were administered to head of the selected households. The respondents answered questions on the socio-economic profile of household head which included gender, age, ethnicity, marital status, level of formal education, monthly household income, tenure and household size; internal dwelling quality, external quality, neighbourhood quality, accessibility to services and building materials used. Ethical considerations included consent from the management of gated housing estates and voluntary participation by respondents in the study area. Qualitative data included a structured interview with household heads and observation schedule used in studying the state of housing quality. Quantitative data for this study were extracted from the questionnaire responses. Descriptive analysis was conducted on the data to generate percentages and frequencies of responses on socio-economic profile of household heads,

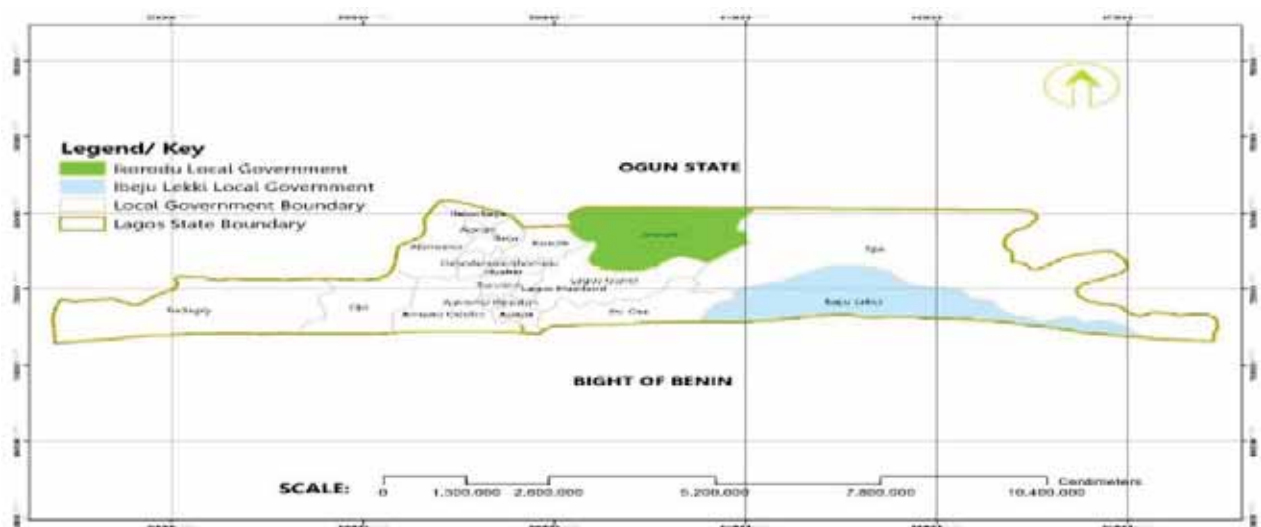


Figure 1: Map of Lagos showing Ibeju-Lekki and Ikorodu
Source: Fieldwork, 2016.

PRESENTATION OF RESULTS

Socio-Economic Profiles of the Respondents

Table 1: Household Heads' Socio-Economic Profile

Variables		Ibeju-Lekki N=366	%	Ikorodu N=379	%
Gender of Household Head	Male	223	60.9	244	64.4
	Female	143	39.1	135	35.6
Profession of Household Head	Civil Service	70	19.1	90	23.7
	Trading	134	36.6	119	31.4
	Professional Practice	61	16.7	56	14.8
	Unemployed	2	0.5	3	0.8
	Retired\ Pensioner	13	3.6	12	3.2
	Artisan	56	15.3	67	17.7
	Student	21	5.7	18	4.7
	Farming	1	0.3	12	0.5
	Other	8	2.1	2	0.5
Literacy Level of Household Head	Postgraduate	56	15.3	25	6.6
	BSc/Higher Diploma	105	28.7	124	32.7
	National Diploma	62	16.9	79	20.8
	Secondary	110	30.1	130	34.3
	Primary	25	6.8	18	4.7
	None	8	2.2	3	0.8
Respondent's Ethnic Group	Yoruba	263	71.9	263	69.4
	Hausa	6	1.6	13	3.4
	Ibo	70	19.1	85	22.4
	Other	27	7.4	18	4.7
Monthly Income Household Head	Low Income	133	36.6	150	39.6
	Middle Income	70	19.1	178	46.9
	High Income	163	44.6	51	13.4
Household Size	1-2 Persons	48	13.1	88	23.2
	3-5 Persons	202	55.2	185	48.8
	6-9 Persons	96	26.2	87	23
	10-12 Persons	8	2.2	14	3.7
	More than 13 Persons	12	3.3	5	1.3
Tenure	Less than 5 years	114	31.1	139	36.7
	5-10 years	116	31.7	142	37.5
	More than 10 years	134	36.6	97	25.6
	Other	2	0.5	1	0.3

Source: Field Survey (2016).

* Low income 25,000.00-50,000.00(\$70-\$140).

* Middle income 50,001.00-150,000.00(\$140-\$420).

* High income 150,001-above (\$420).

access to services, and rating of neighbourhood quality, internal dwelling quality, external dwelling quality and building materials used in the study area. All statistical data analyses were performed using SPSS.

There were five recognised household sizes in the study areas as presented in Table 1. The commonest household sizes in both study areas were three to five persons. 55.2% of the households in Ibeju-Lekki and 48.8% household in Ikorodu had this household size. This was mostly common among the highly educated families and also the Yoruba ethnic group in the study areas. The least number of household size in the study areas was more than thirteen people which constituted 1.3% in Ikorodu and 3.3% in Ibeju-Lekki. Male headed households were larger than female in both study areas. Informal trading was the commonest occupation in both study areas. This category of occupation had 36.6% in Ibeju-Lekki and 31.4% in Ikorodu. More people were engaged in civil service work in Ikorodu (23.7%) than in Ibeju-Lekki (19.1%). More residents were involved in professional practices in Ibeju-Lekki (16.7%) than in Ikorodu (14.8%). Farming was one of the least populated occupations in the two peri-urban settlements. Illiteracy level in both peri-urban settlements was very low. A high percentage of

the population in both locations was literate, with only 6.8% and 4.7% respectively having primary education. The Yoruba ethnic group constituted the largest portion of the population in both peri-urban settlements, while the Hausa tribe was the least represented in the study areas. The predominant earning group of household head in Ibeju-Lekki was the high income, with average monthly earnings of N150,000(\$420). This group constituted 44.6% while the low earning group, with monthly earnings of N25,000(\$70)-N50,000(\$140), constituted 36.3% and the middle income earning N50, 000(\$140) -N150,000 (\$420) constituted 19.1%. However, in Ikorodu, the middle income group constituted 46.9% and was the highest. The low income group was 39.6% and the high income was 13.4%. Analysis of tenure in the study areas showed that the maximum length of residence in both study areas was ten years.

Internal dwelling quality in the study area

The analysis in Table 2 shows the presence of good natural ventilation in both peri-urban settlements. Most buildings had cross ventilation aided by the availability of suitable openings and appropriate window sizes. Burglary protection system installation was high in both locations. Few houses

Table 2: Households' Internal Dwelling Quality.

Variable		Ibeju-Lekki		Ikorodu	
		N=366	%	379	%
Good Opening	Yes	339	92.6	334	88.1
	No	27	7.4	44	11.6
	Neutral	0	0	1	0.3
Burglary Installation	Yes	314	85.8	309	81.5
	No	51	13.9	69	18.2
	Neutral	1	0.3	1	0.3
Number of Rooms/Household	1-2rm	193	52.7	218	57.5
	3-4rm	172	47	160	42.2
	Missing	1	0.3	1	0.3
	1	146	39.9	147	38.8
Windows/Room	2	220	60.1	231	60.9
	Missing System	0	0	1	0.3
	Flush	297	81.1	317	83.6
	Pit Toilet	69	18.9	61	16.1
Toilet Type	System	0	0	1	0.3
	Yes	264	72.1	281	74.1
Tiled Kitchen	No	102	27.9	98	25.9
	Tap/Borehole	272	74.3	322	85
Source of Water	Well/Others	94	25.7	57	15
	Yes	256	69.9	306	80.7
Electricity Supply	No	110	30.1	72	19
	Missing System	0	0	1	0.3

Source: Field Survey (2016).

lacked burglary protection systems. The commonest type of rooms per household were 1-2 rooms, 52.7% and 57.5% in Ibeju-Lekki and Ikorodu respectively. 71.0% and 67.5% of respondent kitchens were tiled in Ibeju-Lekki and Ikorodu respectively. Flush toilet installation was generally seen in both locations despite of pits and other poor quality sanitary methods. 83.6% of the toilets were flush toilet systems with 72.1% of the toilets being tiled in Ibeju-Lekki. 83.6% of households had flush toilets and 74.1% of households had tiled bathrooms in Ikorodu. The vast majority of peri-urban residents' in both locations relied on borehole water system, 74.3% in Ibeju-Lekki and 85% in Ikorodu. Other sources

of water were wells and streams. Electricity supply in Ikorodu was better in Ibeju-Lekki. 80.7% of Ikorodu respondents had reliable supply of electricity from the grid and there was less reliance on alternative sources of electricity, thus reducing noise pollution.

External dwelling quality

Observation carried out on the selected housing units, showed generally high level of disrepair in both locations (Table 3). However, higher disrepair, in the form of dampness and tear was found in the buildings in Ikorodu (61.6%) than in Ibeju-

Table 3: Households' Internal Dwelling Quality.

Variable		Ibeju-Lekki N=366		Ikorodu	
			%		%
State of Disrepair	0-5years(Low)	137	37.4	134	35.4
	5 above(High)	229	62.6	245	64.6
	Good	272	74.3	242	63.9
	Bad	94	25.7	137	36.1
State of Painting	Total	366	100	379	100
	Full	307	83.9	279	73.6
	Not Full	58	15.8	98	25.9
	Others	1	0.3	1	0.3
Lots Size	Missing System	0	0	1	0.3
	Modern Family House	257	70.2	230	60.7
Building Design	Tenement House	109	29.8	148	39.1
	Missing System	0	0	1	0.3

Source: Field Survey (2016).

Lekki (62.6%). The state of painting showed a fairly regular exterior maintenance. More modern building designs existed in Ibeju-Lekki than in Ikorodu. This could be attributed to the presence of high income households in Ibeju-Lekki. Majority of the houses in both locations were built on standard full plots. A very good percentage of buildings in both locations had external paint, though some were in poor state. There were reasonable number of modern housing present in both locations. But, tenement building designs were more prevalent in Ikorodu, especially those built for rental purposes.

According to the field survey analysis in Table 4, 30.6% and 25.1% houses were affected by noise pollution in Ibeju-Lekki and Ikorodu peri-urban settlements respectively. 66.4% of the housing units in Ibeju-Lekki lacked good drainage in comparison to 80.2% in Ikorodu. 66.9% households in Ibeju-Lekki had access to good waste disposal system, while only 26.4% signified the availability of an efficient waste management system in Ikorodu. The greater proportion of the residential areas, 61.7% in Ibeju-Lekki and 79.9% of Ikorodu, did not have good roads. Environmental security

in Ikorodu was 44.1% and 71% in Ibeju-Lekki.

Respondents' access to services

The survey analysis in Table 5 indicates that in Ibeju-Lekki, a greater percentage of the sampled population enjoys locational proximity to their places of work. 85.8% of the respondents had good proximity in comparison to 72.8% in Ikorodu. Locational proximity to the central business district was an advantage in both study locations. 86.1% of the household heads in Ibeju-Lekki and 72.0% in Ikorodu peri-urban were seen to be close to the central business districts. The percentage of the population lacking health facility was less in Ibeju-Lekki as compared to Ikorodu (48.8%). Availability of school was not a critical issue in Ibeju-Lekki. 94.3% households showed satisfaction with the provision of schools but only 61.5% of households in Ikorodu showed satisfaction with access to school. About 22.1% of households saw lack of public transport as a locational deficiency in Ibeju-Lekki as against 15.6% in Ikorodu peri-urban settlement.

Respondent's Rating of Neighbourhood Quality

Table 4: Respondent's of Rating of Neighbourhood Quality.

Variable		Ibeju-Lekki		Ikorodu	
		N=366	%	379	%
Noise Polluton	Yes	112	30.6	95	25.1
	No	250	68.3	277	73.1
	Neutral	4	1.1	4	1.1
	Missing				
	System	0	0	2	0.5
Good Drainage System	Yes	119	32.5	70	18.5
	No	243	66.4	304	80.2
	Neutral	4	1.1	2	0.6
	Missing	0	0	2	0.5
	System	245	66.9	100	26.4
Good Waste Disposal	Yes	121	33.1	276	72.8
	No				
	Neutral				
	Missing				
	System	0	0	2	0.5
Good Road	Yes	140	38.3	74	19.5
	No	226	61.7	303	79.9
	Neutral				
	Missing				
	System	0	0	1	0.3
Environmental Security	Yes	260	71	167	44.1
	No	103	28.1	211	55.7
	Neutral				
	Missing				
	System	3	0.8	1	0.3

Source: Field Survey (2016).

There was generally a reasonable level of internal dwelling quality in both study areas. This could be seen by the higher number of households with tiled kitchen, bathroom, flush toilet and accessibility to borehole or tap water. However, external dwelling quality varied in each study area. Though, there existed a high level of disrepair in both study areas, observation showed that most disrepair was basically associated with poor maintenance and to the age of buildings as confirmed from the respondents. Buildings with high disrepair were mostly aged above five years. The finding also showed dampness to be an additional cause of external wall tears in Ibeju-Lekki, because of the surrounding coastal landscape. It is worthy to state that more disrepair was noted in low income households than in the middle and high income groups. This corroborates Cook and Bruin (1994) findings on the impact of poverty inter alia housing maintenance and quality.

In terms of neighbourhood quality, the lack of suitable drainage system contributed greatly to floods, thus causing vehicular congestion, especially during the rainy season in the study areas. Associated problems with this challenge were high commuting time and reduced productivity for the households in Lagos peri-urban settlements. Waste disposal management was a huge burden for peri-urban residents in

Ikorodu peri-urban settlements. Further more, poorer waste management in this study area in comparison to Ibeju-Lekki can be attributed to more self-built housing in the former. Most low income households rely on the use of participative community services to tackle waste disposal and this is often ineffective. Implications of poor waste management include the spread of diseases and endangered human health in affected Lagos peri-urban settlements (Lawanson, Yadua and Salako, 2012; Boamah, 2015).

Noise pollution was less of an influential neighbourhood challenge in the study area. But, this was minimal in both study areas. Observation during the field work also showed that residential areas close to manufacturing companies were more prone to noise pollution.

The high level (55.7%) of environmental security in Ikorodu peri-urban settlements could be attributed to the socio-economic class of the households. Most houses were not gated and hence prone to robbery and burglary attacks in Ikorodu.

Both locations had good locational proximity to the CBD. But, the presence of government institutions in Ikorodu were a boost for better public transportation system as

Table 5: Respondents' Access to Services.

		Ibeju-Lekki		Ikorodu	
		N=366	%	379	%
Closeness to Work	Yes	314	85.5	276	72.8
	No	52	14.2	102	26.9
	Missing system	0	0	1	0.3
Closeness to CRD	Yes	315	86.1	273	72
	No	51	13.9	104	27.4
	Missing system	0	0	2	0.5
Availability of Public Transport	Yes	284	77.6	318	83.9
	No	81	22.1	59	15.6
	Missing system	1	0.3	2	0.5
Availability of Children School	Yes	345	94.3	233	61.5
	No	21	5.7	144	38
	Missing system	0	0	2	0.5
Availability of Health Facility	Yes	324	88.5	190	50.1
	No	38	10.4	185	48.8
	Neutral	4	1.1	1	0.3
	Missing system	0	0	3	0.8

Source: Field Survey (2016).

Assesment of Building Materials Used.**Table 6:** Building Materials Used.

		Ibeju-Lekki		Ikorodu	
		N=366	%	379	%
Wall	Block wall	342	94.4	316	83.3
	Mud wall	13	3.55	51	13.4
	Thatch/others	7	1.9	11	2.9
	Missing System	4	1.1	1	0.3
	Aluminium	277	75.7	223	58.8
Roof	Thatch	20	5.5	62	16.4
	Concrete slab	23	6.3	47	12.4
	Other	46	12.6	46	12.1
	Missing system	0	0	1	0.3
	Aluminium	251	68.6	243	64.1
Window	Louvre	37	10.1	74	19.5
	Wooden	47	12.8	56	14.8
	Casement	31	8.5	5	1.3
	Missing system	0	0	1	0.3
	Steels/iron	130	35.5	170	44.9
Door	Flush/panel/wooden	229	62.6	176	46.4
	Glass	2	0.5	24	6.3
	Others	5	1.4	8	2.1
	Missing System	0	0	1	0.3

Source: Field Survey (2016)

compared to Ibeju-Lekki. High cost of transportation for those without personal vehicles in the latter was a result of limited public transportation facilities. In Ikorodu, the good distribution of government organisations and strategic locations of most institutions close to both primary and secondary roads made it easier for peri-urban residents to access their work places.

More households lacked health facilities, more in Ikorodu than in Ibeju-Lekki, which showed a more improved infrastructure development and hence better quality of life. Settlements further away from the city centre lacked medical facilities because of the cost implication of locating such facilities in areas where housing density is low.

A higher percentage of households showed dissatisfaction with the provision of primary school in Ikorodu as compared to Ibeju-Lekki. This could be attributed to the locational preference of private education providers, as they are strategically located where their services can be rewarded by high income groups. Low income group in peri-urban settlements could not afford the high service charges attached to private education in Lagos. Reliance of most low income group in Lagos peri-urban was on public schools, and these were limited in relation to the peri-urban population of school age children.

There was no significant difference in the use of building materials in Ibeju-Lekki and Ikorodu. However, majority of the households had adopted conventional building materials like cement sandcrete blocks, aluminium burglary proof windows, mostly wooden panel internal doors and steel external doors. The use of louvred and wooden windows in both locations was limited. Aluminium roofing was common in both peri-urban settlements of Ibeju-Lekki and Ikorodu. Thatch roof (sun dried palm fronds) wall was sparingly used in areas belonging to natives, whose primary occupation was fishing and coconut farming.

CONCLUSION

Housing quality cannot be examined in isolation without putting into consideration the three variables factored in this research work, neighbourhood quality, locational quality and dwelling quality. To corroborate the findings of El-Hadj, Faye and Geh (2018), government disparity in infrastructure development or the back to front system adopted where intervention is needed has impacted greatly on poor neighbourhood, locational quality and provision of basic social amenities in most peri-urban housing developments in Lagos State. Regarding government and private developer

housing, concentration has been more on dwelling and neighbourhood quality, creating poor user performance in such housing in Lagos peri-urban settlements.

Also, most government housing initiative lack good locational quality because of the intentional policy of residential segregation from poor neighbourhoods in Lagos peri-urban settlements. Government disparity in infrastructure development has impacted the poor neighbourhood and locational quality of most of the peri-urban housing developments. Therefore, planning of housing schemes in Lagos peri-urban settlements should be integrated with other urban land uses, for efficient distribution of infrastructural facilities. Furthermore, post occupancy study should be carried out in government and private housing development to determine their efficiency and suitability for households in the peri-urban settlements. This will enhance performance standard in other housing projects to be carried out.

Both government-led and developer-led housings rely much on the use of conventional building materials. The research findings show no trace of alternative building materials for the mentioned housing initiatives in Lagos peri-urban settlements. Advocacy for housing policy that promotes the use of alternative building materials by the government and private developers will aid housing affordability and accessibility for the low income group and would lead to improved quality of housing in Lagos peri-urban settlements. This would also help in reducing poor quality self-built housing. It can be concluded that there exist differentials in housing quality in Lagos peri-urban settlements and this is influenced mostly by socio-economic capacity of households, mostly income, type of housing initiatives and the state government subtle policy of residential segregation by income, class and education.

RECOMMENDATION

To improve housing quality among the low income group, the state government should intervene in the housing process of self-built housing development, in terms of disseminating education on spatial adequacy, dwelling quality and suitability of construction materials to be used. There should be a policy review regarding balanced infrastructure development to minimise differentials in housing quality due to residential segregation in Lagos peri-urban settlements. Furthermore, updated demographic data is relevant for policies regarding the provision of infrastructure and relevant complementary facilities needed to promote housing quality in Lagos peri-urban settlements.

REFERENCE

- Acheampong, R. A. and Anokye, P. A., 2013, "Understanding Households' Residential Location Choice in Kumasi's Peri-Urban Settlements and the Implications for Sustainable Urban Growth", *Research on Humanities and Social Sciences*, 3(9), 60-70.
- Adebayo, I. and Aliu, A., 2010, "Evaluating The Influence Of Housing Quality On Urban Residents' Wellbeing: The Case Of Lagos Nigeria", *International Journal of Academic Research*, 2(6), 401-410.
- Aderamo, A. and Ayobolu, D., 2010, "Spatial Structure of Housing Quality in Ilorin, Nigeria". *Research Journal of Social Sciences*, 1(5), 12-21.
- Allen, A., 2003, "Environmental Planning and Management of the Peri-Urban Interface: Perspectives on an Emerging Field". *Journal of Environment and Urbanization*, 15(1), 135-147.
- Allen, A., 2010, *Neither Rural nor Urban: Service Delivery Options That Work for the Peri-urban Poor*, University College London, Environment and Sustainable Development (ESD), London: University College London.
- Aluko, O., 2010, "The Impact of Urbanization on Housing Development: The Lagos Experience, Nigeria". *Ethiopian Journal of Environmental Studies and Management*, 3(3), 64-74.
- Amao, F. L., 2012, "Urbanization, Housing Quality and Environmental Degeneration in Nigeria", *Journal of Geography and Regional Planning*, 5(16).
- Anofojie, A. E., Adeleye, O. A. and Kadiri, M. A., 2014, "Housing Quality Assessment In Selected Public Residential Estates in Amuwo-Odofin L.G.A, Lagos, Nigeria", *International Journal of Research In Earth and Environmental Sciences*, 2(6), 7-17.
- Boamah, N., 2012, "Housing for the Vulnerable in the Offinso South Municipality of Ghana", *Housing, Care and Support*, 15(3), 140–147.
- Boamah, N., 2015, "The Impact of Households Characteristics on the State of Housing in the Offinso South Municipality (OSM), Ghana. *Environment, Development and Sustainability*, 17(6), 1251–1266.
- Bradley, R. H., and Putnick, D. L., 2012, "Housing Quality and Access to Material and Learning Resources within the Home Environment in Developing Countries", *Child Development*, 83(1), 76–91.
- Chirisa, I., 2010, "Peri-Urban Dynamics and Regional Planning in Africa: Implications for Building Healthy Cities", *Journal of African Studies and Development*, 2(2), 15-26.
- Cook, C. and Bruin, M. J., 1994, "Determinants of Housing Quality: A Comparison of White, African-American and Hispanic Single-Parent Women", *Journal of Family and Economic Issues*, 15(4), 329–347.
- Dutta, V., 2012, "Land Use Dynamics and Peri-urban Growth Characteristics: Reflections on Master Plan and Urban Suitability from a Sprawling North Indian City", *Journal of Environment and Urbanization ASIA*, 3(2), 277–301.
- El Din, H. S., Shalaby, A., Farouh, H. E. and Elariane, S. A., 2013, "Principles of Urban Quality of Life for a Neighborhood", *Housing and Building National Research Center*, 9(1), 86–92.
- El-Hadj, M., Faye, I. and Geh, Z., 2018, *The Political Economy of Housing Development in Africa. In Housing Market Dynamics in Africa*. Palgrave Macmillan, London.
- Fiadzo, E. D., Houston, J. E. and Godwin, D. D., 2001, "Estimating Housing Quality for Poverty and Development Policy Analysis: CWIQ in Ghana", *Social Indicators Research*, 53(2), 137-162.
- Goodman, J. L 1978, "Causes and Indicators of Housing Quality", *Social Indicators Research*, 5(2), 195-210.
- Hamam, S. E., Ahmed, S. and Hend, E. F., 2013, "Principles of Urban Quality of Life for a Neighborhood", *Journal of Housing and Building National Research Center*, 9(1), 86–92.
- Ibem, E. O. and Aduwo, E. B., 2015, "Assessment of the Sustainability of Public Housing Projects in Ogun State, Nigeria:

-
- A Post Occupancy Evaluation Approach”, *Mediterranean Journal of Social Sciences*, 6(2), 523-536.
- Kain, J. F. and Quigley, J. M., 1970, “Measuring the Value of Housing Quality”, *Journal of the American Statistical Association*, 65(330), 532-548.
- Lawanson, T., Yadua, O. and Salako, I. (2012). “An Investigation of Rural-Urban Linkages of the Lagos Megacity, Nigeria”. *Journal of Construction Project Management and Innovation.*, 2(2), 464-581.
- Puttal, V. and Ravadi, N. 2014, “Role of Urban Planning as Tool to Mitigate the Environmental Repercussions Due To Peri-urbanisation”, *Journal of Civil Engineering and Environmental Technology*, 1(3), 96-102.
- Rapoport, A., 1998, “Using "culture" in Housing Design”, *Journal of Housing and Society*, 2(25(1and2)), 1-20.
- Simon, D., 2008, “Urban Environments: Issues on the Peri-Urban Fringe”, *Annual Review Environmental Resources*, 33, 167-185.
- Štreimikiene, D., 2014, “Housing Indicators For Assessing Quality Of Life In Lithuania”, *Intellectual Economics*, 8(1), 25–41.

ANALYTICAL STUDY ON PROVISION OF PUBLIC TOILETS IN LAHORE CITY

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ABSTRACT

Provision of public toilets is not merely a matter of utilizing land, but it is an essential component of design and planning. Inadequate provision of accessible public toilets in the city of Lahore in Pakistan, is not only affecting the quality of the city but is also discomforting its residents. To examine the current status of the public toilets and the major causes of open defecation, a survey of four hundred respondents in different public places of Lahore city was conducted, along with a review of various policies in place with regards to public toilet provision. Principal Component Analysis (PCA) established a comprehensive set of features responsible for achieving an effective solution to provision of public toilets, which ranged from accessibility, to availability, cleanliness, maintenance and safety. The paper reveals that the availability and cleanliness of public toilets should be ensured at potential urban spaces, as that can contribute to healthy and accessible environment for citizens and make cities sustainable and livable.

Keywords: Public Toilets, Lahore, Principal component analysis

INTRODUCTION

Access to appropriate sanitation facilities is an essential requirement and right of human beings. Since the year 2000, around 1.4 billion people gained access to elementary sanitation facilities, which includes flush lavatories or latrine.

Approximately 2.3 billion persons across the globe lack basic sanitation facilities, along with eight hundred and ninety two million people practicing open defecation (UNICEF and WHO, 2017). Provision of adequate sanitary facilities is the most effective technique for prevention and spreading of diseases. In 2017 the strategic development goals (SDGs) monitored the percentage of people who had access to services of washing hands with water and soap. Around fifty percent of the population of the world in the countryside and eighteen percent in the urban areas lacked sanitation services. Deprived sanitation systems around the world have increased frequency of ailments and pollution in the atmosphere (UNICEF and WHO, 2017). Deprived sanitation system causes death of one and half million children annually (Prüss-Üstün, 2008a). Excreta and solid waste contribute towards unhealthy and polluted environments.

Provision of public toilets at public places of metropolitan cities and towns demands some prerequisites, i.e. water connections, land, electricity, supplementary fixtures, and willingness of managing authorities to look after these facilities. Currently human waste of around two billion people in urban settlements and towns is lacking proper treatment and management before disposal, ultimately waste from cities is disposed in water bodies without primary treatment (Arbogast, et. al., 2015).

In the South Asian region nearly nine hundred fifty three million people do not have access to adequate sanitation and Pakistan ranks amongst those ten nations where there

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is a dire need of improved public toilets facilities (Khan, 2017). The greater proportion of female population in Pakistan is facing agitation, sickness and pestering, as there is a no room for female public toilets at public places. Indeed, Pakistani cities do not have readily available database, documentation and public toilet maps to facilitate urban residents, regarding existing provisioning of public toilets.

In Lahore there are twelve public toilets sites operational under the administration of Metropolitan Corporation Lahore (MCL) and twenty seven public toilets sites along Shahdra-Gajjumata Metro Bus Route. The condition of public toilets of MCL lack proper cleanliness and maintenance. The prevailing condition of public toilets in Lahore and other cities is alarming for development authorities and public representatives in legislation assemblies. The municipalities, planning agencies and urban development specialists should take this issue on board and devise a planning framework for provision of public toilets.

A GLANCE AT HISTORY

The history of public and private toilets has its roots in ancient civilization of Harappa and Mohenjo-Daro, where every housing unit had its private toilet and well-connected drain to dispose human excreta. Excavations of Egyptian civilization have exposed that they had indoor cesspool toilets in elite class houses, and toilets in temples and other outdoor toilets for the public (Antoniou et. al., 2016). Roman Civilization was famous for their *thermae* (public baths) and this facility was publicly available in entire Rome. Most of the cities had public bath complexes which were grounds for social gatherings as well (Evans, 2003). Roman public baths had access to water from streams, rivers and aqueducts and log fire was used for heating water. European cities had advanced public toilet systems during the middle ages. Fortified towns and palaces had common places for bathing. Toilets were also integral components of all religious buildings of the Ottoman Empire. During the Arabs conquests, they conveyed new ethics and codes on hygienic issues, and introduced a structure of public baths, drainage, sewerage and plumbing system. Public toilets were recognized as an essential component of urban houses in the Islamic Empire of Al-Andalus (Antoniou, et. al., and 2016).

MAKING SUSTAINABLE CITIES

Adequate provision of public toilets at public places endorse the right to participate in social and cultural activities (Bichard and Knight, 2011). Responsive and inclusive public places are major sponsors for quality and healthy life, which supports the agenda of sustainable cities and communities.

Public toilets are integral component for developing sustainable, inclusive and responsive human settlements in the global village. The agenda of '24-Hour City' necessitate authorities to provide supplements like streetlights, urban public transport, security and public toilets for the formulation of the backdrop of a twenty four hour city economy (Greed, 2004). Improved sanitation along with hygiene and clean drinking water are necessary to have a healthy life and socioeconomic development (Mara, et. al., 2010).

Furthermore, consistent interventions in these three basic components of health can considerably combat morbidity and health issues. Past studies shows that adequate sanitation can encounter diarrheal diseases from thirty two to thirty seven percent. Improved sanitation facilities are pivotal to attain substantial goals of poverty alleviation and economic development, because it imparts social development and a healthy environment for the masses (Surya, et. al., 2017). Provision of adequate public toilets not only allows citizens to participate in the city's activities, but also enhances their living standard, which ultimately leads towards sustainable development. It has been observed that many residents, like elders, disabled and women travel occasionally and they often avoid long trips as lack of availability of public toilets discourages them from doing so.

DESIGN OF RESTROOMS

The design layout for the restrooms in the literature mostly emphasizes on seven principles. Firstly, the provided facility should be used by everybody, it must be flexible, decent and simple to use, tolerant to exploitation, convenient as well as practical in terms of size and place (Sawadsri, 2003). Presence of mirrors in restrooms can enhance security. Some of the accessories to be considered are toilet fixtures, ceilings, door handles and openers, flush, taps, soap, dispensers, hand dryers, paper towels, toilet seats and hot water. Advertisement placed on restroom walls can help offset the cost of its operation and maintenance. Adequately ventilated restrooms can considerably reduce the sense that a restroom is dirty. Management process should include risk assessment, access, security and graffiti management. Sustainable design can include half-flush choice, optimal use of natural lighting and aeration, a minimized lifespan carbon footprint and usage of high value of recyclable materials.

LEGAL FRAMEWORK IN PAKISTAN

According to UNICEF 2015 report, over forty million Pakistanis do not have access to adequate toilet facility, which compel the masses to defecate openly, which results

Table 1: Documentation of Different Types of Public Toilets

A STUDY OF TYPES OF PUBLIC TOILETS	
Flush Toilets	A flush toilet comprises of a ceramic container which is connected to a up-side tank which rapidly supplies water to and from the drainage pipe that immediately removes the effluent. When the toilet is used by the user, manure flows into the septic tank which is associated with a sewage treatment plant.
Squat Toilets	In 1976, squat toilets were mainly used but now the trend has changed and public toilets are moving from squat toilets to sitting toilets. A squat toilet is also known as "squatting toilet" and sometimes "natural position toilet". They focus on the position of squatting rather than sitting, which means the user must place one foot on each side equally in the direction of the toilet drain hole. This kind of toilet is commonly used in Asian, African and European countries. In the Muslim countries, according to Islamic toilet practice, squat toilets are recommended.
Pit Latrine	A pit latrine is a dry lavatory system which accumulates human excreta in a ditch or trench that ranges from a decent slit ditch to a more intricate structure, along with seating and crouching pans and proper ventilation. These are helpful in emergency circumstances. In developed nations pit latrine are used in camps and wilderness zones, however they are also ordinarily used in country and peri-urban areas of many of the emerging nations.
Vault Toilets	They are non-flush toilets encompassing sealed containers placed in the soil that receives the excreta which remains in the ground unless it is removed by pumping. A concept of vault toilet is extracted from a pit lavatory (explained above). The waste gathers in the vault, does not absorb in the soil, and acts similarly as a septic tank.
Urine Diversion Toilets	These toilets comprise of two sections, both use water for flushing. These toilets are named as diversion toilets because its excreta is used for composting or as a biofuel. Astronauts also use this type of toilet to recover portable water in space.
Portable Toilets	These toilets are used in construction sites, in film recording sites, as well as in outdoor gatherings, where few facilities are available. They are classically self-contained blocks which are easily movable portable lavatories and are usually unisex solitary unit of which privacy is ensured by a lock on the door of toilet. They are typically light in weight and can be transferred, loaded and unloaded by a truck.
Chemical Toilets	Toilets that do not need any connection to water supply are termed as chemical toilets and they are used in various circumstances, like in trains and airplanes.

in degradation of the environment. Provision of basic facilities like public toilets has never gained the primacy on legislation benches. This negligence on the part of policy makers leads the country to be on third number in the list of open defecation after Republic of India and Indonesia (UNICEF, 2015). According to statistics of national hygiene report, forty four percent of the population lacks access to working toilets, and more than fifty five percent of women, do not have access to safe and secure sanitation. Greater metropolitan and capital cities of Pakistan like Karachi, Lahore, and Peshawar are lacking adequate provision of clean public toilets.

The situation of public toilets provision and management systems in the country are quite poor, which is very alarming for legislators, policymakers, urban planners and development specialists. It is necessary for them to formulate comprehensive public toilet framework and strategy for all administrative tiers. Present legislation and policy provisions for public toilets are in piecemeal, which does not create room for the formulation of comprehensive and inclusive public toilets planning framework and standards.

Punjab Sanitation Policy, 2015

Section 7.6 of the policy obliges provincial government departments to collaborate with private sector for the provisioning and management of public toilets. Further more, this section makes it compulsory for concerned authorities to guarantee the provision of communal toilets at public places, particularly at commercial markets, bus terminals, parks, playgrounds and open spaces for elderly, male, female and disabled persons. The sanitation policy has devised an outline for the proper construction and operation as well as supervision of public toilets through built-operate and transfer, by encouraging private sector to finance and design public toilets. Likewise, authorities are liable to ensure public participation in planning, construction and operation phases to endorse the sustainable development agenda.

Section 83 of Punjab Local Government Act, 2013

The metropolitan and municipal committees and the District Councils of Punjab province are major custodians for provision of communal latrines at public places in their areas of jurisdiction, under Section 83 of the Local Government Act. This act safeguards the civic rights of females, elderly, and disabled people, by expounding that there shall be separate public toilets provision for male, female and disabled people. The act states that local agencies have the

responsibility of cleanliness and management of public toilets. Local government bodies are empowered to ensure public toilet provision in public buildings, during building plan approval process.

Punjab Land Use (Classification, Reclassification and Redevelopment) Rules, 2009

The Rule 51 of the land use rules entitled as 'Preparation of Redevelopment Plan' for a project area, which is reclassified from residential to commercial land use, necessitate development agencies to provide public toilets along with other utility services. These rules simply highlight the provision of public toilets, but do not detail out the distribution, location and management of public toilets.

Thus, it can be concluded that the policies and rules related to provision of public toilets in urban areas are inadequately detailed out and non-comprehensive.

STUDY AREA

The urban site designated for this study is Lahore. which encompasses maintained infrastructure, well established pedestrian circulation patterns, access to public transportation, strong built heritage, gardens, and many other inner-city facilities. The city is a fusion of individuals with diverse skills, ages, educational backgrounds, which makes it a crowded city. It has been observed that Lahore faces problems with regards to access to public toilets. Inadequate provision of readily accessible and responsive public toilets in the city is not only affecting the quality of city centers, public transport terminals, public parks, bazars, public square and religious buildings, but it also muddling the dignity and comfort of the public.

DATA COLLECTION

Questions were grouped around comfort, uniqueness, clarity, accessibility and security related to public toilets (Burton, and Mitchell, 2006). The concept being explored was to design inclusive neighborhoods which should be accessible and friendly. Questions related to management of public toilets, adequate cleaning regimes, information for uses, proper maintenance and accessibility of toilets were also asked. The premise was that public toilets are a type of place which need to be utilized for fulfilling private need of citizens. They are considered an essential part of civic life in urban areas and they need to be treated according to their specific requirements.

Targeted Respondents and Sampling Technique

Calculated sample size is described below

Population of Lahore District = 11,126,285 people
Population of Metropolitan Corporation Lahore = 3,655,774 people

By applying Slovin's Equation

$$n = N / (1 + Ne^2)$$

Here, "n" represents number of respondents 'N' denotes "total population" of an area, that is in this case "Lahore region", and "e" is the . For better accuracy confidence interval of 95% was used.

Computation for the Confidence Level

$$\begin{aligned} e &= 100 \% - 95 \% = 5 \% = 0.05 \\ n &= 3655774 / 1 + 3655774 (0.05)^2 \\ &= 3655774 / 9140.435 \\ &= 399.95400 \end{aligned}$$

A calculated sample size of four hundred respondents was used, in which people were questioned regarding their demands, requirements and expectations about inclusiveness and better communal lavatories. Likert scale of 5 attributes was designed, which ranged from "1" Strongly Agree to "5" Strongly Disagree respectively. Throughout the survey, participants were requested to rate the significance level of entries listed under each parameter on a provided Likert scale of range (1 to 5), to recognize the status of each individual parameter in understanding the consumption and usage of a lavatory and its environment.

In Figure 1, public toilets which were researched for this survey are marked. These toilets were observed, photographed and examined by the researchers to gather primary data (Figure 1).

ANALYSIS

Before starting the analysis of the data, the researchers examined the data thoroughly to settle that which objects at the radical ends of the scale ought to be eradicated by compressing and classifying the collected data. Principal Component Analysis (PCA) technique helped in this regard, as it condensed the dimensions of the data set (collected samples) by establishing new variables, which reduced the original variable's set. Five foremost independent variables

were availability, accessibility, cleanliness, maintenance and safety. To find the vital variables and to transmute them into substantial components, PCA was applied on these variables (Table 2).

Pearson correlations method was applied on the response scores to create a correlation matrix. All the responses were demonstrated in the form of rows and columns to show statistical relationship with the correlation scores. Those items which had a correlation score of less than 0.30 were neglected, because 1.00 score specifies that variables have perfect association conferring to each other.

Table 3 shows that the value of Kaiser-Meyer-Olkin of Sampling Adequacy is more than 0.5 with .00 significance, that specifies that PCA is applicable and appropriate to use.

According to Greed, 2006, accessibility to toilets, availability of toilets, quality of staff are the major components that should be used for analysis. Furthermore, attendants must be competent and rewarded fairly. Cleaning supervisors should be the front-line troops in control of diseases and dirt that usually attract hovers, lice, mice, fleas and ticks, which are major cause of dispersing ailment (Hawker et al, 2004). Having public lavatories that are hygienic also supports its appropriate operation and preservation, and the interactive variation of its users. Not ensuring better cleaning of public lavatories results in illness (Greed, 2006). Gender also plays an important part in sanitation facilities, which needs to be considered because of physical variances and privacy issues.

Before determining the rotation of variables, the correlation among the regression factor score 1 and 2 needed to be calculated. The variables were mainly divided into two parts which depended on loading. Table 5b indicates that there was no correlation between regression factor score 1 and 2, which clearly suggests to use varimax rotation to determine the variable's loading.

The loading of variables in different components can be seen in (Figure 3).

Figure 3 displays the loading of variables when Varimax rotation was applied and this stage continued until the researchers got the noteworthy loading of the variables. After some rotations, decisive stage was obtained (Table 6). The aim of providing public toilets is to offer an operative and sustainable facility that may respond to users' desires at a reasonable price, and which may also help to improve environmental settings and sanitary conditions within an area. Table 6 undoubtedly indicates the two components

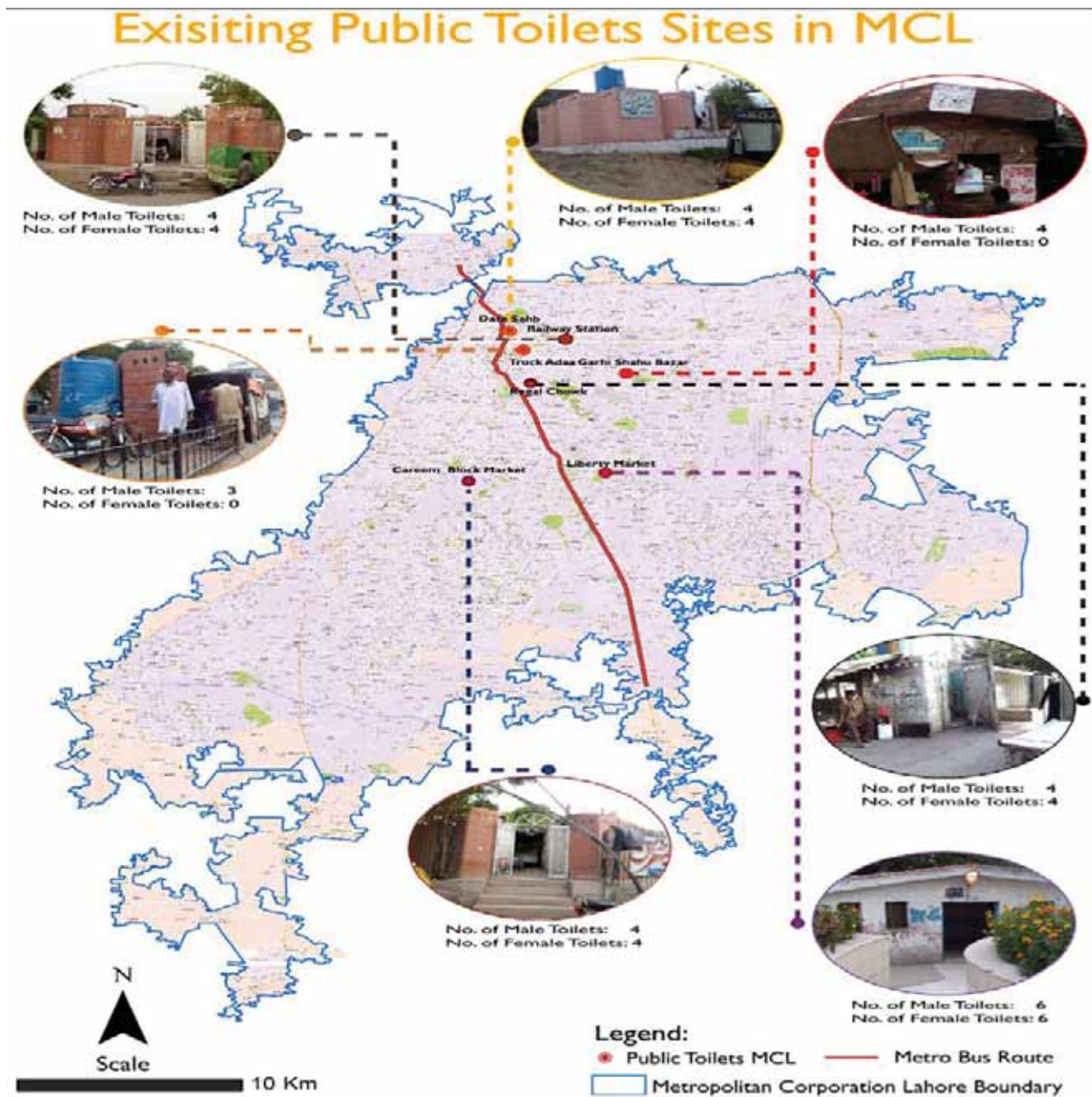


Figure 1: Location of Case Studies of Public Toilets, Lahore.

with set of variables, in which component 1 comprises of 3 variables, which are availability, accessibility and safety for women in public toilets. Similarly, it has been distinguished that social aspects like instructions for users, training of chars, cleaners and assistants and ethnic variation in social attitude to the toilets are considered central pillars in operation and maintenance of public toilets. Component 2 in Table 6 encompasses two variables,

explicitly, cleanliness and maintenance of public toilets, though it has also been proven that cleanliness and maintenance play a vital role in usage of toilets.

Regression Analysis

By conducting PCA on the variables, it was found that out of five variables, two were significant features.

Table 2: PCA Without Rotation and Correlation Between Selected Variables.

		Availability of Toilets	Accessibility to Toilets	Cleanliness of Toilets	Maintenance of Toilets	Safety for Woman at Toilets
Correlation	Availability of Public Toilets	1.000	.494	.168	.317	.504
	Accessibility to Public Toilets	.494	1.000	.231	.353	.594
	Cleanliness of Public Toilets	.168	.231	1.000	.553	.140
	Maintenance of Toilets	.317	.353	.553	1.000	.424
	Safety for Woman at Toilets	.504	.594	.140	.424	1.000

Source: Developed by Researchers

Table 3: PCA Significance of PCA and Communalities Extraction Matrix

(a) KMO and Bartlett's		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.688
Bartlett's Test of Sphericity	Approx. Chi-Square	569.507
	df	10
	Sig.	.0
(b) Communalities Extraaction Matrix		
	Initial	Extraction
Availability of Public Toiles	1	0.63
Accessibility to Public Toiles	1	0.69
Cleanliness of Toiles	1	0.846
Maintenance of Toiles	1	0.761
Safety for woman at Public Toiles	1	0.732

Table 4: Eigenvalues and Variance of the Componets

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Varisnce	Cumulative %	Total	% of Varisnce	Cumulative %
1	2.540	50.793	50.793	2.540	50.793	50.793
2	1.119	22.376	73.169	1.119	22.376	73.169
3	.537	10.745	83.914			
4	.479	9.585	93.499			
5	.325	6.501	100.000			

Table 4 specifies that only 2 components have eigenvalue more than 1 which embodies 73 % of the total variance whereas, component 1 has 50.7 % and component 2 has 22.3%. (Figure 2).

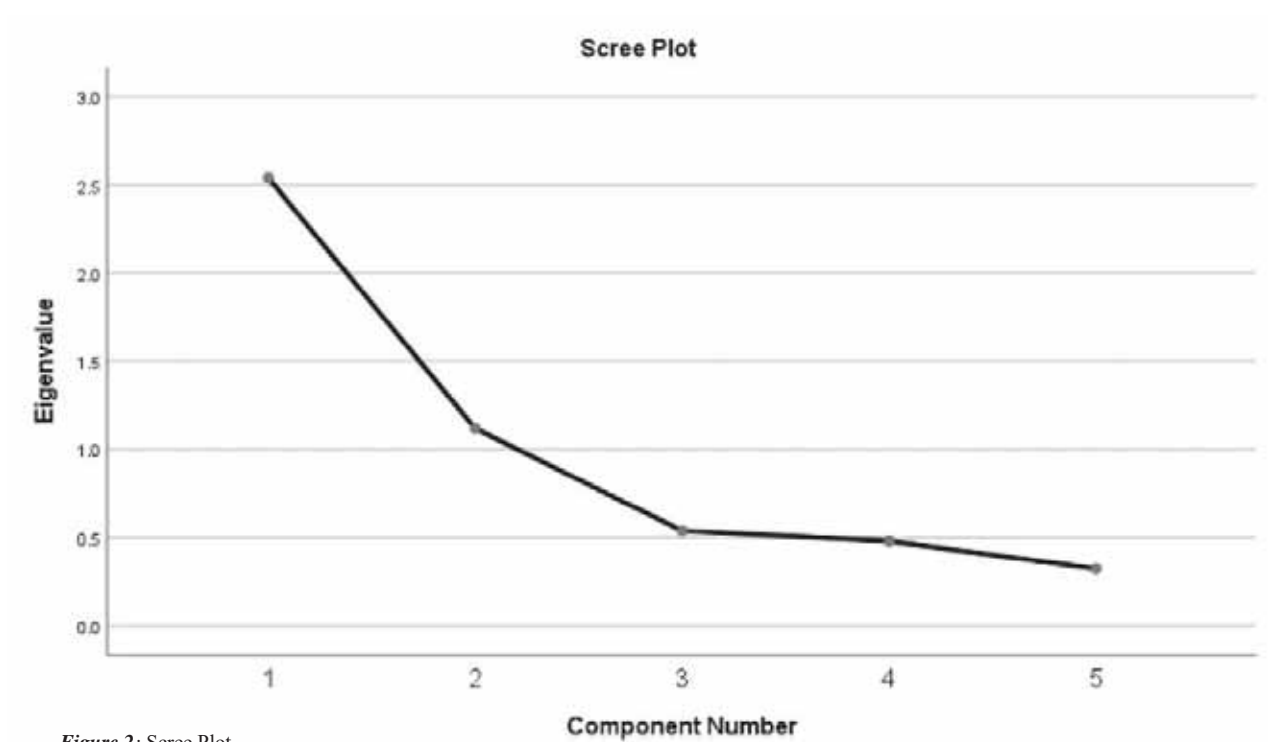


Figure 2: Scree Plot

The scree plot endorses that the stroke is steeper among components 1 and 2 (Figure 2).

Table 5: Loading of Variables and Correlations Between Regression Factors

(a) Component Matrix			
		Component	
		1	2
Safety for woman at Public Toiles		0.783	-0.346
Accessibility to Public Toiles		0.778	-0.292
Maintenance of PublicToiles		0.731	0.476
Availability of Public Toiles		0.714	-0.374
Cleanliness of Public Toiles		0.528	0.753
(b) Correlations Between the Regression Factors			
		REGR Factor Score 1 for Analysis 1	REGR Factor Score 2 for Analysis 1
REGR Factor Score 1 for Analysis 1	Pearson Correlation	1	0
	Sig. (2-tailed)		1
	N	400	400
REGR Factor Score 2 for Analysis 1	Pearson Correlation	0	1
	Sig. (2-tailed)	1	
	N	400	400

Furthermore, before commencing towards regression, it was essential to check either the variables were collinear or not. Regression analysis attempted to summarize the regression coefficients from the model established by the authors. It also helped to determine the relation between the usage of public toilets and other independent variables (Table 7).

Table 8a shows that R2 value was significant. The established model defined that the accuracy was of 94% among variables. Table 8b displays that the interrelationship between variables was significant. Table 8c specifies that the availability of public toilets has more significant relationship with usage of public toilets than cleanliness of public toilets.

The regression equation can be illustrated as:

$$Y = 27.295 + 291.790 (X1) + 77.87 (X2)$$

Where

Y= Usage of public toilets;
X1 = Availability of public toilets; and
X2 = Cleanliness of public toilets.

This model expresses that the usage of public toilets depends on both the availability of public toilets and their cleanliness.

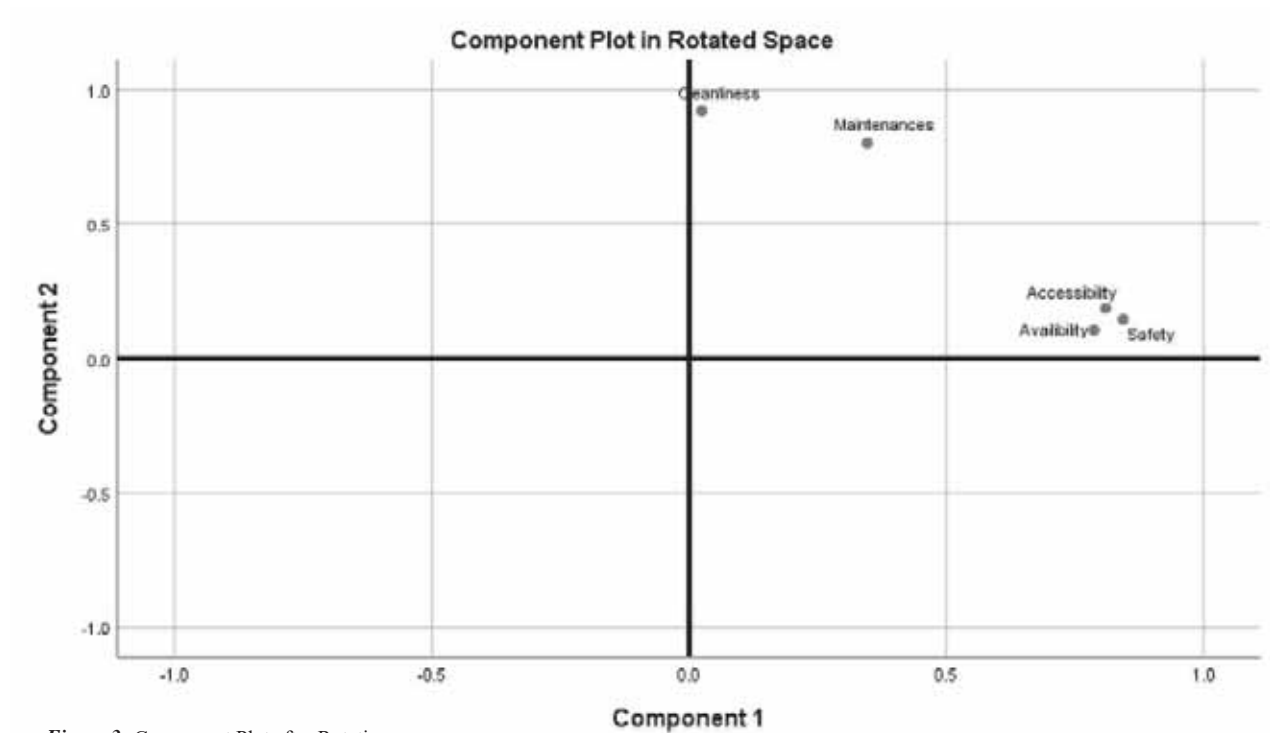


Figure 3: Component Plot after Rotation

Table 6: Significant Variable and Component Transformation Matrix

(a) Rotated Component Matrix		
	Component	
	1	2
Safety for woman at Public Toiles	0.843	0.144
Accessibility to Public Toiles	0.809	0.186
Maintenance of PublicToiles	0.787	0.105
Availability of Public Toiles	0.024	0.919
Safety for woman at Public Toiles	0.346	0.801
(b) Component Transformation Matrix		
Component	1	2
1	0.833	0.553
2	-0.553	0.833

Source: Developed by Researchers

The equation can be divided into two representative models to assess influences of the variables separately:

$$Y = 27.295 + 291.790(X_1) \quad \text{Eq (1)}$$

$$Y = 27.295 + 77.87(X_2) \quad \text{Eq (2)}$$

DISCUSSION AND ANALYSIS

Adequate public toilets complement functionality, livability, inclusivity, and personalization of the city, where public has confidence on civic facilities when they visit public places. Public toilets facility has significant impact on several domains of life and promotes public ability at shopping areas, at work places, at public parks and entertainment areas.

Furthermore, the inadequate provision of civic facilities like public toilets has devastating impact on people's health. The analysis of this study reveals that most respondents had information regarding sanitation services and disadvantages of defecating in open spaces. But at the same time many of the respondents (male) admitted that they used open places for urinating, because of non-availability of sufficient public toilets. This act has harmful effects on both the environment as well as health of citizens. Inadequate maintenance, and lack of proper cleaning of toilets also causes illness. Consequently, there is a desperate necessity for more public lavatories in crowded cities like Lahore. The research also found that two major factors, namely cleanliness and availability of the public toilets, were the two most significant factors related to usage of public toilets.

Table 7: Five Significant Variables that were Obtained in Two Components Formation

		Availability of Public Toilets	Accessibility to Toilets	Cleanliness of Toilets	Maintenance of Toilets	Safety for Woman at Toilets	Usage of Public Toilets
Availability of Public Toilets	Pearson Correlation	1	.494**	.168**	.317**	.504**	-.519**
	Sig. (2-tailed)		.000	.001	.000	.000	.000
	N	400	400	400	400	400	400
Accessibility to Toilets	Pearson Correlation	.494**	1	.231**	.353**	.594**	-.476**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	400	400	400	400	400	400
Cleanliness of Toilets	Pearson Correlation	.168**	.231**	1	.553**	.140**	-.131**
	Sig. (2-tailed)	.001	.000		.000	.000	.000
	N	400	400	400	400	400	400
Maintenance of Toilets	Pearson Correlation	.317**	.353**	.553**	1	.424**	-.353**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	400	400	400	400	400	400
Safety for Woman at Toilets	Pearson Correlation	.504**	.594**	.140**	.424**	1	-.551**
	Sig. (2-tailed)	.000	.000	.005	.000		.000
	N	400	400	400	400	400	400
Usage of Public Toilets	Pearson Correlation	-.519**	-.476**	-.131**	-.353**	-.551**	1
	Sig. (2-tailed)	.000	.000	.009	.000	.000	
	N	400	400	400	400	400	400

Table 8a-8c: Inter Relationship Between Variables

(a) Model Summary						
Model	R	R ²	Adjusted R ²	Std. Error of the Estimate		
1	.937 ^a	0.877	0.816	86.72549		
a. Predictors: (Constant), Cleanliness of Public Toilets, Availability of Public Toilets						
(b) ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33.716	2	16.858	73.738	.000 ^b
	Residual	90.762	397	0.229		
	Total	124.477	399			
a. Dependent Variable: Usage of Public Toilets						
b. Predictors: (Constant), Cleanliness of Public Toilets, Availability of Public Toilets						
(c) Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	27.295	188.868		0.147	0
	Availability of Public Toilets	291.79	60.067	0.887	4.864	0
	Cleanliness of Public Toilets	77.87	106.07	0.136	0.742	0.476
a. Dependent Variable: Usage of Public Toilets						

The societal and physical roles of public lavatories in cities are indisputable as they are considered as the image of our ethos (Anthony and Dufresne, 2007). The provision of communal toilets is a perilous component of the built-up environment.

In the primary research, the presence of five comprehensive public lavatory features, in a set of correlations, helped achieve an effective solution to provision of public toilet. Each factor was considered individually as well as with its variables concurrently. The model established that the usage of public toilets depends on their availability. Greed (2003) claims, that public toilets are former priority for urban places, which also applies in the city of Lahore. Thus, it is essential

to develop city wide strategic policies to resolve complications in public lavatory provision and supervision.

Well organized local administrations must pursue and apply inputs provided by users and hire specialists who are aware of the usage and practice of public toilets. The public must be guaranteed a safer and healthy environment for usage of public toilets. Promoting a philosophy of cleanliness would result in better provision of toilets for everyone (Greed, 2008). In this regard, an inclusive communal toilet provision can improve city life, as it is essential for resilient urban planning, social participation and elimination of pollution and diseases and in achieving sustainable development.

RECOMMENDATIONS AND WAY FORWARD

Based on the analysis of the primary data and observation of public toilets that the following interventions are suggested that can bring fruitful results with respect to provision of public toilets.

1. Development authorities should develop public toilet strategy as supplementary document of integrated master plan of Lahore City, which embodies spatial distribution and hierarchy of public toilets, which are compatible with various land uses (commercial, residential, open spaces) as essential component of development.
2. The government should work in corporation with the private sector, societies and social organizations and should provide policies for improvement in sanitation system, in terms of operational and management arrangements and by means of calculating costs and revenues. The government should also provide incentives to the public groups and stakeholders to participate in this activity. Moreover, to meet costs, a small charge for the public toilets can be considered per user.
3. Development authorities should categorize 'toilet hotspots' in public spaces of Lahore, to construct new public toilets and make action plans for the upgradation and renewal of existing public toilets, in collaboration with Metropolitan Corporation of Lahore.
4. Development authorities, in collaboration with concerned departments, should make citywide documentation of public toilets, using satellite maps and ensuring adequate advertisement of these maps on public places to facilitate visitors. Likewise, it should be ensured that special provisions in design of public toilets are made for the disabled and visually impaired persons, to endorse the agenda of inclusive and sustainable cities.
5. Adequate provision of separate female public toilets, at public places, should be made to endorse the perspective of gendered oriented cities. This can be a major contributory factor in women empowerment and can improve women participation in urban economics.
6. The local authorities should also develop hierarchies of 'toilet magnets', for instance public toilets should be placed at public transport terminals, commercial hubs of the city, public squares, public bazars, near religious buildings, parks and playgrounds.

7. The development authorities should develop and formulate standards for public toilet provision, like British Standard for Public Toilets (BS 6465), which necessitate developers of retail markets and shopping malls to provide one toilet and urinal for male, two women only toilets, and one unisex toilets for special persons for every retail floor area of every one thousand to two thousand square meters.

8. Spatial distribution of public toilets should ensure smooth access to public toilets.

9. A monitoring and evaluation system for adequate provision of public toilet facilities should be developed, including cleanliness, maintenance and compliance with rules and regulations and defined terms and conditions.

10. It should be ensured that all toilet facilities, like sufficient litter baskets, sufficient supply of urinal paper, sanitary discarding baskets in every female lavatory cubicle, adequate supply of liquid soap, paper towels, are in decent working order.

11. Finally, in a society where many people have no idea how to use such a facility, some guidance through appropriate media can be planned and provided.

LIMITATIONS

This study also has some limitations, such as the samples collected were only from Lahore. Future studies should include samples from different cities of Pakistan, focusing on administrative policies, codes and standards for public toilets and engagement of policy makers in providing public toilets.

DEDICATION

This research paper is dedicated to our beloved teacher Dr. Prof Gulam Abbas Anjum. We are thankful to him because his efforts made us capable of doing research on such a wide topic. Although he is no longer with us but his efforts throughout his course cannot be emphasized enough.

REFERENCES

- Antoniou, G. et. al., 2016, "Evolution of Toilet World Wide Through the Millennia", *Sustainability*, 8(8): 779.
- Arbogast, L.W., Brinson, R.G. and Marino, J.P., 2015, "Mapping Monoclonal Antibody Structure by 2D ¹³C NMR at Natural Abundance", *Analytical Chemistry*, 87(7): 3556-3561.
- Anthony, K.H., Dufresne, M., 2007, "Potty Parity in Perspective: Gender and Family Issues in Planning and Designing Public Restrooms", *Journal of Planning Literature* 21: 267–294.
- Richard, J.-A., Knight, G., 2012, "Improving Public Services Through Open Data: Public Toilets", *Proceedings of the Institution of Civil Engineers - Municipal Engineer*, 165: 157–165.
- Burton, E. and Mitchell, L., 2006, "Neighbourhoods for Life: Designing Dementia - Friendly Outdoor Environments", *Quality in Ageing and Older Adults*, 7(1): 26-33.
- Evans, G.W., Wells, N.M. and Moch, A., 2003, "Housing and Mental Health: A Review of the Evidence and a Methodological and Conceptual Critique", *Journal of Social Issues*, 59(3): 475-500.
- Greed, C., 2008, "Improving Public Access to Better Quality Toilets: A Strategic Guide," *Gendered Mobilities*, 243-256.
- Greed, C., 2006, "The Role of the Public Toilet: Pathogen Transmitter or Health Sacilitator?", *Building Services Engineering Research and Technology*, 27: 127–139.
- Greed, C., 2004, "A Code of Practice for Public Toilets in Britain", *World Toilet Summit of The World Toilet Organization, Beijing*.
- Hawker, J. and Ali, S., 2004, "Ethnic Inqeualities in Campylobacter Infection in Birmingham, UK: Decriptive study of Notified Cases", *Journal of Epidemiology and Community*, 58(4): 278-279.
- Khan, G. F., 2017, "Social Media for Government: A Practial Guide to Understandin", *Implementing , and Managing Soical Media Tools in the Public Sphere*, London, Springer.
- Mara, D., Lane, J., Scott, B. and Trouba, D., 2010, "Sanitation and Health", *PLoS Medicine*, 7(11): 113-119.
- Pruss - Ustun, A., 2008a, "Safer Water, Better Health: Costs, Benefits and Sustainability of Intervention to Protect and Promote Health", World Health Organization.
- Surya, A.V., Vyas, A., Krishna, M. and Abidi, N., 2017, "Identifying Determinants of Toilet Usage by Poor in Urban India", *Procedia Computer Science*, 122: 634-641.
- Unicef, 2015, "Joint Water Supply and Sanitation Programme", World Health Organisation.
- Unicef and WHO, 2017, "Joint water Supply, Sanitation Monitoring Programme", World Health Organisation.

THE INFORMAL SETTLEMENTS OF LAHORE: UNDERSTANDING THE ROLE OF INFORMAL *KATCHI ABADI* IN THE CONTEXT OF AFFORDABLE HOUSING

*Mehreen Mustafa**

ABSTRACT

The city of Lahore is expanding at great pace in terms of its urban sprawl and demographics. The consequence of rural to urban migrations, as of arbitrary physical and social development in the city has triggered the process of urbanization at a rate which was never recorded before. Urban housing in this context is the most complex, in demand and unattended phenomena. The lack of efforts in bridging the gap between the demand and supply chain of urban housing in Lahore is promoting a culture of social and spatial inequity, and has produced a form of urban housing for the economically marginalized communities i.e. the *Katchi Abadis*.

In order to explore the above mentioned issues, a research project was initiated with the aim to understand the complexities of *Katchi Abadis* in Lahore, through the study of their existing realities, by employing tools of community based participatory methodology.

Based on the project conducted, the objective of the research paper was to explore *Katchi Abadis* as a form of affordable urban housing developed by the marginalized communities with limited resources and without financial or legal assistant of concerned authorities. The paper analysis the internal social and spatial politics of *Katchi Abadis* and their impact on the context and vice versa. The paper is aimed at highlighting the phenomenon of *Katchi Abadis* as an existing urban phenomena (neglected and segregated) which should be understood, in order to effectively cater to the growing housing demand in the city of Lahore.

Keywords: *Katchi Abadi*, informal settlement, urban housing, marginalized community, urbanization, affordable housing, community based participatory approach, Lahore.

INTRODUCTION

1.1 Contextual Background

Pakistan is one of the most urbanized countries in South Asia while its metropolitan city Lahore is the second highest as compared to other cities (Khaliq-Uz-Zaman, 2012). Studies have shown that despite physical congestion, lack of services and profound decrease in economic opportunities, the urban population in Pakistan, which constitute about thirty six percent of the total population, is expected to grow fifty percent of the total by 2030 (Nizami, 2010). Being a metropolitan city, Lahore is conceived as a city of economic and social opportunities thereby attracting huge influx of migrants from distant and nearby areas. This population shift, in terms of migration, has been translated into an increase in the urban population growth of Lahore and other major cities of Pakistan (Figure 1). Supporting the fact is a study which demonstrates that population growth in the city of Lahore alone has increased six times since 1951 (Pakistan Census report, 2002).

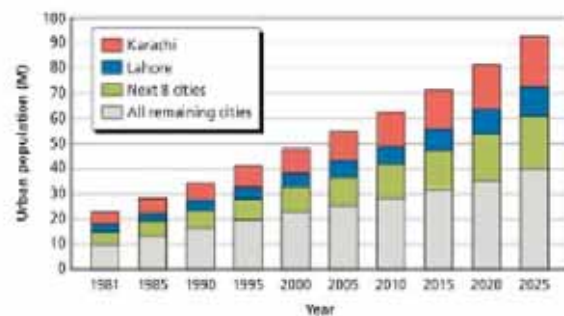


Figure 1: Population growth in Pakistan's Major cities (1981-2025)
Source: Blank, et. al.,

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Like all the developing countries, the unprecedented urban growth in Lahore is caused by proliferating influx of migrants and has been associated with “pathological” growth of urban *Katchi Abadis* (Siddiqui, 1987). The demographic background of the migrants coming to the city of Lahore is very interesting, since the city not only attracts people from rural areas but also attracts large number of people from other relatively smaller cities. This specific type of migration is known as urbanization. Urbanization refers to the population shift from rural to urban residency, the gradual increase in the proportion of people living in urban areas, and the ways in which each society adapts to this change. The process of urbanization at one end has contributed in the city’s economic growth by providing the required human resource. However, at the other end the process has also exerted great pressure on the city’s limited and insufficient resources for its residents, especially in terms of housing. The housing crisis is not limited to the city of Lahore, but is a national issue as explained here:

“The seriousness of the housing issue in Pakistan can be judged from the fact that conservative estimates put the housing backlog at 9 million units which is increasing at 300,000 units annually because of unmet demand. 62 percent of this demand is for lower income groups” (Hassan, 2018: 32)

In Lahore specifically this housing crisis is cashed as an opportunity by real estate developers. The real estate developer sector of Lahore caters for the economically privileged residents/migrants announcing and developing attractive housing schemes, promising high quality of living and security. Agrarian land present around the periphery of Lahore (especially in the south) is being acquired at very nominal price and is sold to the privileged class at high price, by inculcating basic infrastructural facilities.

Nevertheless, the real estate sector is able to serve and make profit from relatively smaller section of the housing demand, catering only to the economically privileged class. More than seventy percent of the demand in terms of urban housing belonging to low or lower middle class remains unattended (Hassan, 1996). Due to the lack of affordable housing facilities, the marginalized section of Lahore has facilitated themselves in looking for options such as *Katchi Abadis*. The Punjab *Katchi Abadis* Act passed in 1992 defines the *Katchi Abadis* as “any area or part thereof which was occupied unauthorisedly before 31st December 2011 and continues to be so occupied and has at least fort dwelling units on it to be a *Katchi Abadi*”. The definition of *Katchi Abadis* approved by the state, i.e. settlements on the land not owned

by its occupants, segregates the residents, and the reason as to why these settlements began in the first place is not known (Mustafa and Mahmood, 2017).

The definition provided by the state also takes only “formal *Katchi Abadis*” in account, excluding the “informal *Katchi Abadis*” from the discussion and consideration.

Taking specifically the city of Lahore in account, two distinct forms of *Katchi Abadis* significant in their settlement pattern, physical morphology and social structure appear on the urban and social fabric. This paper refers to and defines these two distinct forms of *Katchi Abadis* as follows: Formal *Katchi Abadis* are not limited to but have the following characteristics:

1.2 Formal *Katchi Abadis*

- Recognized by the state.
- Permanent in its habitation and existence on specific piece of land.
- High land use density.
- Infrastructural facilities are in better shape than the other form of *Katchi Abadis*.
- Usually occupied by refugees during or after 1947 partition.
- Examples Hindu Camp, DAV Hostels: DAV hostels were first used as refugee camps during partition and now comprise of the third generation of refugees residing in extremely poor conditions (Mustafa et.al., 2016).

Table 1 and Figures 2 and 3 demonstrate the land use of the formal *Katchi Abadi* of DAV Hostels.

Table 1: Details of D.A.V Hostels. Hindu Camp – Lahore				
S.NO	Name of Hostel	Property of Area	Area	Unit
01	D.A.V Hostel number 1 Court Street	SW-96-R-6	23 Kanal, 15 Marla	206
02	D.A.V Hostel number 2 Court Street	SW-96-R-6	34 Kanal, 5 Marla	292
Source: Islam, Mustafa and Kabir, 2016				



Figure 2: Front Façade of DAV Hostels
Source: Islam, Mustafa and Kabir, 2016



Figure 3: Expansion of DAV Hostels
Source: Islam, Mustafa and Kabir, 2016



Figure 4: A view of the informal *Katchi Abadi* near Main Plaza Johar Town, Lahore
Source: Building Together, 2016



Figure 5: A view of the informal *Ktachi Abadi* near Main Plaza Johar Town, Lahore
Source: Building Together, 2016

1.3 Informal *Katchi Abadis*

Informal *Katchi Abadis* also known as “*Jhugiyen*” are not limited to but have the following characteristics:

- Unrecognized by the state.
- Temporary in its habitation and existence on specific piece of land.
- Low land use density.
- Minimal or no infrastructural facilities available.
- Occupied by nomads, gypsies, lower income section from rural areas and recently by Afghan refugees.
- Example: Case study in consideration: Informal *Katchi Abadis* settlement near Mian Plaza in Johar Town, Lahore (Figures 4 and 5).

Although the two types of *Katchi Abadis* are distinct in physical and social form, yet they share the common issue of land ownership rights. Both types of *Katchi Abadis* are products of rapid urbanization and lack of affordable housing solutions through formal sector. This research revolves

around the most marginalized forms of *Katchi Abadis* i.e. informal *Katchi Abadis* or *Jhugiyen*.

1.4 Problem Statement

According to a report published by the World Bank, Pakistan is facing housing backlog of around nine million units and the number is increasing by 270,000 units every year (World Bank, 2016). Thus, fifty eight percent of the urban population of Pakistan lives in formal and informal *Katchi Abadis* and the percentage is increasing each year. Hassan, 1996 and Siddiqui, 1987 admit that in such a challenging urban context the informal *Katchi Abadi* settlements appear to be the only possible affordable housing opportunity for the low income groups, who migrate towards cities for better economic opportunities. Therefore, the informal settlements are indeed, despite of limited and poor resources, bridging the urban housing demand and supply gap.

There is no precise or widely accepted definition available which explains what exactly affordable housing is (Lin, 2011).

However, a persistent and constant feature of low income community, as target groups of affordable housing, is present in all the definitions available.

Likewise a little has been studied and written regarding the characteristic and standards which define an affordable housing facility. Most studies in the field of affordable housing have been carried out to aid the state institutions, real state agencies or non-government organizations. What is missing in all such studies and work is the representation of the communities living in such settlements. Little or no work has been carried out exploring the concept of affordable housing with respect to the perspective and narrative of people of living in low income settlements. Fichter and Turner (1972) have highlighted the dilemma of state of Non Governmental Organisation(NGO) funded affordable housing concepts, which lack representation and participation of low income communities.

Fichter and Turner's (1972) central thesis is that housing is best provided and managed by those who dwell in it. Keeping the autonomy and creativity of low income communities in mind, this paper, with the help of information collected through the study of concerned informal *Katchi Abadis*, establishes how the settlement in question can be explored as a form of affordable housing designed by low income communities, so that the quality of construction improves and thus the livelihoods are impacted positively. Although the informal *Katchi Abadis* of Lahore house the most marginalized community of the society, yet these settlements are part of a very complex socio-cultural system that cannot be worked from a distance (Mustafa and Mahmood, 2017). Contrary to common conception, where these settlements are avoided and hid as being the ugly face of the city, these informal *Katchi Abadis* can be seen as creative solutions devised by the so called "uncreative" and "uneducated" section of the society, as adaptations of their version of metropolitan life. These settlements can be seen as the only workable dwelling for low-income groups, when there are no legitimate models of affordable housing available for them (Eezdi, 2016).

1.4 Aims and Objectives

Thus the objective of this study is as follows:

- To understand the complex phenomena of informal *Katchi Abadis*
- To explore the informal *Katchi Abadis* of Lahore as a form of affordable housing solutions designed by the concerned marginalized communities.

- To explore the informal *Katchi Abadis* as a workable solutions in the field of urban housing, rather than an urban eye sore.
- To study and document the built and social environment of an informal *Katchi Abadi* in order to understand the internal dynamics and achieve an in-depth insight of communities life.
- To study and document the impact of the informal settlement on its immediate context and vice versa.

1.5 Research Questions

The paper revolves around the following main research questions:

- Can the informal *Katchi Abadi* be explored as form of affordable urban housing developed by the marginalized community with limited resources without financial or legal assistance of concerned authorities?
- Are informal *Katchi Abadis* bridging the demand and supply gap of housing?
- Can the above mentioned questions be explored by analyzing the internal social and spatial politics of *Katchi Abadis* and their impact on the context and vice versa?

2 SOURCES AND METHODS

The basic information and data required for the research issue was generated with the help of following two sources:

- Literature review of publications and other relevant material available on the subject.
- Maps, demographics, photographs and interview data generated from three day workshop titled "Building Together: Learning and designing with the *Katchi Abadis* of Lahore" (details below).

Building Together: Learning and building with *Katchi Abadi* was a three day workshop initiated by the Community based Participatory Learning and Design Center, in Lahore with the intention to build valuable links with the *Katchi Abadi* Community. The project was conducted in the form of a workshop, and focused on exploring and understanding the notion of community based participatory learning and design, by taking an informal *Katchi Abadi* site located near Allah Hu Chowk, Johar Town, Lahore (Figures 6 and 7).

The idea of community based participatory approach was an integral part in the conception, development and conduction process of the workshop. Community based

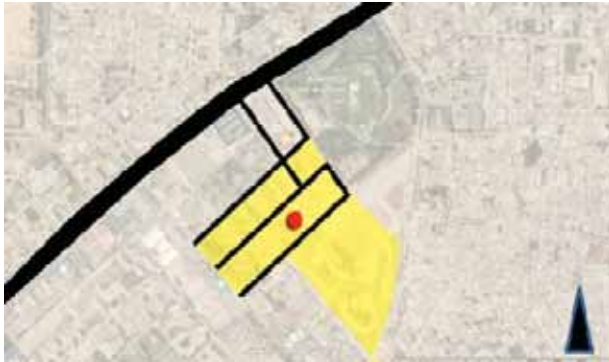


Figure 6: Site Map of the Informal *Katchi Abadi* near Mian Mir Plaza, Lahore.

participatory learning, research and design is a collaborative and multi-disciplinary field, which places the community at the center of the design process to yield creative and sustainable design solutions. The political dimension of user empowerment and democratization is essential to participatory approach, where the community is viewed and engaged as an active participant in the process of development. Therefore, following the guidelines, the key participants of the workshop i.e. the community and the students were placed at the center of the research and were actively involved in the decision and development of the workshop through meetings and discussion sessions.

The participants were first introduced to the idea of community based participatory learning, research and design. Various concepts, approaches and methodologies being designed and practiced all over the world were also discussed. Debates such as politics of informal settlements, ethics, tools and methods of field research, site dynamics and workshop briefing was inculcated in the workshop, with the help of presentations, interactive dialogue sessions and Ted Talk screenings.

With the basic understanding of the ethics, tools and methods of participatory research and mapping, the participants were introduced to the approved site i.e. the informal settlement near Allah Hu Chowk in Lahore. The participants (students and community) mapped and documented the location, number, land use, typology and characteristic (in terms of materials, interiors, shapes and layout) of various community structures with the help of questionnaires and forms. The context, facilities, natural elements and basic information regarding the economic and social backgrounds of the community members were also mapped, in order to understand the impact and relation of social and built environment on each other. At the end of the second day of the workshop, a community meeting was arranged, where



Figure 7: The area within the informal *Katchi Abadi* which was mapped during the workshop

the students and the community members discussed and analyzed the research conducted.

3 ANALYSIS AND DISCUSSION

The *Katchi Abadi*'s, which are present in almost all the major cities of Pakistan, are an important part of the built environment which help shape them as well, yet the users of the city never acknowledge their presence. These settlements are also neglected during the formal city planning processes. The communities generally, and the community of the concerned *Katchi Abadi* particularly, may appear as homogeneous entity bounded primarily by economic interest, whereas in reality the concerned community is not only heterogeneous but contradictory as well. The multiple identities and their overlapping often generate common identity and narrative, allowing the conflicting heterogeneity present in the community to settle and exist peacefully. The concerned community of *Katchi Abadi* likewise, is composed of different communities, of distinct caste, sect and economic backgrounds.

The site in question is situated near Allah Ho Chowk, Johar Town, is mostly surrounded by commercial, educational, health and recreational land uses (Figures 8 and 9)

Most of the informal *Katchi Abadis* in Lahore (inclusive of the concerned one) are facilitated by four major sources:

- a) The Lahore Development Authority (LDA) or other relevant concerned authorities, that house migrants on the land which is either property of the government but prone to influences of land mafia or on land with disputed ownership. This explains to great detail why informal *Katchi Abadis* are usually developed or found on a large piece of land surrounded by potent commercial context in urban center or peripheries.



Figure 8: The area within the informal *Katchi Abadi* which was mapped during the workshop



Figure 9: The area within the informal *Katchi Abadi* which was mapped during the workshop

- b) The land mafia also houses the migrants on disputed land. The migrants find a temporary shelter or space to live in, where as, the land mafia does not have to employ paid workers to guard the land they intend to grab. Eventually the residents are either evicted or re settled to another disputed land, also managed by the land mafia, once the mafia acquires the permission to develop or sell the land.
- c) A relatively small section of the residents are also facilitated by their employers who are living / working near the informal settlements, in collaboration with the main facilitator i.e. the land mafia or government authority.
- d) A number of residents are also facilitated by their relatives who are already living in the informal *Katchi Abadis* as residents. This type of facilitation usually takes place when either a family is evicted from another informal *Katchi Abadi* or has recently migrated to the city. This particular type of facilitation also indicates the presence of a complex network between various informal *Katchi Abadis* facilitated by the four major sources explained.

The physical form and social structure of the informal *Katchi Aabdis* due to their temporal and adaptable trait therefore demonstrates a non-homogeneous settlement pattern. The

settlement pattern is dictated by the demands of the facilitator and the land on which they are formed. The concerned *Katchi Abadi* at Mian Plaza has existed since 2004 (Figures 10, 11 and 12) whereas different settlers have occupied the *Abadi* and various portions have been evicted over the years. Figures 10, 11 and 12 also illustrate the impact of development projects on the urban morphology of the site in discussion and vice versa.

The process of selected eviction or re settlement pattern is guided by land potential and social structure of the informal *Katchi Abadi* community, in terms of their ethnic backgrounds, caste and religious believes. Likewise the apparently monotonous form of informal settlement in consideration has also organized itself (spatially and socially) with respect to ethnic backgrounds and caste. Therefore the spatial organization of the informal *Katchi Aabdi* in question is divided into (physically unmarked) different zones or areas belonging to a specific caste or ethnic group (Figure13).

The eviction or re settlement process of the residents from a specific portion therefore only disturbs the social and spatial autonomy of specific ethnic groups of the settlement. The facilitator in charge and the ethnic background of the residents are also directly associated with livelihoods, culture and social behavior of the residents. As can be seen in Table



Figures 10 to 12: Demonstrating the changing urban form of the informal *Katchi Abadi* near Main Plaza, Johar Town, Lahore.
Source: Google earth , 2004 , 2016 & 2018

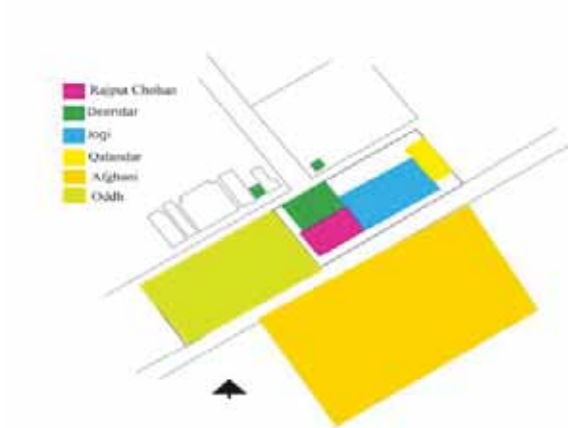


Figure 13: The spatial organization of the settlement with respect to caste and ethnic background
Source: Building Together, 2016

2, the community of the informal *Katchi Abadi* in consideration is majorly composed of *Rajput Chohan*, *Deendar*, *Qalandar*, *Jogi*, *Oddh* and Afghanis. They earn their livelihood by selling toy bangles, rings etc. to charming snakes, selling milk and working in nearby vicinity as maids and watchmen. Their belief system and means of earning livelihoods are directly reflective in their way of living. *Oddh* and *Deendar* communities are economically privileged and religious conservatives.

Special built form arrangements facilitating communal living are seen in the locality, for instance spaces are designed

Table 2: Details of D.A.V Hostels. Hindu Camp – Lahore

S. No	Ethnic Ggroup / Caste	Means of Earning Livelihood
01	Rajput Chohan	Maids & Watchman
02	Deendar	Maids , watchman & rikshaw drivers
03	Odhh	Livestock
04	Jogi	Snake charmers
05	Qalandar	Selling rings , Bangles & Toys
06	Afghani	Collecting and selling garbage

Source: Building Together, 2016

such that children can engage in religious education while women study in pardah (segregation). Therefore the homes of *Oddh* and *Deendar* communities are covered from all sides by either walls made of thatch and bamboo, or with the help of a piece of cloth. The other community members, except Afghanis, have designed their homes in a way that they can lift or drop the walls (made of pieces of cloth) of their homes depending on the weather conditions (Figure 14). Unlike *Deendar*, *Oddh*, *Rajput Chohan* and Afghanis, the *Jogi* and *Qalandar* communities celebrate their religious practices by building a small decorative platform inclusive of alum and space for diya near their homes (Figure 15).



Figure 14: The walls are covered using curtains made from piece, of cloth and are dropped or lifted as per weather conditions.
Source: Building Together, 2016



Figure 15: A small platform, clusive of alum, is made using bricks and mud, to commemorate religious beliefs.
Source: Building Together, 2016

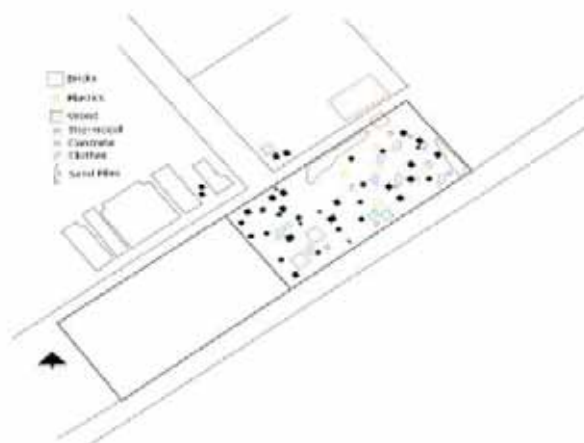


Figure 16: A number of resource materials found on the site. Most of it was used by the inhabitants to repair their dwellings and for other purposes as well.
Source: Building Together, 2016

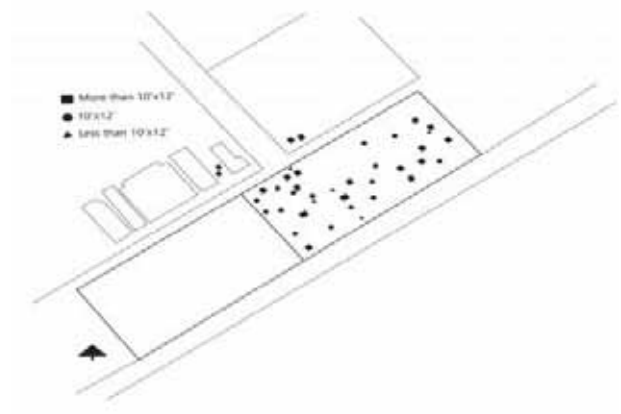


Figure 17: A number of different sizes of huts were seen on the site. The different size usually depended on the number of family members and their needs.
Source: Building Together, 2016

FINDING AND ANALYSIS

Low Cost and Sustainable Construction Techniques and Material:

Apart from bamboo and thatch roof, almost all the material used in the construction of the *Jhugis* is picked from trash and then recycled. The settlement itself is full of material used in the construction of *Jhugis* for example mud, bricks, ropes, stones, pieces of cloths and plastic (Figures 16). Reducing the cost of material to significant level is essential, irrespective of the fact that the size and design of the *Jhugis* is not uniform. *Jhugis* are built in various shapes and sizes, keeping the family size and demand of the dwellers in mind

(Figures 17). An interesting community based approach is employed for the construction of *Jhugis*, where the human resource in terms of labor is not a paid one. People or neighbors from close proximity volunteer themselves as unpaid labor for the construction process. The vernacular knowledge of building a *Jhugi* is inherited and even a twelve year old child is aware of the construction techniques. These people have the knowledge of exact number of structural supports and systems required for a specific type of *Jhugis* to withstand the natural and manmade forces (Figures 18 and 19).

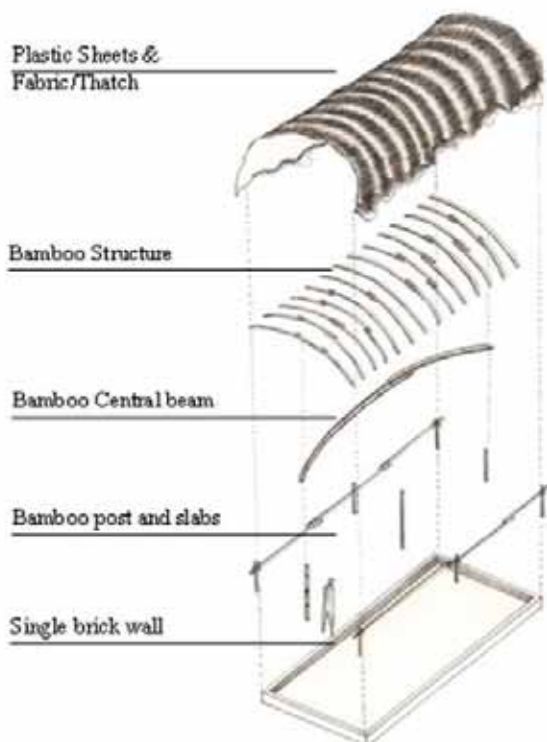


Figure 18: Axonometric view of the *Jhugi* design (Type A)
Source: Building Together, 2016

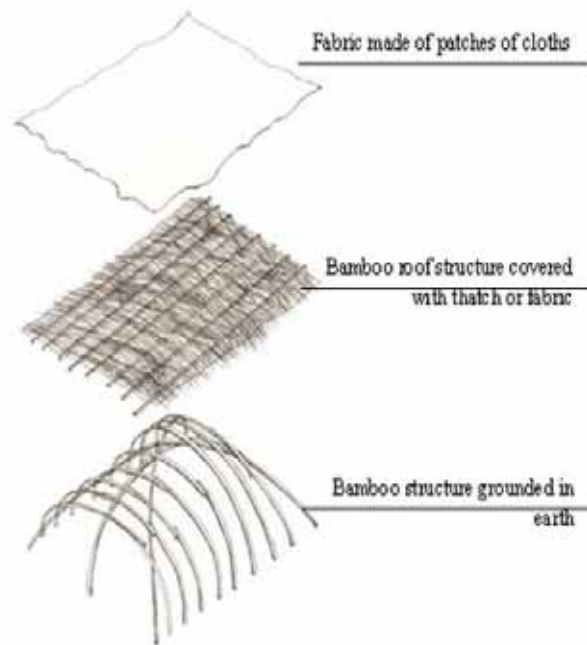


Figure 19: Axonometric view of the *Jhugi* design (Type A)
Source: Building Together, 2016

Relying on Minimum or Existing Infrastructure

The facilitator of the concerned informal settlements range from government officials to influential land grabbers. The settlers are employed by their facilitators, as a cost effective tool to maintain and hold on to a piece of land. Therefore, the provision of services like electricity, water supply and sewerage, are highly discouraged. The community, even with the help of their own resources, cannot install or use an energy source without the permission or consent of their facilitator. The facilitator, most likely always, denies any prospect which helps the community to get comfortable on the land. Getting comfortable means inviting any unpleasant resistance during eviction or resettlement.

The community concerned, however had devised creative strategies to cater and fulfill their energy and mobilization demands. A basic network of road was made available around the periphery of the site. The settlers, with the help of waste material available on site, such as sand, stones, brick , gravel and mud built pathways and unpaved roads up to three to five feet wide, to shorten their commute (Figures 20)

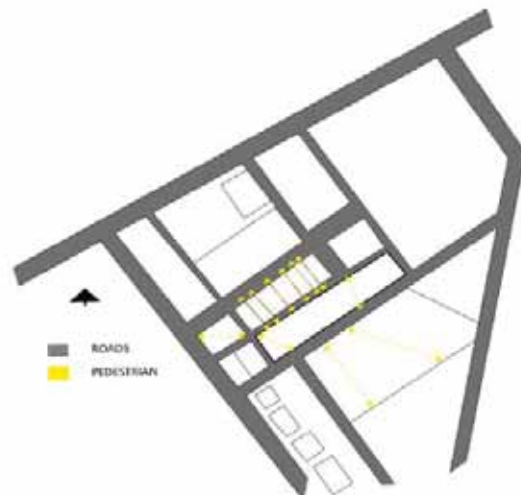


Figure 20: The road network around the site is well maintained. A few informal pedestrian pathways can be seen around the site, which were made as shortcuts, cutting thorough empty plots.
Source: Building Together, 2016



Figure 21: Even though a number of infrastructural elements were present on the site but the inhabitants were not allowed to use the facilities. For example, a number of electrical poles were present on the site but majority of the huts are without electricity.
Source: Building Together, 2016



Figure 22: A number of *Kacha* toilets were found on the site, which were being used by the inhabitants. The toilet with facilities was to be paid for and only those who could afford it, were using it.
Source: Building Together, 2016

Few *Jhugiyans* were also privileged enough to borrow electricity from existing light poles or nearby plazas. Others relied on solar panels for their energy consumption. Whereas most of the community depended on day light and oil lamps to meet their respective energy demand (Figures 21). Water was fetched in fixed hours from a source provided by the facilitator. The settlers had to pay for it some times but most of the time it was free of cost. Furthermore, interesting amalgamation of below mentioned design strategies were practiced by different groups of people living in the settlement, for solid waste management (Figure 22).

- A group of houses had rented out a toilet in nearby plaza.
- Other group of houses had installed a *kacha* toilet, comprising of walls made of fabric and bamboo, on existing manholes.
- Another group of houses had dug a pit and built *kacha* toilet around it. These pits were either cleaned or the toilet would eventually move to new location. Depending upon the need and limited resources, every household had devised creative strategies to meet their energy and other daily demands, without exerting additional pressure on the available resources.

▪ Temporal and adaptable

Embedded in the organizational structure of the concerned informal *Katchi Abadi* is the trait of being a temporal and adaptable settlement. Nothing in the informal *Katchi Abadi* is fixed, be it its demographics or physical form, everything can adapt and change according to the demand of time and land. The integral characteristic of being temporal and adaptable settlement always works in favor of the informal *Katchi Abadi* residents, the settlement itself and the city.

Since these settlements provide services, such as human resources (especially for domestic chores), dairy products (especially milk) and vendors, serving the formal as well as informal economy of the city. Temporal and adaptable is the only trait of the informal *Katchi Abadis* which also acts as a challenge while the upgradation is in consideration, since the settlement is in a state of transition.

The informal *Katchi Abadis* have addressed the demand and supply gap of urban housing crisis since many years, but are always viewed as problems rather than as an opportunity. The phenomena of the informal settlements in the southern hemisphere have proven to be inevitable.

It is high time that these settlements are explored as parallel housing phenomena's rather than eye sores. As explained by Turner (1969) there is a need to take view of these informal settlements as highly successful solutions to housing problems in urban areas of the developing countries and work towards supporting them through technical assistance, access to credit and managerial advice.

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- Society for Cultural Education and Institute for Art and Culture.
- Center for community Based Participatory Learning and Design.

REFERENCES

- Blank, C, Jonah, et. al., "Drivers of Long-Term Insecurity and Instability in Pakistan Urbanization", RAND Corporation, California.
- Eezdi, R, "*Katchi Abadis*: The Backstage of the City - TNS - The News on Sunday", The News on Sunday, viewed 24 Nov. 2016, from tns.thenews.com.pk/katchi-abadi-in-the-backstage-of-city/#.XMLqwbdkJlIU.
- Fichter, R, and J. Turner J.F.C., 1972, *Freedom to Build*, NewYork MacMillan Publishing Company.
- Hassan, A, 1996, "National Conference on Business Administration and Economics", The Role of the Informal Sector in Provision of Urban Housing and Facilities, viewed 10-06-18, from settlements/land-housing/the-role-of-the-informal-sector-in-provision-of-urban-housing-and-facilities.
- Hassan, A, 2018, "Houses Or Housing?", viewed 3 Oct. 2018, from arifhasan.org/human-settlements/houses-or-housing.
- Lin, J, 2011 "The Development of Affordable Housing: A Case Study in Guangzhou City, China." Department of Real Estate and Construction at Kungliga Tekniska Högskolan, Royal Institute of Technology.
- Mustafa, M, and Ibrahim M., 2017, "A Walk in the Dust", *THAAP Journal 2017: People and the City*, 2017: 225-232
- Mustafa, M, et. al., "The Isolated Communities of South Asia: An Outcome of the Political Mapping from the Indian Subcontinent", *THAAP Journal 2016: People's History of Pakistan*, 2016: 267-284.
- Nizami, 2010 "Labour Force and Employment", *Econ Surv*, viewed 6-7-18, from [http:// www.finance.gov.pk/survey/chapter_10/16_Population.pdf](http://www.finance.gov.pk/survey/chapter_10/16_Population.pdf).
- Pakistan Census Report, 2002 Pakistan Population 2019 (Demographics, Maps, Graphs), viewed 6-10-18, from worldspopulationview.com/countries/pakistan-population/.
- Siddiqui, T., Ahmed., 1987, "Shelter For The Urban Poor: An Experiment By Hyderabad Development Authority", Hyderabad Development Authority, Hyderabad.
- Turner, J.F C, 1969, *Housing by People: Towards Autonomy in Building Environments*, Marion Boyars, UK.
- World Bank, 2016, "Project Information Document/Integrated Safeguards Data Sheet (PID/ISDS)", World Bank, Report No: PIDISDSC18646, [Online].
- Zaman, Khaliq Uz. 2012 "Urbanization of Arable Land in Lahore City in Pakistan; A Case-Study." *European Journal of Sustainable Development*, Vol. 1: 69-83.

RETROSPECTION OF THE ARCHITECTURAL CHARACTERISTICS OF MITHA RAM HOSTEL IN KARACHI

*Ar. Tania Ali Soomro**

ABSTRACT

Underlining the architectural characterization of a historic edifice is an essential tool towards its preservation and needs to be seen critically. Though the concept of heritage preservation is relatively a new phenomenon, yet it is widely accepted due to the recognition of heritage as an economic asset. Historic buildings are the strength of a nation that helps in building its identity as they reflect on the past, history and culture of a nation. For instance in Pakistan the sites such as Moen-jo-Daro and Thakh-i-Bahi are cherished, as they signify the value of empires that once dwelled, hence expresses a strong nostalgic value. Though these examples are on the World Heritage list, thus they have enough protection and monitoring system, but the rest of the national or provincial level historic properties suffer greatly due to the rapid transformation, resulting from an ever increasing commercialization pressure. This pressure directly and indirectly affects the heritage enclaves. Historic buildings specifically are subjected to destruction, deteriorating to a state in which they are not able to justify the purpose for which they were primarily built. Mitha Ram Hostel in Karachi is one such example, which is still surviving and is operative, but has had a change of function. Moreover there is lack of permanent institutional setup or any sort of partnership with the government, hence not many conservation exercises are seen in the country (Mumtaz, 2017). Apart from the institutional setup, community being the primary stakeholder, plays a vital role in safeguarding the heritage. But regrettably majority of the community defies any interest in conserving these buildings. Some of the restoration measures stop damage to heritage buildings but are not satisfactory to prolong the lifespan of the buildings. Thus, a need for a proper conservation plan cannot be denied. Mitha Ram Hostel, is an exceptional piece of architectural marvel that the city of Karachi has as a reminiscent of the colonial past. The hostel structure was built during the phase

of 1894 and 1901 in pre-partition era, hence British colonial features are predominantly visible in the building. The structure was built to facilitate the out stationed pupils of the Dayaram Jethumal (DJ) Science College and was designed by Architect James Strachan who is credited with designing the most important structures the city offers at present day. The Serai Quarter, where this hostel is located, represents the old prevailing colonial architectural heritage in Karachi and holds over two hundred protected properties, but the enormity of this hostel surpasses the rest.

The present state of conservation of the building is partly maintained, however, it was notified as a protected heritage on the provincial level by the Department of Culture, Government of Sindh, having enlistment number 1995-152. This provided it with an addition protection. This, along with the Jinnah Courts Hostel has been taken over by the law enforcement agencies, depriving the key educational institutions of their asset of edification. This research paper inspects the distinct architectural character of the hostel structure, and aims to analyze the diminishing hostel culture within the Quarter. The paper concludes with the concern of conserving the hostel structure as a forgotten architectural heritage of Pakistan, which otherwise is highly neglected in the third world context.

Key words: Colonial Architectural Heritage, Architect James Strachan, Protected Properties, Serai Quarter, Karachi, Mitha Ram

INTRODUCTION

Pakistan appeared on world map on August 14, 1947 in South Asia and as a result of adoption of new constitution in 1956, it gained its current name as the Islamic Republic of Pakistan. Over the span of time the historic city of Karachi has expanded with all its glory, so has its historic quarters.

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This expansion has resulted in positive as well negative implication (discussed later in the paper).

The Mitha Ram Hostel, built primarily to accommodate the students of DJ Science College, is a distinctive representation of the architectural development that transpired in the British era. At present numerous significant architectural monuments can be found within the historic quarters of the city. The ratio of maintained buildings is quite low as most of the areas have undergone several transformations, both from the point of view of appearance as well as functionality. Prior to 1947 the Quarters housed several residential apartment blocks, but later due to increase in commercialization, those residential apartments were incorporated with various commercial activities on ground floors as per the demand of the users. Many religious buildings were pulled down and open spaces were encroached upon to construct new buildings. However, the educational buildings survived and sustained their original function to a great extent.

Urban Development of Karachi During the British Raj

Karachi used to be a small fishing village named Kolachi. It was founded by the local Baloch tribes from Balochistan and Makran, and was ruled by the Talpur Dynasty in the Eighteenth century, one of the ruling dynasties in the province of Sindh before the British occupation. Later the village got the status of a lesser port township. With the British annexation in 1839 Karachi emerged as a metropolitan hub of the region which attracted an influx of merchants varying from Parsis, Goans, Hindus and Europeans. A separate settlement next to the native walled city of Kolachi was built exclusively for the business community and the Englishmen. The area was bifurcated as the British neighborhood which comprised of the Cantonment, Civil Lines and the Saddar Bazaar Quarters, and the native town based upon the Kharadar and Mithadar areas (Hasan, 1996). There was no concept for master & planning at this time and the city developed more as a response to growing needs in many unplanned ways, rather than a planned scheme.

Architectural Development of Karachi During the British Raj

The architectural approach followed by the Englishmen was very exclusive in a way they combined the western architectural attributes with the regional context of the area which resulted in an amalgamation of both the substantial yet very diverse styles together. Anglo Vernacular, colonial or the domestic gothic are the terms by which the pre

independence architecture (prior to 1947) of Karachi is referred to. In late nineteenth and early twentieth centuries the city reflected a hybrid architectural character, which was the result of the development of the city as a port town. This development attracted many builders, masons, craftsmen and other technicians from different regions in search of work opportunities. These individuals imported with them a distinctive architectural vocabulary to the built environment and created a great number of splendid edifices that to the present day are considered as the colonial architectural heritage of the region. Few of the impressive examples are Jehangir Kothari Mansion, Alvi Chambers and Adamjee Building.

FORMATION OF SERAI QUARTER

The Quarter was named after the *Kafilah* or a Caravan Serai which had existed prior to the British annexation and was located outside the original city gates. During the 1880s the area had developed into a thriving mercantile center which included the grounds of the *Kafilah* Serai as well. Later on the *Kafila* Camping Ground was given over to Sindh *Madrasah*, a school built for the education of Muslim youth.

Architectural Development of the Serai Quarter

Serai Quarter offers a mix of structures that depicts the glory of the colonial past of the region. A more detailed inventory of the buildings is shared in (Figure 1). The most prevailing construction material used is limestone with different forms of surface ornamentation, however few of the brick masonry structures are also seen within the Quarter. Use of Gable roof covered with terracotta roof tiles reflects western influence. The colonial buildings found in the Quarter are not preserved and in a dilapidated state. Principally the buildings that operate under government jurisdiction are in good condition. Few of the monumental buildings that the Quarter still has are the Merewether Clock Tower, Adamjee Building, State Bank Plaza and the Chamber of Commerce.

Some institution of high education such as the Sindh Madrasa (1885), Dayaram Jethumal College (1887) and Sri Narian Temple are also housed in the Serai Quarter (Figure 1). Historically, a well-planned railway network facilitated accessibility between the port, the business center and the rest of the city. According to the listings of 2011, the Quarter has two hundred and nineteen notified heritage properties under the Sindh Cultural Heritage Preservation Act. This number includes two hundred and seventeen cultural heritage properties and two open spaces.

CASE STUDY OF MITHA RAM HOSTEL - A Precedence of Declining Hostel Culture in Karachi

During the British Raj; an influx of economic migrants such as, Christians, Jews, etc, aided Karachi's growth as an educational hub, besides being a thriving economic center.

Many educational facilities opened on vast open areas, including the ground of Kafila Serai, which was allotted to

Sindh Madressa. To facilitate the out stationed pupils plenty of hostels and studio apartments were provided within the city. A few of the hostels having historical importance and still existing are Sevakunj Hostel, located in Arambagh, which was meant for accommodation of the students of Dawood College of Engineering and Technology and Jinnah Courts (Leslie Wilson) Hostel located on Dr. Ziauddin Ahmad (Kutchery) Road which was in the use of students of Sindh Muslim Law College. Whereas the Mitha Ram













Detail of the Building	Current Pictorial View	Historic Pictorial View
Serai Quarter:		
Merewether Clock Tower Date of construction is 1884-92 Designed by Ar. James Strachan Enlistment Number 95 - 077		
Sindh Madressa ul Islam Date of construction is 1885 Designed by Ar. James Strachan Enlistment Number 95 - 111		
Overseas Investors Chamber of Commerce & Industries (OICCI) Date of construction is 1927 Opened in 1927 Enlistment Number 95 - 084		
Other Quarter:		
Max Denso Hall Location: Market Quarter Designed by Ar. James Strachan Enlistment Number 1995-176, 1997-094....		
State Bank of Pakistan Location: Railway Quarter Date of construction is 1983 Enlistment Number 1997 - 293 Converted Into A Museum In Early 2000s)		
Jehangir Kothari Building Location: Market Quarter Date of construction is 1904 Designed by Ar. James Strachan Enlistment Number 1997 - 145		

Figure 1: Buildings Constructed During the British Raj in Different Quarters.
 Source: Historic Images - Archives 150

Hostel was built as a housing facility for D.J. Science College.

INTRODUCTION TO THE MITHA RAM HOSTEL

Historical background

The hostel got its named after Rao Bahadur Dewan Mitha Ram Gidumal (Larri, 1996), a prominent lawyer in the late 1880s, who is referred to as the pioneer of the education movement in Karachi, for building a college for the students of this region as many of them couldn't afford to travel to Bombay (which was the norm at the time in the smaller coastal cities). He under the financial support of Pinjrapur Education Welfare Trust was able to build the magnificent Dyaram Jethmal College and its hostel for the out-stationed students between 1894 and 1901.

Legal and Ownership Status

The city of Karachi and its historic ensemble are given a supplementary protection by Sindh Building Control Authority (SBCA) via the Karachi Building and Town Planning Regulations. The Mitha Ram Hostel is owned by the Government of Sindh. It was notified as a protected heritage on provincial level in 1995 having an enlistment number 1995-152 under the Sindh Cultural Heritage (Preservation) Act 1994 by the Government of Pakistan, Ministry of Culture. Maintenance of the said building is controlled via following the regulations of SBCA. The building is owned by the Government of Sindh.

Location

Mitha Ram hostel is situated opposite D.J. Science Collage in Serai Quarter, which is one of the throbbing business

centers of the city (Figures 2 and 3). The location is in the historic quarter at a walkable distance from all main educational establishments, which play a significant part in their thriving inhabitation. The same area is the center of current downtown and is at a short distance from major landmark buildings and markets. The hostel is situated at nearby distance from the famous 'Pakistan Chowk', which was once famous for having multiple number of student related activities and was considered the educational hub of the city.

Architectural Style

The architectural expression of Strachan in Karachi prior, to the Indian subcontinent partition can be termed as 'Domestic Indo-Gothic Style'. The style fundamentally illustrates the inspiration from the British/ European classical forms of architecture, combined with the indigenous approach to express the regional architectural traditions, such as the arrangement of the arcaded porticos with the semi covered vestibules. Most of his designs are featured with the arcaded frontage with columns flanked with the Corinthian capitals and the pointed arches, as an insight of the Gothic architecture. In Mitha Ram Hostel the courtyard is signified as the core of the structure, which is enclosed by arcaded verandahs, providing access to the interior spaces of the building. His personal preference was for preferred Gizri stone over brick masonry, therefore most of his structures are typically built in the same material with different finishes. The most significant element of this hostel is the provision of a distinctive clock tower defining a focal point of the building. Strachan's signature style is visible in various contemporary structures built by him in Karachi as shown in figure 1. In each design he takes inspiration from different sources.



Figure 2: Site plan of Mitha Ram Hostel facing D.J. Science College on Dr. Ziauddin Ahmed (Kutchery) Road
Source: [Right] Base map– Google earth, [Left] Author – Year 2015

General information regarding the hostel		
01	Legal Status	Protected heritage Enlistment number 1995-185 and 1997-003
02	DoC	1894-1901
03	Architect(s)	James Strachan
04	Main Donors	Rao Bahadur Dewan Mitha Ram Gidumal, other citizens
05	Total Area	4353 sq-yds (39177 sqft)
06	Ownership Status	Government of Sindh
07	Occupancy Status	Rangers Accommodation
08	Location	Coordinates: 24 51'9" N, 67 0'48" E
09	Prominent Architectural Features	Pitched Roof, Bossed Stone Masonry, Star Pediment, Acroterians, Entrance Portals, Arcade, Pilasters, Coupled windows, Grill Iron Work, Timber Jaffery Work, Timber Staircase, Arched Doors, Pigmented floor

Figure 3: General information about Mitha Ram Hostel

Understanding the Plan

The Neo Gothic architectural style of the hostel seems to have influenced by the Simla Viceregal Lodge (Larri, 1996: 249). Strachan designed the building as a free standing structure, with an open compound, meant for recreational activities.

This structure comprises of separate blocks or outhouses for messes, a mosque, a canteen, several sports courts and a cricket ground and an added independent quarter for the hostel staff and a laundry area for the students. The spaces are arranged in a linear manner in the form of a spine, having long corridors that ensure the rooms are well ventilated and kept cool. The spine is equally divided into equal halves by

an entrance portal and the central lobby, that connects various services such as the warden office and the library. The entrance through the building is by an extended colonnaded porch that on the first floor, is used as a terrace having beautiful stone parapet walls that are further flanked with pommels as prominent architectural features (Figure 4). Two sets of staircases are attached to the portal on either sides.

The restrooms and the emergency staircases are organized at either ends of the spine. The planning on all the floors is the same, except for minor changes.

The structure of the hostel building is load bearing, with twenty feet thick walls made of Gizri limestone. The external

Ground floor plan of the Building:

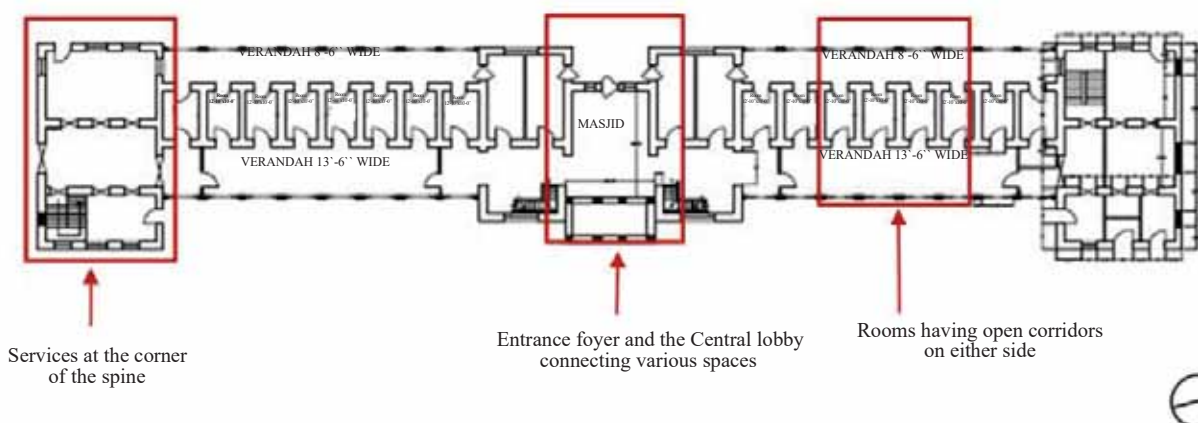


Figure 4: Plan of the hostel building showing internal layout of the spaces– Year 2017
Source: Drawing - Antiquities Department – Government of Sindh – Year 2011

façades of the building have fair finished stones laid in Ashlar masonry, whereas the internal surfaces of the walls are plastered with lime. The structural advancement brought by the British is very distinctive in this building. The combined knowledge of local attributes of the soil and developed structures were well suited to the local soil and climatic conditions. One such example is the Mitha Ram Hostel; where the plan orientation is laid in such a manner that it remains cool throughout the day. The building has two perpendicular staircase towers which have been defaced by several alterations, mainly due to the present status of deteriorating stone façades. Building materials used in this particular structure are stone masonry, lime plaster, wood supports for the roof, pigmented floral Belgian tiles, wrought iron grill work.

Architectural Characteristics

The most significant architectural attribute that the building offers is the minimalistic ornamentation approach adopted for the façade design. The roof crowns are in the shape of a star on both ends, and on the two central towers which is the most impressive element of the facade. The top of the crown is flanked with a pointed pommel.

Another imposing part in both front and back façade is the detail of windows and the gallery. Each corner of the building is decorated with pilaster finished in exposed masonry. (Figures 5 and 6).

Eastern and Western Facades:

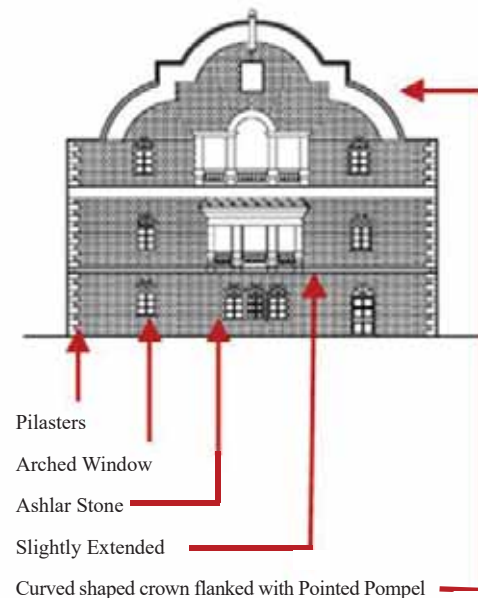


Figure 5: Eastern and Western facades of Mitha Ram Hostel

Front - Southern Facade of the Building:

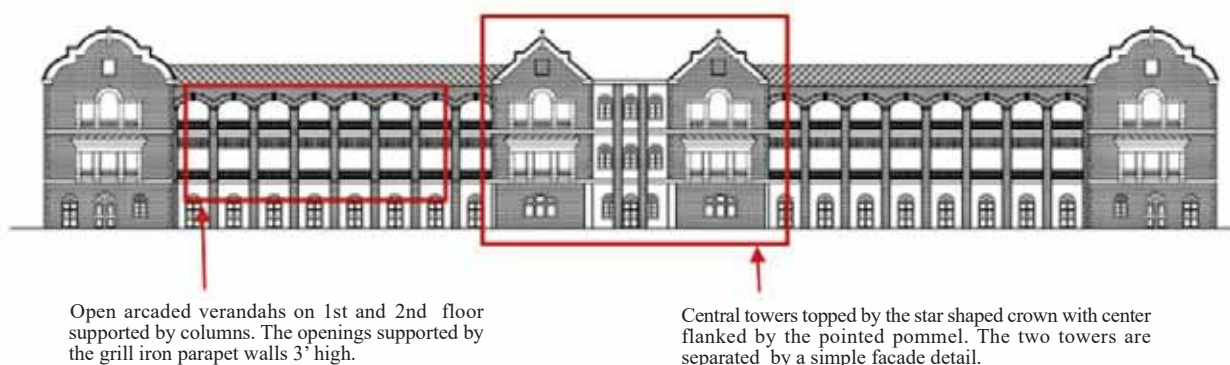


Figure 6: Elevation of the Hostel Building Presenting Facade Organization
Source: Drawing - Antiquities Department – Government of Sindh – Year 2011

The combination of arched and rectangular windows creates a balance in the design of the facade. The Teak wood doors and windows are of premium quality. The ones which are still there are in fairly good state. The staircase is also made of Teak wood. The doglegged staircases are centrally located on both sides of the entrance foyer. These staircases are the only way of connection between various levels. Each step was provided with a groove for metallic nosing, but regrettably this has disappeared over time. Currently the staircase is in a pretty bad shape and is in urgent need of restoration. The staircase tower has a gable pitch truss roof, while the rest of the areas have plain wooden roofs.

The parapet wall consists of decorated grill iron work and is about three feet height. Beautifully done mosaics with small Belgian tiles decorate the flooring on ground floor.

The Present State of the Building 1901 – 2018

The original building layout included only the hostel but later on change in usage of the hostel as Pakistan Rangers Quarters (since 1992) resulted in extensions on site in the form of additions of new blocks to the lot. The lack of appropriate repairs, negligence and the changes done to facilitate the new function has caused decay to the main building structure. Nonetheless the loss is not considered irreversible; the building still shows potential to be preserved. Though the function of the building remains the same, there

is a shift in the needs of the residents. A block has been added to the southern side of the hostel building which serves as the mess for Rangers (Figure 7).

A place for ablution and lavatories adjacent to the mess were also added at a later period. A separate Rangers hostel was also constructed next to the main building to accommodate the increasing number of the occupants. A number of major and minor alterations were also observed inside and on the external façades of the building. Majority of those alterations were carried out in inappropriate manner, which resulted in the deterioration of the main building.

Alterations – On the Building Exterior

The building lot has undergone several changes over time. The stone masonry joints were observed to be exposed and cracked at certain locations. In prior restoration attempts, the cracks and the open mortar joints were treated with cement mortar, defacing the old fair-faced masonry of the building. Many semi covered areas in the building have been encroached and transformed into closed spaces, one such example is the conversion of the main entrance foyer on the southern side into a mosque on ground floor. The entrance into the building is not anymore through a decorative portal, rather it has been moved to the back side of the building. The ground floor has a transitional space in the form of a eighty one feet longitudinal veranda/ corridor



Figure 7: General information about the building – Year 2017
Source: Base map – Google earth

between indoor rooms and the outdoor entrance portal. The same corridor has been closed and divided into rooms. None of the doors have retained their original character, both in the interior and the exterior. On the exterior, all windows and doors have been painted with white enamel paint. Most of the window openings have been closed off with fixed wooden planks or block masonry, due to the alteration of space. These alterations have defaced façades of the building and created a negative visual impact. Another appalling visual effect on the building is left by the exposed plumbing lines running along the entire lengths of the façade. Unsightly and unplanned light lamps have also been installed on various locations. All these alterations give a dreadful appearance to the external façades of the building.

Alterations – In the Building Interior

The building interiors have suffered more than the external façades. The major area of concern is the subdivision and the conversion of the internal spaces.

The overall condition of the tile flooring on ground floor is intact and shows potential to be brought back to its original character, with little cleaning and polishing. The flooring does however, show some signs of damage, mostly at the locations where the corridors have been subdivided with masonry walls. The wooden flooring on the upper floors is in very bad state, having immense gaps, making it unsafe to be used. The parapet walls on both the levels are badly damaged due to lack of maintenance. In the majority of the areas the grills are demolished and only the hand rail remains. The wooden staircase is in a dilapidated state with most of the treads broken. The hostel design had the provision of lavatories on each floor, on either ends of the central spine. Owing to the negligence of the concerned authorities and the current occupants this facility had to be shut down permanently, however, a separate lavatory block was added outside the main building block. The shutting down of lavatories has resulted in the blockage and then the removal of all of the plumbing fittings and the fixtures.

The remains of the debris still lay on the floor of that area. The condition of the roofing is in a bad shape. Wooden planks are broken and exposed to the sun allowing rain water and the birds to enter the building. Many other modifications and poor state of maintenance has resulted in a lot of damage to the structure and the building is in need of extensive restoration (Figure 8).

Critical Analysis

The whole exercise of investigating about the alterations and transformation made to the Mitha Ram Hostel is associated with the understanding of what should be retained in terms of heritage buildings and building elements. Much of the alterations made to Mitha Ram Hostel have left adverse effect and cannot be reversed.

All the defacing interventions should be reverted in order to give back the building its aesthetic appeal. The necessary requirements must be carried out with proper planning and detailing to bring the building back to its original status. The most outrageous impairment befallen the building has been the shift of function from students' accommodation to the rangers' quarters in 1992 (till the date). The Rangers' put up barricaded walls that made the building inaccessible and not-visible from the main road, which is not liked by the neighbors. The inhabitants lamented that the charm of the area is at stake due to the persistent existence of the military within the area, hence feel threatened. The local government had former plans to restore the building and put up a museum in it, but it remained a mere idea not materialized as yet.

The building specific alteration based recommendations suggest that the attached masses are suppressing the significance of the original building hence are highly recommended to be removed. Or if not likely to be removed then at least much of the masses should be replaced with appropriately designed units, which complement the design of the main building, and give a look of a unified compound. All broken and dismantled elements should be reinstalled with the original design. Furthermore, as most of the areas in and outside the building face problems of exposed and tangled electricity wires and fittings, thus this issue must be addressed promptly. The electricity wires should be replaced with proper conduit channels. The proper cleaning of the building façades and the interior should also be addressed. Before cleaning, all exposed masonry joints and the cracks must be checked and repaired to avoid moisture retention.

Conclusion

In the light of investigation and retrospection of the buildings' characteristics it is concluded that the Mitha Ram Hostel building is not in a good state. Though, because the building has been constantly in use this has ensured its survival, but in a highly dilapidated state. A proper conservation plan is











Alteration/ Damages Caused to the Exterior of the Building			
Alteration/ Damage	Image of the Building	Alteration/ Damage	Image of the Building
Altered windows and the arcaded verandahs		Dilapidated stone masonry showing eroded stones with open mortar joints	
Altered doors applied with enamel paint		Conversion of ground floor corridor into rooms	
Broken timber roof & ceiling showing broken parts		Conversion of entrance portal into mosque blocking the entrance permanently	
Altered lavatories with broken plumbing lines and fixtures, debris visible on the floors		Altered grill iron parapet wall	
Broken timber staircase with no balustrades and deteriorated treats		Highly deteriorated wooden flooring on first and second floor showing broken floor wooden planks	

Figure 8: Damage Atlas on Mitha Ram Hostel

essential to be drafted since the maintenance of the historic buildings is an extensive and time-consuming task, therefore a conservation plan would be beneficial for the building premises.

The key assumption drawn through this study is that the state of the degradation has not occurred in isolation, rather it is a reflection of a collective devastation of the area in terms of social and historic values. This consolidates with the non-prevailing situation of heritage law and the conflict between the direct and indirect users/ stakeholders, mainly

the government institutions. For instance the scope of the change of function of Mitha Ram Hostel was not understood at the grass root level. Also the repercussions of the change of users from students to army rangers was somehow overlooked, by not considering the psychology of the type of people for whom the building was designed, which subjected the building to undergo major interventions inappropriate in nature.

However, despite the changes the building has sustained its imperial character and still offers potential to be preserved.

Consequently it is anticipated that the revival of the old function might facilitate the improved condition of the building, since it holds a strategic historic significance which certifies its value to be recognized both on national and international levels.

The local government had former plans to restore the building and put up a museum in it, but it remained a mere idea not materialized to date. It is anticipated that the revival of the old function might facilitate in improving the condition of the building.

References

Archives 150, viewed 27-11-2017, from <https://www.facebook.com.archive150>.

Drawings acquired in 2012 by the Department of Antiquities, Culture Department Government of Sindh, under the project of Architectural Documentation and Restoration of Mitha Ram Hostel Building.

Hasan, A., 1996, "Conserving Karachi's Historic Architecture," viewed 03-02-15, from <http://arifhasan.org/articles/conserving-karachis-historic-architecture>.

Lari, Y, 1996, *The Dual City: Karachi During the Raj*, Oxford University Press with collaboration of Karachi Heritage Foundation.

Mumtaz S. N., 2017, "Community Based Urban Area Conservation Lessons From Pakistan", *Journal of Research in Architectural Planning*, Vol 22, 22-34.

BOOK REVIEW

THE SEVEN LAMPS OF ARCHITECTURE

John Ruskin

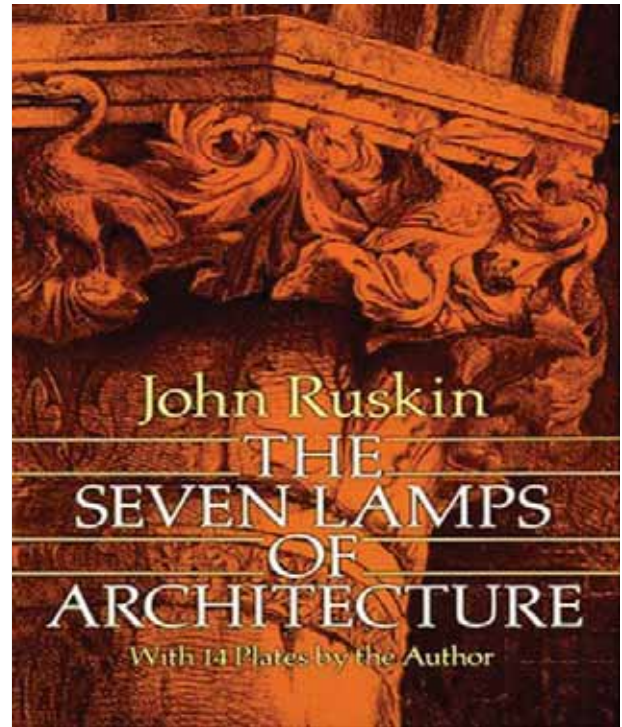
Reviewed by Ar. Humaira Nazir*

“The Seven lamps of Architecture” a treatise by John Ruskin is an interesting description of the deterioration of European development from the Renaissance style, forwarded through an investigation of lost idea of Gothic style. The main concept behind this book was to make people aware about the noblest Gothic style which lost its identity due to different innovations. The treatise combines a series of lectures on architecture with detail description of principles of architecture.

Ruskin was an English writer, lecturer and renowned art critic who through his eighty-one years of life, painted, composed and crusaded for (boundless) societal change. Despite the fact that he was not a designer himself, he survived the stature of the British Empire with Queen Victoria at its rudder, and spearheaded the expansion of the Romantic and Gothic Revival developments in England. He was granted uncommon power of expression and observation. The story of this treatise started in 1948 when he visited northern France and felt that he needed to write something about the essence of Gothic Architecture in England. One year later in 1949, he compiled his thinking into this treatise. This treatise not only focuses on the revival of Gothic Architecture with criticism of the flourishing architectural style of that era but also expresses his love for nature and aesthetics in architecture.

The seven lamps are moral virtues that must incorporate art and architecture with logic. These lamps are not guiding tools for creating buildings, but serve as foundation for building with honesty. Ruskin was the first person to explain good and bad “taste” in art and architecture, and he uses seven lamps for this explanation. The seven lamps are sacrifice, truth, power, beauty, life, memory and obedience.

In the lamp of sacrifice he differentiates between architecture and building, through considering architecture as art, and building as engineering. In the notion of sacrifice, Ruskin does not mean sacrifice of money but that architects have



to sacrifice certain desires of design, to make God happy.

In the lamp of truth Ruskin urges on the importance of honesty in the buildings in terms of structural, surface and ornamental truth. He is against these three deities of architecture, just because of dishonesty in them. He explains the honesty of structure by criticizing the nineteenth century self-supporting masonry system, which was replaced by reinforcement of materials and with these reinforcements, cladding of stone is used to give feeling of masonry and to mislead the viewers. Then again, according to him the building's façades should not be treated with fancy elements, so that building flaws are hidden behind them. For surface honesty he targets the frescoed walls and ceilings of chapels. He mentions the painting of Micheal Angelo on the ceiling of different chapels, which respects the construction materials, but in the ceiling of Milan Cathedral the vaults are covered

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with stone fan motifs and these motifs are just painted with the missing shadows and depth of carved stones, which is misleading. He suggests that nobody in this world wants ornaments. Ruskin criticizes the replacement of hand work of skilled masons by machines, which creates dead ornaments.

In the lamp of power he describes three elements which are view, setting and lines for creating buildings. Buildings must provide view of all sides. Shape, mass, scale and shadows are addressed in this section. Power is increased by making buildings taller and massive, but this power is achieved only when buildings evoke awe inspiring emotions in viewers. On the contrary, for smaller buildings it is essential to make their masonry bold. Power of architecture lies in the shadows of buildings, because visible components are derived from the shadows they cast. In discussing the element “line”, Ruskin goes into the details of “bounding line”, which is continuation of an edge and gives the feeling of mass as a whole. Therefore, it is essential for architects not to disrupt the line. In Greek temples, it is the line of frieze, which helps the reading of the mass as a whole.

The lamp of beauty is the brightest lamp of Ruskin. According to him, beauty is an objective matter and it is related to shared values among humans. He emphasizes to adapt nature as a model of beauty and the elements of architecture should relate to lines and shapes of nature. He further explains this phenomena by taking the example of Greek columns, and how their structure depict the plant's stem. However, after careful observation of Doric column he clarifies that the cornice and triglyph are not imitations of nature and the only use nature as an inspiration is their severity and simplicity. The Ionic and Corinthian columns are however imitations of nature, with the capital depicting the leaves of acanthus and scrolls. However, this does not mean that they directly copy nature, it only means that they incorporate curves, patterns, webs or textures into the design.

The lamp of life, indicates that skilled crafts men are required to make buildings timeless. Masons and carpenters must pour their lives into buildings and should be constructed with hands, not with machines. Ruskin criticizes mass production, large scale buildings and new techniques which reduce the skilled labor's craft.

In the lamp of memory, Ruskin emphasizes conservation of the old and existing culture of places. He states that the buildings must be a representation of their present culture as well as a reflection of the past. According to Ruskin, the life of buildings automatically increases if they reflect cultural meanings to the viewers. People should build their buildings not for their present use, but also for the use of future generations.

“The utmost beauty of building is not its stones, not the gold but only its age”.

The lamp of obedience describes that architecture must obey the necessities of time. It must grow from the spirit of people, their lives, their history and faith. For Ruskin, architecture is not irregular or fantastic, but it obeys the customs and the schools, which are invented due to natural growth and development, not because of mechanical obligation.

Conclusively after reading this book it is observed that the timeless observations of Ruskin are significant today as well, as the issues tackled in the book are still relevant. The book is thoughtful and must be read by all architects, students and individuals who are interested in the art of building. This book is easily understandable by those who have ever visited France and England, and have carefully observed the architecture of these places, especially the churches and cathedrals.

The tone used by Ruskin is very noble, but at some points he discusses the same ideas at length, which could have been edited. One way of having a greater impact of this book for students is to deliver its contents through a series of lectures.



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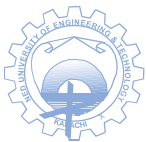
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