Regulatory Barriers, Urban Sprawl and Economic Cost Nexus: A Case Study of Islamabad

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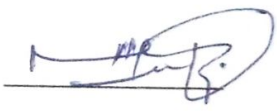
External Examiner: Dr. Muhammad Tufail Signature: 

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ACKNOWLEDGEMENTS

First and foremost, I would like to thank Allah Almighty, the most gracious and merciful, for giving me the ability to complete this task. Without His favors, this accomplishment would have been beyond reach.

ABSTRACT

Urban planning and economics show that having more people in one area can improve living standards, but only up to a certain point. Thereafter, urban planning and economics show that having more people in one area can improve living standards, but only up to a certain point. Thereafter, the benefits start to decrease. In South Asia, Pakistan has the fastest-growing urban population, increasing by 3% each year. Islamabad, Pakistan's capital, has seen rapid growth in its urban population. This growth is mainly due to strict zoning rules. However, the construction industry in Pakistan faces many rules and regulations that make it hard to build important projects and add extra costs to the economy. This study looks at how these regulations have led to the separation of urban areas into suburban zones. This separation increases transportation costs for people living in the suburbs who travel to urban centers for work, shopping, or other activities. Transportation costs are a key part of the economic burden caused by urban sprawl. The research employs a mixed-method approach, using quantitative descriptive statistics to establish a foundation for understanding the restrictions on urban growth. For qualitative data, structured interviews were conducted with 300 households from each society, 22 in urban and suburban communities in Islamabad. Regression analysis was used to assess the impact of these barriers on economic costs and smart city development. The study found that suburban households spend more time and money on travel. Things like how often they travel, why they travel, traffic jams, waiting for transport, and the distance of their trips all add to these costs. However, more flexible zoning rules that allow mixed-use developments where homes, shops, and offices are closer together can help lower these costs. High-density urban planning, which means having more people living and working in the same area, can also make cities more affordable and efficient. This research highlights the need to change the rules that cause urban sprawl and increase transportation costs. By adopting better policies, such as encouraging mixed-use areas and planning for denser cities, the government can reduce travel costs, support sustainable growth, and make cities more comfortable and livable for everyone. The benefits start to decrease. In South Asia, Pakistan has the fastest-growing urban population, increasing by 3% each year. Islamabad, Pakistan's capital, has seen rapid growth in its urban population. This growth is mainly due to strict zoning rules. However, the construction industry in Pakistan faces many rules and regulations that make it hard to build important projects and add extra costs to the economy. This study looks at how these regulations have led to the separation of urban areas into suburban zones. This separation increases transportation costs for people living in the suburbs who travel to urban centers for work, shopping, or other activities. Transportation costs are a key part of the economic burden caused by urban sprawl. The research employs a mixed-method approach, using quantitative descriptive statistics to establish a foundation for understanding the restrictions on urban growth. For qualitative data, structured interviews were conducted with 300 households from each society, 22 in urban and suburban communities in Islamabad. Regression analysis was used to assess the impact of these barriers on economic costs and smart city development. The study found that suburban households spend more time and money on travel. Things like how often they travel, why they travel, traffic jams, waiting for transport, and the distance of their trips all add to these costs. However, more flexible zoning rules that allow mixed-use developments where homes, shops, and offices are closer together can help lower these costs. High-density urban planning, which means having more people living and working in the same area, can also make cities more affordable and efficient. This research highlights the need to change the rules that cause urban sprawl and increase transportation costs. By adopting better policies, such as encouraging mixed-use areas and planning for denser cities, the government

can reduce travel costs, support sustainable growth, and make cities more comfortable and livable for everyone.

Keywords: Urban migration, urban sprawl, regulatory barriers, economic cost.

Table of Contents

List of Figures

List of Tables

CHAPTER 1
INTRODUCTION

1.1 Introduction

The world is currently grappling with the significant challenge of global urbanization, as over half of the global population, or 55%, already resides in urban areas. By 2050, this percentage is projected to increase further to 68%. The theory of modern urban planning and development economics holds that the potential net gains of living standards increase up to a level but then it decreases. The increase in living standards occurs due to the concentration of more people in a specific area. The highest percentage of urbanization in South Asia is in Pakistan which is 3%. In the context of Pakistan, a majority wants to move towards larger cities like Islamabad, Lahore, Karachi, Peshawar, and Quetta. These cities provide more economic opportunities as well as access to basic amenities related to health and education. The urban population in the capital city of Pakistan (Islamabad) has seen an outstanding increase. Abundance of problems in the major cities due to growing urbanization in underdeveloped countries.

In the industry of construction, the most significant problems are regulatory (zoning regulation & building codes) barriers. (Hasan et al., 2022)The rapid expansion of Islamabad can be largely attributed to its restrictive zoning policies. According to the latest figures, the city has experienced a threefold increase in impervious surfaces, from 82.66 km2 in 1990 to 286.01 km2 in 2018. This growth has resulted in a significant increase in contiguous urban areas, encouraging sprawl and single-family homes in outlying areas, rather than promoting high-density development in city centers and residential neighborhoods. This trend is not only unsustainable but also inefficient, leading to wasteful use of valuable urban land (Jalil, Hanzla, 2021). Among other reasons, inefficient land use regulations and prevalent informal processes

are significant hurdles in the way of the smooth pace of compact city development in Pakistan. The industry of construction in Pakistan faces unbeatable regulatory barriers that may negatively influence the socially important piece of work and add extra economic costs. One study from the south of the border has suggested that excessive regulation is “Gumming up the economy” (Leew, 2017).

Urban sprawl continues to grow uncontrollably, making it harder for cities to provide adequate resources and negatively impacting the environment. As cities expand, connecting different areas becomes challenging, leading to transportation issues, reduced social interaction, and difficulties in delivering essential services (Hamza Sarfraz, 2023). The term "sprawl" was first coined in 1937 by city planner Earle Draper. While urban expansion has increased housing and land availability, it has also created problems like traffic congestion, higher transportation costs, limited job accessibility, and unequal distribution of public goods, which contribute to segregation and marginalization. Economically, this growth is often wasteful, highlighting key concerns about its impact on transportation, income, and fairness (Randall P. Walsh, 2004).

In recent years, amid the debate on sustainable development and urban compactness, there has been a widening interest in reintroducing compact cities (Shafii et al., 2006). The 11th sustainable development goal (SDG) centers on the establishment of inclusive, secure, resilient, and sustainable cities and human settlements. The attainment of the goal is intricately linked to the presence of urban facilities, which typically diminish with increasing distance from the central business district (Rehman et al., 2024). Moreover, theories of urban residential location propose that residents' housing decisions are shaped by factors such as proximity to urban amenities, the availability of public transportation, and the associated expenses related to both commuting and accommodation.

This research aims to address the regulatory procedures that contribute to urban sprawl and its

economic costs. It emphasizes the need for new policies to reduce regulatory barriers and control unwanted urban expansion in Islamabad. The study focuses on analyzing these barriers, which have divided urban and suburban areas, leading to higher transportation costs for households in suburban regions. This increases overall economic costs, particularly transportation expenses. The research also seeks to clarify the challenges faced when attempting to eliminate these issues (Zaychenko et al., 2018).

This study tackles a critical issue—urban sprawl in Islamabad—and offers a fresh approach by linking zoning regulations, economic costs, and smart city strategies. What makes it original is its focus on how restrictive zoning policies directly raise transportation and housing costs, and how smarter, more compact urban planning can reduce these burdens. Unlike existing work, it combines local data and economic analysis to recommend actionable reforms that support sustainable urban growth. This study also aligns with key national and local policy frameworks, such as Pakistan's National Urban Policy (2018), the Islamabad Master Plan (1960 and its revisions), and Vision 2025, which all emphasize the need for inclusive and sustainable urban growth. By examining how restrictive zoning policies conflict with these goals, the research contributes not only to academic discourse but also to practical policy-making in Pakistan.

1.2 Research problem

The rapid expansion of cities, especially Islamabad, has become a major issue. Urban sprawl increases commuting times in sprawling areas, reducing economic productivity (Haque, 2015). The city's horizontal growth worsens resource management and drives up housing prices and rents. Over the past four decades, Islamabad has seen the highest urban population growth in Pakistan, with a 377 sq. km increase in built-up areas. This expansion has led to

suburban settlements and significant economic challenges, including 1) traffic congestion, 2) higher transportation costs, 3) increased fuel expenses, 4) limited job accessibility, and 5) uneven distribution of public services, which contributes to residential segregation and marginalization (Shah et al., 2021). Despite the severity of this issue, it has not received sufficient attention from the government.

A whole range of unintentional consequences of this type of urban growth are brought forward in the literature. Many politicians, planning practitioners, and academics believe that the government should try to regulate the development of urban forms to avoid the consequences of urban sprawl often perceived as undesirable (Dieleman & Wegener, 2004).

1,2,3,4,5,6,7,8 = Commuting cost indicators due to transportation and its accessibility.

1.3 Research Objectives

i. Review the zoning regulations that lead to urban sprawl in Islamabad.
ii. Compare Commuting costs of Peri-urban and city center settlements.

1.4 Research Questions

i. What are the zoning regulations that lead to urban sprawl in Islamabad?
ii. What will be the commuting costs of the per-urban and civic city on mobility to city centers?

1.5 Explanation of the Key Terms/Concepts

i. Urban migration: The action of people moving from Rural areas to cities. Economic migration is the activity of people from one place, city, and country to another to welfare from greater economic opportunities in the receiving place, city, and country.
ii. Urban sprawl: The term "Urban sprawl" describes the outward expansion of poorly planned, low-density development that relies heavily on automobiles, resulting in

large swaths of land being consumed and significant distances between homes, businesses, and job centers. This leads to dangerous levels of isolation between residential and commercial areas, with detrimental consequences for those living in these areas.

iii. Regulatory Barriers: Administrative restrictions, which are established by the decisions of state and municipal authorities, must be examined as a prerequisite for conducting business in the area, resulting in increased bureaucratic costs and time. These restrictions include the process of obtaining zoning changes, building permits, and occupancy permits, as well as obtaining approvals from all government agencies involved in the development process and any required public hearings or citizen meetings.

iv. Economic cost: Economic cost itself contains a wide meaning of social and environmental too. Economic cost means the cost that affects the state or government plus individuals combined.

1.6 Units of Data Collection

This research has been designed to rely on primary and secondary data.

Primary data

Qualitative methodology has been used in the research to gather the data. Data is collected by interviews with the designed questionnaire from different households of urban and suburban societies in Islamabad.

Secondary data

Secondary information included a review of documents, building codes, various Articles, different Books, the Sludge series, Knowledge briefs, and newspapers.

CHAPTER 2
LITERATURE REVIEW

2.1 Empirical literature review

The literature review is divided into two main areas: the current state of the real estate market—particularly the growing demand for housing—and the regulatory burdens that shape housing supply.

Urbanization is a defining trend in contemporary human settlement patterns. According to (Muhammad Amjad Khan C, 2022), urbanization refers to the increasing movement of populations from rural to urban areas. This process places significant strain on urban infrastructure, including roads, housing, and public utilities, often resulting in the continuous expansion of suburbs. (Leew, 2017). warns that urbanization will escalate, with an estimated 70–80% of the global population expected to live in cities in the coming decades. However, this urban shift is frequently accompanied by environmental degradation, rising living costs, and increased poverty. Despite the universal aspiration for affordable and healthy living conditions, many urban dwellers are unable to afford housing due to escalating property prices and rental costs.

Government interventions, while aimed at ensuring quality and safety, often add regulatory burdens that inadvertently contribute to housing shortages. Building codes established by the National Research Council, for instance, set minimum standards for materials and energy performance. While these codes promote safety, they also reduce flexibility in housing design and increase development time. (Haque, 2015). Illustrates how regulatory procedures in Pakistan significantly delay housing projects. Officially, approvals may take three months, but in practice, this duration often doubles, increasing time, material, and labor costs. This over-regulation leads to an inelastic housing supply, making it unresponsive to growing demand.

In Islamabad, this issue is particularly pronounced. According to the Islamabad Capital Territory Building Control Regulation (2022), no building may be constructed without prior approval from the Capital Development Authority (CDA). This centralized control delays housing development and contributes to urban sprawl. (Rana et al., 2019) examines barriers to smart city development and highlights regulatory inefficiencies and fragmented governance as major obstacles. Similarly, (Shafii et al., 2006) points out that despite technological readiness, Southeast Asia faces challenges in promoting sustainable construction due to weak policy frameworks.

Land ownership further complicates urban planning in developing countries. (Owusu, 2013) notes that land is typically owned by private individuals or traditional authorities while planning responsibilities rest with local governments. This disjoint undermines coordinated urban development. (Patel et al., 2018) emphasizes how stringent regulations aimed at promoting safety significantly raise housing costs, pushing low-income families into informal settlements. His study shows that easing certain rules could reduce construction costs by 34% and increase housing availability by 75%, without compromising safety or quality.

In Pakistan, the planning environment is fragmented. (Ghulam Abbas Anjum, 2011) Identifies overlapping roles among planning agencies such as the City District Governments, Development Authorities, and Town Municipal Administrations, leading to conflicting regulations and implementation failures. (Zaychenko et al., 2018) This reinforces this view, noting that excessive regulatory procedures in developing countries deter investment and slow down housing development.

(Haque, 2015) Also discusses the weaknesses of Master Plans in cities like Islamabad. These blueprints are often outdated and misaligned with urban growth, leading to inefficient land use. (Hasan et al., 2021) Argue that Islamabad's zoning policies favor low-density development, contributing to urban sprawl and restricting economic activity.

Urban sprawl, a topic widely studied in developed countries, has been criticized for its detrimental effects. (Brueckner et al., 2001) Explains how sprawl consumes agricultural land, increases commuting costs, and weakens city centers. Turner (Burchfield et al., 2003) found that even in 2000, 18% of Americans saw sprawl as a serious concern, comparable to crime. However, opinions diverged on solutions: some favored infill development, while others supported expansion into undeveloped areas.

The concept of "sprawl" dates back to 1937, coined by Early Draper (Randall P. Walsh, 2004). Post-World War II urban planning in the U.S. prioritized automobile infrastructure, enabling horizontal city growth. Government funding for suburban infrastructure further incentivized sprawl. In Pakistan, recent satellite studies by (Shah et al., 2021) show a 377 sq km increase in built-up area in Islamabad, accompanied by a sharp decline in forest cover and water bodies. The city's rapid, unplanned expansion has strained public services like water supply, sanitation, and transportation.

Sprawl also undermines social cohesion. (Brueckner et al., 2001)Notes that suburban living often limits social interaction and increases isolation. (Randall P. Walsh, 2004) observes that while better transport allows people to live farther from urban centers, it comes at the cost of time and money. Migration from rural to urban areas further disrupts community bonds and reduces access to nature.

To build sustainable cities, policy reform is critical. (Rana et al., 2019) stresses the need for streamlined regulations in developing countries. (Shafii et al., 2006) calls for a strong commitment from both government and the private sector. Legal frameworks must be reformed to support affordable housing and inclusive urban growth.

The literature review highlights key challenges in urban development, particularly in Islamabad, where urban sprawl and housing shortages are pressing concerns. Urbanization,

while driving growth, places significant strain on infrastructure, leading to increased demand for housing, but escalating property prices and regulatory burdens hinder housing affordability. Government interventions, such as building codes and zoning regulations, aim to ensure safety but often contribute to delays in housing projects and restrict supply. In Islamabad, the centralized control by the Capital Development Authority (CDA) and fragmented planning agencies exacerbate these issues. Furthermore, outdated master plans and inefficient land-use policies, coupled with regulatory overreach, contribute to urban sprawl and limited economic activity. Studies indicate that urban sprawl in Islamabad has led to environmental degradation and rising commuting costs. Despite technological readiness, weak policy frameworks and fragmented governance further hinder sustainable development. In this context, easing certain regulations could reduce construction costs and increase housing availability, suggesting the need for policy reform to promote affordable housing, streamline regulations, and foster sustainable urban growth.

2.2 Research gap

Table 2.1: Literature on dimensions of Land-use regulations, Urban Sprawl, and Economic costs.

Dimension	Key features	Citation
Land use regulations	Urban sprawl and restrictive zoning regime, Buildings construction delays, and over regulations.	(Hasan et al., 2021). (Haque, 2015). (Patel et al., 2018).
Urban sprawl	Urban sprawl in Islamabad, 1979-2019 by remote sensing, 1972-2009 Multi-sensor and Multi-temporal	(Shah et al., 2021). (M. J. Butt, 2011)

	satellite data.	
Economic costs	Reduction in Agricultural land, Loss of amenity benefits from open space, Depletion of scarce farmland resources, Excessive traffic congestion, Air pollution, Reduced social interaction, Unequal provision of public goods and services, and Increases Poverty.	(Brueckner et al., 2001) (Randall P. Walsh, 2004) (Dieleman & Wegener, 2004)

While (Hasan et al., 2021). Investigating commuting costs linked to land-use regulation and sprawl, they do not compare historical building codes (1993 vs. 2020) or distinguish between civic and peri-urban commuting patterns. Furthermore, they neglect the role of individual behavior and economic incentives in shaping sustainable communities.

(Haque, 2015) Focuses on regulatory delays but overlooks how excessive regulation contributes to sprawl. His comparison of past and present bylaws also fails to contextualize changes relative to Islamabad's population growth.

Satellite-based studies by (Shah et al., 2021), and M. J. Butt (2011) map urban growth but do not sufficiently investigate the economic burden of sprawl on households or their role in promoting sustainability through preferences and choices.

Meanwhile, Western studies like those by (Randall P. Walsh, 2004), (Brueckner et al., 2001), and (Dieleman & Wegener, 2004) explore sprawl's impact in developed contexts but overlook the implications of overregulation and the lived experiences of urban households in developing countries.

Proposed Contribution

This study provides valuable insights that directly inform urban planning and policy decisions in Islamabad by:

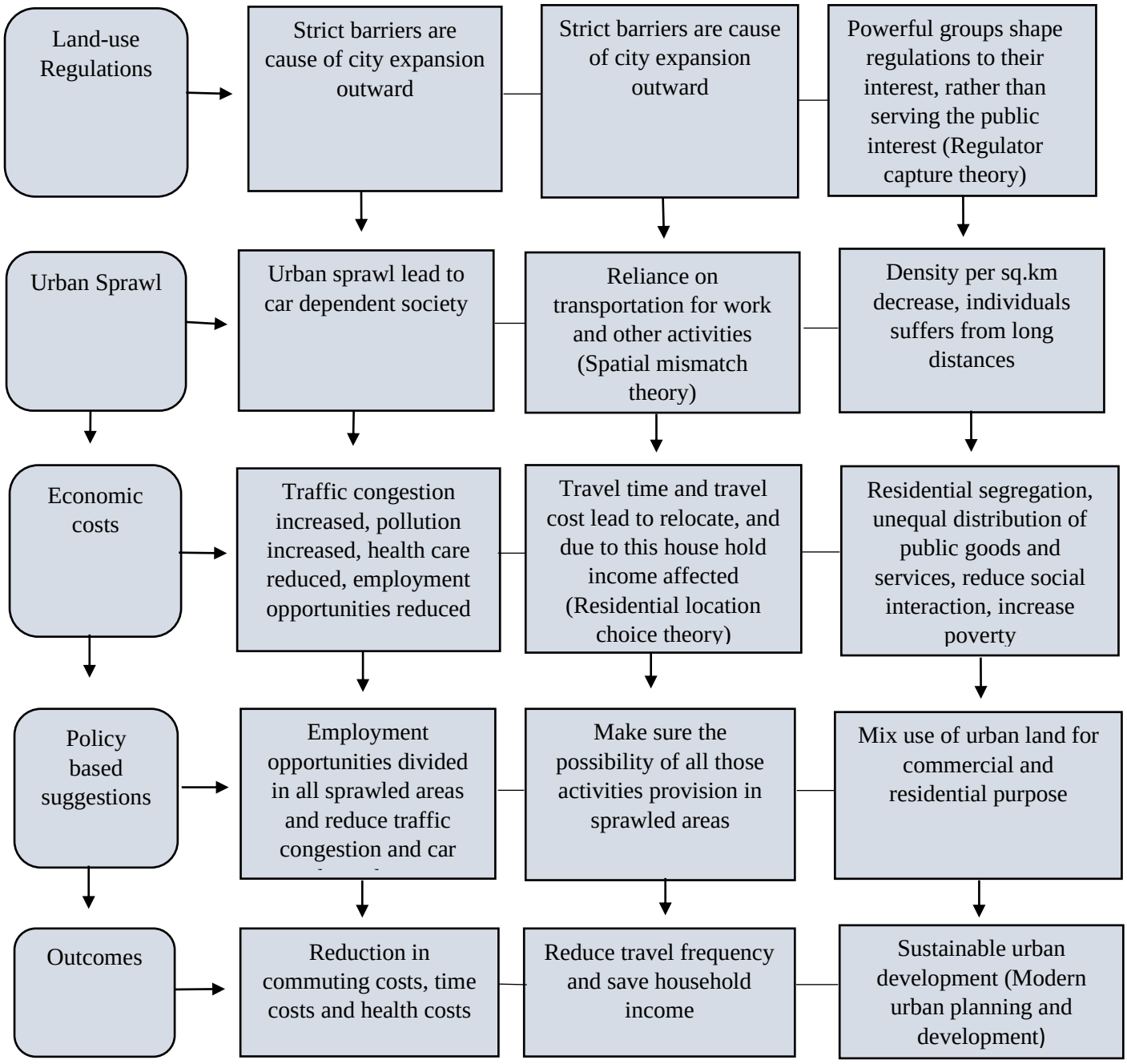
- Analyzing commuting costs: The study compares commuting costs between urban and peri-urban areas of Islamabad, offering key insights into the economic impacts of urban sprawl. This analysis can help policymakers in developing transportation infrastructure and optimizing commuting patterns to reduce costs and improve mobility across the city.
- Reviewing land-use regulations and building codes: By examining the evolution of land-use regulations and building codes from 1993 to 2020, the study offers a historical perspective on how these policies have shaped Islamabad's urban growth. This review serves as a critical tool for policymakers looking to adjust or reform land-use policies to accommodate the city's rapid expansion.
- Linking urban growth with population expansion: The study correlates changes in regulations with the threefold increase in Islamabad's population and its physical expansion. These findings can guide urban development strategies, helping policymakers design future urban planning policies that balance growth with sustainability.
- Highlighting economic and behavioral dimensions of urban sustainability: The research examines the economic and behavioral impacts of urban sustainability initiatives, providing a framework for policymakers to understand the broader effects of their decisions. It will assist in designing policies that address both economic concerns and behavioral shifts toward sustainable urban living.

By addressing these critical aspects, this study directly supports Islamabad's urban policy development, helping to create more sustainable, economically viable, and livable urban spaces.

2.3 Policy contribution

National policies such as the Framework of Economic Growth, and the National Housing Policy 2001 emphasize the development of compact cities on the international level, the 11th goal of SDGs is also committed to making sure the cities are Inclusive, Resilient, and sustainable by introducing "Smart Growth" development. However, there is no practical strategy and pathway to achieve sustainable development on the National level due to the administrative and regulatory barriers. Urban transportation is included in the National Transport Policy (NTP) 2018, which was authorized by the PML-N, as an integrated mode to address the difficulties posed by the growing population of the nation and its booming economy. The nation's NTP has suggested that Pakistan CAA be limited, dividing its regulatory and service delivery responsibilities. The availability of public transportation services and their interaction with other modes will receive more attention. So this study provides input to the mentioned, National and International policies. This study also aligns with key national and local policy frameworks, such as Pakistan's National Urban Policy (2018), the Islamabad Master Plan (1960 and its revisions), and Vision 2025, which all emphasize the need for inclusive and sustainable urban growth. By examining how restrictive zoning policies conflict with these goals, the research contributes not only to academic discourse but also to practical policy-making in Pakistan.

2.4 Conceptual framework



CHAPTER 3
RESEARCH METHODOLOGY

This chapter outlines the research methodology used to explore the relationship between regulatory barriers, urban sprawl, and economic costs in Islamabad. It provides a detailed explanation of the research design, data collection methods, sampling techniques, and analysis approaches employed in the study. A mixed-method approach was adopted, combining quantitative and qualitative data to ensure a comprehensive understanding of the issues.

The chapter also highlights the case study area, Islamabad, as a well-planned yet increasingly challenged urban environment. A structured questionnaire and random sampling methods were used to collect data from 300 households across diverse neighborhoods. The analysis includes descriptive statistics, regression analysis, and in-depth interviews with stakeholders, supported by a review of relevant policies and regulations. Through this methodology, the study aims to generate actionable insights into the urban development challenges faced by Islamabad.

3.1 Theoretical framework

i. Regulatory capture theory, introduced by economist George Stigler in the 1970s, suggests that regulatory agencies may serve the interests of industries or powerful entities rather than the public. In urban planning, this theory implies that influential groups can shape regulations, such as land use, zoning, building permits, and development approvals, to favor their interests. This influence can either encourage or discourage urban sprawl. For example, policies like relaxed building codes or zoning regulations promoting suburban development can result in inefficient land

use, sprawling development patterns, and increased urban sprawl. The connection between regulatory capture, barriers, and urban sprawl leads to significant economic costs, including higher infrastructure expenses, longer commutes, environmental damage, and reduced productivity from inefficient land use.

ii. The residential location choice theory, introduced by Alonso (1964), explains the factors influencing where individuals and households choose to live. Regulatory barriers, such as zoning laws, building regulations, and land-use policies, impact housing availability, type, and affordability. Stricter regulations can limit housing supply or increase costs, pushing people to seek affordable housing in suburban areas, which contributes to urban sprawl. These barriers also affect commuting, infrastructure development, and the environmental impacts of sprawl, intersecting with economic costs. Amenities and neighborhood characteristics further influence residential choices. Understanding how regulatory barriers shape these choices is essential for urban planners and policymakers to create regulations that promote sustainable development, housing affordability, equitable access to amenities, and reduced economic and environmental costs of urban sprawl.

iii. Modern urban planning and development economics take an integrated approach, combining urban planning theories with economic principles to address urban growth challenges. This approach gained prominence in the 1970s and 1980s and aims to understand the economic forces behind urban development while promoting efficient, sustainable, and inclusive urban spaces. Regulatory barriers, such as zoning laws and land-use policies, play a key role in encouraging or deterring urban sprawl, which can result in higher infrastructure costs, inefficient land use, and environmental degradation.

iv. Spatial Mismatch Theory, developed by economist John Kain in the 1960s and 1970s, examines the disconnect between job locations and where workers live due to urban sprawl. This mismatch creates social and economic disparities, worsened by inadequate transportation, leading to higher unemployment rates and low-wage jobs. The theory is also associated with racial and economic segregation. Spatial mismatches result in longer commutes, increased automobile reliance, traffic congestion, pollution, infrastructure strain, rising housing prices, gentrification, and perpetuated poverty cycles. The theory advocates for urban policies that reduce disparities by integrating housing and job centers, improving transportation infrastructure, implementing mixed-use zoning, and fostering job growth in affordable housing areas. Collaboration among policymakers, planners, and community stakeholders is essential for creating inclusive, equitable environments.

3.2 Research Strategy and Design

The research strategy aims to understand the relationship between regulatory barriers, urban sprawl, and economic costs in Islamabad. It involves a literature review, a conceptual framework, and data collection from primary and secondary sources. The study has also examined existing regulations, urban sprawl measurement, and economic costs associated with sprawl using cost-benefit analysis. The data will be subjected to rigorous statistical and qualitative analysis.

The research was based on a literature review and an analysis of the Pakistan Real Estate Regulatory Authority's bylaws and building codes. It also included in-depth interviews using questionnaires with households in urban and suburban communities in Islamabad. The survey comprised both open- and close-ended questions. The first section focused on gathering background information about obtaining business rights, including the certificates and registrations required for building approvals. These covered market access for goods and the

implementation of economic activities. Another section examined urban sprawl in Islamabad over recent decades due to regulatory barriers, along with transportation costs and other expenses by comparing different sectors of the city. The questionnaire aimed to assess the impact of urban sprawl on economic costs and identify the factors contributing to these costs.

3.3 Methods of data collection

My research is a mixed-method approach. This study employs a mixed-method approach to investigate the role of regulatory barriers in urban sprawl and socio-economic disparity. Regulatory Capture Theory will guide the qualitative analysis of policy documents and interviews with urban planners to identify industry influence on zoning decisions. Residential Location Choice Theory informs a household survey and spatial regression to understand how zoning affects housing affordability and location preferences. Spatial Mismatch Theory is applied using GIS analysis to measure the distance between residential areas and employment centers, with an emphasis on commute times and transportation access. Lastly, the principles of Integrated Urban Planning and Development Economics frame the cost-benefit analysis of compact vs. sprawled infrastructure development. Together, these theories provide a comprehensive framework for assessing the socio-economic and environmental impacts of urban planning policies.

3.3.1 Descriptive statistics

I used descriptive statistics (quantitative data) to set the background and provide the detail necessary to explain the current restriction in the way of urban growth.

3.3.2 Regression analysis

My method to gather qualitative data is to compile, I conducted various interviews with households in urban and suburban societies of Islamabad, to examine the current context of economic cost and barriers in the way of smart city growth by regression analysis.

3.4 Sampling

This research used and adopted convenient sampling techniques. This probability sampling allows the researcher to gather and collect data based on convenience.

3.5 Analysis

The research used a regression model for analysis.

3.6 Review of relevant policies and in-depth interviews with relevant stakeholders.

Table 3.1: Review of Relevant Land-use Policies and Regulations

CITY	Type of property	Size of Area	Allowed Area	HOS (ft) G/1ST floor	Height of building	Set back (feet) Front/Back/Side	Arcade /FAR/building line (feet)
ISLAMABAD	Marakiz	1000 sq yds	Along roads		No restriction		0/1:6/0
		3000 sq yds					0/1:8/0
		Larger than 300& less than 5000					0/1:9/0
		Larger 5000 sq yds					0/1:10/0
	Trade center				Basement ground		

					+1 story		
	The existing building in a blue area			Up to 6			0/1:6/0
	High-rise buildings	300 sq yds	Blue area				
		300 sq yds	Sector G8				
		300 sq yds	Sector G 11				
		300 sq yds	Kashmir highway				
	Class 3 shopping centers				Ground plus one story		

HOS=Hight of Story

Sources: Capital Development Authority, Zameen.com.

Table 2.2: Interviews with relevant stakeholders.

Scope of the regulatory barriers	Barriers types
Obtaining the right to conduct business	Company registration
	Registration with the Pakistan Engineering Council
	Certification provided by these agencies
	Certification is based on three categories A, B, and C(the best category considered)

Implementation of economic activities	Control and surveyor activities of govt agencies (CDA)
	Establishment of a form of mandatory reporting (safe and secure fire brigade)
	Inspection activity of authorized govt CDA
	Introduction to building category approvals and registrations of decisions by govt agencies (CDA)
	Corruption on legal files in CDA
Administrative barriers to the general nature	The contradiction of current legislation
	Delayed legal guarantees for business entities
	Red zoning problem

Source: RE (real estate)

In-depth interviews with the different stakeholders in Real Estate industries like Graana.com, Zameen.com, and Gulberg Islamabad.

Scope of Regulatory Barriers in the Islamabad Construction Industry

Through interviews with key stakeholders in Islamabad's real estate and construction sectors—including developers, planners, and legal consultants—several significant regulatory barriers were identified. These barriers were grouped into three categories: entry into the market, implementation of economic activities, and overarching administrative challenges.

1. Barriers to Market Entry

Stakeholders highlighted multiple layers of bureaucracy as a deterrent to new entrants. Company registration processes, alongside mandatory registration with the Pakistan Engineering Council (PEC), were cited as overly complex and time-consuming. Several respondents emphasized the challenge of obtaining high-category PEC certification (Category A being the most prestigious), which often determines the scope and scale of projects a firm can undertake.

2. Barriers During Implementation of Economic Activities

A recurring theme in the interviews was the role of the Capital Development Authority (CDA) in both facilitating and constraining construction activity. Respondents pointed to excessive control, frequent inspections, and inconsistent enforcement of safety and reporting requirements—such as mandatory fire safety clearances—as critical sources of delay. One developer remarked, "The CDA keeps changing the rules midway, and inspections often feel like a tool for harassment rather than quality control." Additionally, corruption within the legal documentation process was frequently mentioned, with several interviewees noting that approvals often hinge on informal payments or personal connections rather than merit.

3. General Administrative Barriers

Stakeholders also discussed systemic contradictions within current legislation and significant legal uncertainty, which undermine investor confidence. A major concern was the "red zoning" policy, which restricts construction in designated areas. According to a senior urban planner, "Red zones are expanding without clear justification, pushing developers further out and fueling unplanned urban sprawl."

This displacement due to rigid land use regulations was consistently linked to the rapid expansion of Islamabad's urban footprint, leading to higher infrastructure costs, longer commute times, and inefficient land utilization.

Overall Insight

These interviews reveal that while regulations are intended to ensure quality and safety, their inconsistent implementation and lack of clarity often result in unintended economic consequences. Most notably, strict regulatory controls in central zones are pushing development to the periphery, accelerating urban sprawl and increasing public and private sector costs.

3.7 Methodological

3.7.1 Case study area and questionnaire design

Considering that the case study approach covers socioeconomic, demographic, administrative, and environmental cultural attitudes and preferences, it is extremely valuable for performing comprehensive analyses of phenomena. It is especially helpful when particular details regarding some parts of the phenomenon are missing from national census data. The capital city of Islamabad was selected as the case study area for this study. The Capital Development Authority (CDA), which has authority over five zones comprising 906 square kilometers, regulates Islamabad. Planning-wise, Islamabad is essentially a new, grid-structured, well-planned metropolis with superior urban amenities compared to the rest of the nation. However, it was planned to be "a city of the future" by its architect C. A. Doxiadis and named "Islamabad – the Beautiful" by its residents, but it is now on the verge of urban decay.

The study collected data from 300 households in Islamabad through face-to-face interviews using a well-designed questionnaire. The five-section questionnaire explored people's attitudes, behaviors, and preferences regarding sustainability. It included open-ended and Likert scale questions, focusing on topics like transportation (cost, availability, affordability) and building codes/regulations. Random sampling was used to gather information.

The first section collected household details such as gender, education, family size, monthly income, and travel frequency. This data helped distinguish families and individuals as diverse entities and provided insights into how these factors influence opinions and behavior regarding transportation and building regulations.

Another section focused on distances from workplaces, proximity to the central business district and urban amenities, and cultural or behavioral factors like norms and proximity to relatives. Questions were designed to gather information on home-to-work, school, and park mobility patterns, transport mode usage, travel frequency, travel time, and commuting costs.

3.7.2 Sample design and conduct of interviews

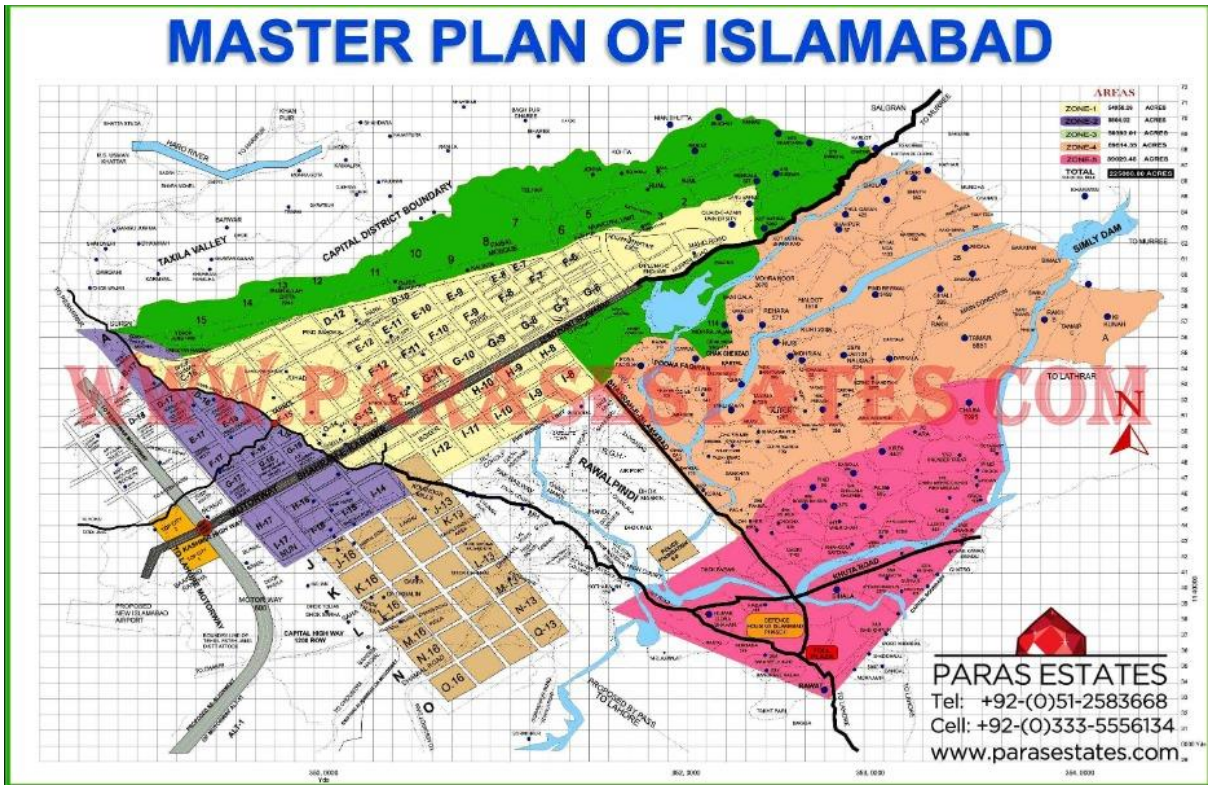
The sampling technique used in the study is random sampling. First, we chose different neighborhoods to make sure we cover the city and suburban areas and include families with different economic backgrounds. Then, in the next step, we randomly selected 22 Questionnaires from each neighborhood. This way, we want to make sure our study represents different types of households, and we can apply our findings to a larger population. For our analysis, we surveyed 14 areas of Islamabad, selecting 7 areas located near the city center and 7 situated on the outskirts. The urban areas: F6, F7, F8, G6, G7, G8, and I8.These sectors are located close to the central business district (CBD) of Islamabad. People living here are usually 5 to 10 minutes away from key commercial and business zones.The suburban areas: KRL Housing Society Rawat, Bahria Town Phase 4, DHA Phase 2, Airport Housing Society, Naval Anchorage, B17, and Top City.These are farther from the center, typically around 30 to 60 minutes away from the CBD, depending on traffic and route. This was done to examine, in line with Regulatory Capture Theory, whether regulations are causing people to move toward peripheral areas. Using the Residential Location Choice Theory, we carried out face-to-face interviews with households to understand why they chose their current residential locations. We also investigated the types of economic costs they are currently facing due to their location choice. This allows us to compare the economic costs experienced by residents in both central and peripheral areas. The aim is to identify which group bears higher economic burdens, so that, guided by the principles of Integrated Urban Development, we can propose effective policy recommendations for decision-makers.

Table 3.3: Sample Design and Details of Sectors

Islamabad	Area/Societies (7/7)
Urban	F6, F7, F8, G6, G7, G8, I8
Sub-urban	KRL Housing Society Rawat, Bahria town phase 4, DHA phase 2, Airport housing society, Naval Anchorage, B17, Top City.

NOTE: Area/societies are selected based on 'Near' and 'Far' from CBD of the Islamabad for the comparison of cost.

Figure 3.1: Study area map (zones and sectors)



The total household population is 3,40,000, according to the 2017 national census. However, this study conducted 300 face-to-face interviews, sufficient to test the model. Islamabad, a planned capital city, is divided into five zones wherein Zone I, the largest residential area, is divided into sectors with their names in the alphabet. This study has covered Zone-I, Zone-II,

and Zone-V of Islamabad's capital territory. In Zone-I, G6, G7, G8, F6, F7, F8 and I8 will covered. In Zone-V, KRL Housing Society Rawat, Bahria town phase 4, Navel Anchorage, DHA phase 2, and Airport Housing Society near Rawalpindi. In Zone-II, Top City, B17 are selected.

3.7.3 Variables and Description

Table 4 provides details about the units of measurement, descriptions, and how variables are constructed for our regression analysis. To gather this data, we need to conduct an anthropological survey. However, for our econometrics analysis, we have collected information on the key variables from households through a survey aligned with our theoretical model. For our analysis, we surveyed 14 areas of Islamabad, selecting 7 areas located near the city center and 7 situated on the outskirts. This was done to examine, in line with Regulatory Capture Theory, whether regulations are causing people to move toward peripheral areas. Using the Residential Location Choice Theory, we carried out face-to-face interviews with households to understand why they chose their current residential locations. We also investigated the types of economic costs they are currently facing due to their location choice. This allows us to compare the economic costs experienced by residents in both central and peripheral areas. The aim is to identify which group bears higher economic burdens, so that, guided by the principles of Integrated Urban Development, we can propose effective policy recommendations for decision-makers.

Table 3.4: Description of Variables.

Dependent Variables		
Variable Name	**Unit**	**Description and Measurement: Definition of Variable**

Economic cost due to transportation	Continuous number	This variable represents the financial burden on individuals or households, including expenses related to Transportation, Public goods and services, Household monthly income, and Living/Housing. It is measured on a Likert scale:
Independent Variables		
Urban sprawl	Ranking	This variable captures the extent and nature of urban sprawl in the geographical area under consideration. Urban sprawl can lead to various consequences, including changes in land use, transportation patterns, and community structure, which can, in turn, impact economic costs for individuals and households. Urban sprawl can be measured using the indicator Land Use Changes: Quantify changes in land use patterns, such as the green spaces into residential or commercial areas by the use of geographic information systems (GIS) data.
Regulatory barriers (Land Use Regulations)		This variable explores the impact of the regulatory framework on urban development, construction practices, and land utilization. A review of building codes and zoning regulations can influence the types of structures allowed, the density of development, and the overall layout of a community, which can subsequently affect economic costs for individuals and households. The measurement of this variable in the form of the Metrix involves assessing and documenting aspects such as: The stringency of Building Codes, Zoning Restrictions, and Permitting Processes in a Metrix form.
Living standard		This variable captures the multifaceted aspects of daily life that influence the overall well-being of individuals or households. It includes considerations like job availability, ease of commuting, convenience in daily activities, and the impact of transportation choices on the overall living standard. Using a Likert scale, we can measure the Living Standard based on respondents' perceptions or experiences. i. Reliance on Transportation Modes for Daily Commuting: (C11) ii. Lack of employment opportunities. (C15) iii. Commuting and convenience, and reliance on transportation modes for daily commuting. (C16)
Factors influencing the economic cost		This variable encompasses various factors affecting economic cost. It reflects the impact of transportation-related challenges and the accessibility of city centers on economic costs. This includes time-related expenses and convenience associated with commuting, as well as the ease of access to city centers for work and social interactions. Using a Likert scale, we can measure the factors influencing economic cost based on respondents' perceptions or experiences: i. Traffic Congestion During Daily Commute: (C21) ii. Additional Time Spent Compared to Ideal Travel Time: (C23) iii. Convenience of Proximity to City Centers for Work and Social Activities: (C25)

Traveling practices		This variable captures various aspects of individuals' travel behaviors. It provides insights into how individuals approach and make decisions about their travel, influencing economic costs based on chosen modes, travel frequency, and the purpose of their journeys. Using a Likert scale, we can measure the different components based on respondents' perceptions or experiences. i. Frequency of Travel on the Specific Route: (D12) ii. Main Purpose of the Travel: (D13) iii. Mode Used for the Journey: (D14) iv. Factors Considered While Choosing the Mode: (D15)
Overall Travel Cost		This variable captures the holistic nature of the travel process, considering both temporal and monetary aspects as well as the physical distance covered during a trip. Using a Likert scale, you can measure the different components of the travel experience based on respondents' perceptions or experiences. i. Waiting Time: (D23) ii. Travel Time: (D24) iii. Travel Cost: (D25) iv. Distance of Trip (Both Sides): (D26)
Locational choice Regarding convenient mode		This variable represents the decision-making process. The locational choice regarding a convenient mode focuses on the key elements individuals consider when selecting a place to live, taking into account factors that affect their daily lives, including commuting convenience, proximity to amenities, and economic considerations related to commuting expenses. Using a Likert scale, we can measure different components based on respondents' perceptions or experiences. i. Factors Influencing the Decision to Relocate: (D32) ii. Renting a House in an Area with Easy Access to Basic Amenities: (D33) iii. Commuting Expenses as a Critical Consideration: (D34)
Family unit		Family unit based on single-family or nuclear.
Travel frequency		The total traveling frequency of the respondent

3.7.4 Empirical model and indices development

The data obtained from the face-to-face survey was organized in Microsoft Excel, and after the construction of the indexes by weighted average, the data was transferred to the Stata

software pakag17 for Simple linear regression analysis. This regression approach is specifically designed for situations where the dependent variable continues in both analyses for urban and suburban for comparison in two different types of areas. While Simple linear regression models assign probabilities to specific values of the variable, the regression model assigns probabilities to values falling below certain thresholds on the Likert scale data. Consequently, the study utilized the simple linear regression model as a suitable approach for conducting the empirical analysis.

3.7.5 Equation for the regression model.

(Urban Equation)

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \varepsilon_i$$

Where

Y represents Monthly transportation costs of Household

X_1 represents Time to reach Centers

X_2 represents Mode used for the journey

X_3 represents Extra time spent on travel

X_4 represents Money costs due to traffic

X_5 represents Time for travel in suburban

X_6 represent Money for travel in suburban

X_7 represents Travel frequency

X_8 represents Travel on this route

X_9 represents Factors while choosing the mode

X_{10} represents Relatives in KM

X_{11} represents Grocery in KM

X_{12} represents Travel costs

X_{13} represents Years of contract

The above regression model shows the relationship between Urban household monthly transportation cost UMTCi and Time to reach centers TimeRCi, Mode used for the journey modeUFTJi, Extra time spent on travel ExtSOTi, Money cost due to traffic jams MoneyCTi, Need of time for travel in suburban TimeTSi, Need of money for travel in suburban MoneyTSi, Travel frequency TravelFi, Travel on this route TravelTRi, Factors while choosing the mode FactorsCM; Relatives in kilometers Reli; Grocery in kilometers Groci; Travel cost TravelCi and Years of contract YearOCi.

(Suburban Equation)

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \varepsilon_i$$

Where

Y represents Monthly transportation costs of Household

X_1 represents Time to reach Centers

X_2 represents Mode used for the journey

X_3 represents Extra time spent on travel

X_4 represents Money costs due to traffic

X_5 represents Tavel frequency

X_6 represent Factors while choosing the mode

X_7 represents the Purpose of travel

X_8 represents Travel cost

X_9 represents Who pays the rent.

The regression model shows the relationship between Suburban household monthly transportation cost SMTCi and Time to reach centers TimeRCi, Mode used for the journey ModeUFTJi, Extra time spent on travel ExtSOTi, Money cost due to traffic jams MoneyCTi, Factors while choosing the mode FactorsWCMi, Purpose of travel PurOTi, Travel cost TravelCi and Who pay the rent WhoPRi. The study developed the indices by the constant weight method based on essential indicators collected through the designed questionnaire. We designed our model in a way that allows us to study the sample according to relevant theories. Specifically, we want to understand what difficulties people face in compact cities due to regulatory barriers. We also examine the reasons behind their location choices, especially considering commuting costs. Then, we analyze how easy or difficult it is for them to access their workplaces from their chosen locations.

Using our model, we compare both areas to see how each variable affects household monthly transportation expenses. This analysis is done in light of the principles of spatial mismatch theory.

CHAPTER 4
RESULTS AND DISCUSSION

4.1 Descriptive Analysis

Research studies aim to systematically observe and describe the properties of events or objects to understand the relationships between variables. The main goal is to generalize findings, which helps explain phenomena and predict future outcomes. To conduct a research study effectively, certain principles must be followed to ensure that observations align with descriptions based on facts and figures. Measurement, a precise process of assigning numerical values to the characteristics of an event or object, is essential for this. For quality research, careful planning and design are needed to collect data, but post-analysis is what ensures the research's quality . In practice, data sets are often drawn from large populations, and a straightforward description of the data may not always be possible. Analyzing the characteristics of the data is crucial to achieving the research objectives. This analysis involves categorizing, classifying, and summarizing data to answer research questions. Data classification and categorization help organize large data sets into understandable forms . Descriptive analysis also ensures that generalizations are made only for a specific group of individuals, and no other groups are considered in the analysis. Descriptive analysis is a simple analysis in research but it delivers worthy and valuable information concerning the particular group under consideration. Firstly, descriptive analysis helps to answer research questions by estimating, summarizing, and arranging data into graphs and tables. Secondly, it helps to understand the behavior of variables having uncertainty and variability in the data. Thirdly, it indicates the unexpected observation and pattern in the dataset which is crucial for a formal analysis. Most importantly, the descriptive analysis guides the distribution of the data set i.e. normal distribution, etc. The application of empirical methodologies and

estimation techniques to draw inferences is subject to the descriptive analysis of the dataset. Therefore, this section briefly explains the descriptive statistics and visualization of variables included in this study.

Analysis of this study comprises three sections. Section 4.1 provides the household's demographic and socioeconomic characteristics by using descriptive analysis in Microsoft Excel, followed by Section 4.2, which depicts the attitude, behavior, and perception about measures of economic cost between urban and suburban societies.

4.2 Socioeconomic and demographic characteristics of respondents

A total of 300 respondents were survived via in-person interviewed

Table 4.2: Distribution of Household Demographic and Socioeconomic Characteristics: Frequency and Percentage.

Characteristics	**Range**	**Percentage distribution**	**Frequency**
Age	16-25	30.33	91
	26-35	33.33	100
	36-45	30	90
	46-55	6.33	19
Relationship with the head of household	Self	31.33	94
	Wife/ Husband	20.66	62
	Son/ Daughter	32.66	98
	Mother/ Father	3	9
	Brother/ Sister	10.33	31
	Other relatives	2	6
Gender	Male	93.66	281
	Female	6.33	19
Education	Illiterate	3.33	10

	Primary	1.33	4
	Secondary	4.66	14
	Matric	15.66	47
	Intermediate	13.33	40
	Graduate	21	63
	Masters	40.66	122
Designation	Employ	31.33	94
	Unemployed	18	54
	Student	19.66	59
	House wife	0	0
	Other	31	93
Type of household	Home owner	48	144
	Tenant	52	156
Family Unit	Joint	67.33	202
	Nuclear	26	78
	Other	6.66	20
Monthly earnings	<30,000	8.66	26
	30,000-50,000	14	42
	50,000-1,0000	12.33	37
	1,0000-1,50,000	11.66	35
	1,50,000>	53.33	160

Table 4.1 presents basic information on the socioeconomic and demographic variables, including Age, Relationship with the head of household, Gender, education, Designation, Type of household, Family unit, Monthly earnings, and Medical problem. Among the total population, 93.66 % are male, and 6.33 % are female, which shows the clear stratification among gender groups. For the educational background, there were obvious differences among different levels. The education of the household is 3.33% illiterate, 1.33% primary level, 4.66 secondary level, 15.66% Matric, 13.33% Intermediate, 21% Graduate, and 40.66 master level which shows a high percentage of education. The designation of the household is 31.33% Employ, 18% Unemployed, 19.66% Student 31% in Others i.e Business, etc. The

type of household is 48% Homeowner and 52% Tenant. The Family unit of the household is 67.33% living in joint, 26% are living Nuclear, and 6.66 are in Others like Hostel, etc. The household income of 8.66 % is less than PKR 30,000, followed by 14 % having income ranges between 30,000 to 50,000, 12.33% having income ranges between50,000 to 100,000, 11.66% having income ranges between 100,000 to 150,000 and the 5th and last range are above to 150,000. Since most of the Pakistani population are adults of young age, the proportion of respondents between 16 to 25 years is 30.33 %, 26 to 35 is 33.33% which is relatively high, the proportion of respondents between 36 to 45 years is 30% while the respondent between 46 to 55 years are only 6.33.

4.3 Knowledge, People's attitudes, Behavior, and Preferences about sustainability communities or compact city development.

Figs. 1–49 depicts the descriptive statistics of variables and distribution of responses, which are either of count or Likert scale nature. For example,

Figure 4.1: Comparison of Living Costs in Sprawled Areas vs. Urban Areas Under Strict Regulations (in Rupees)

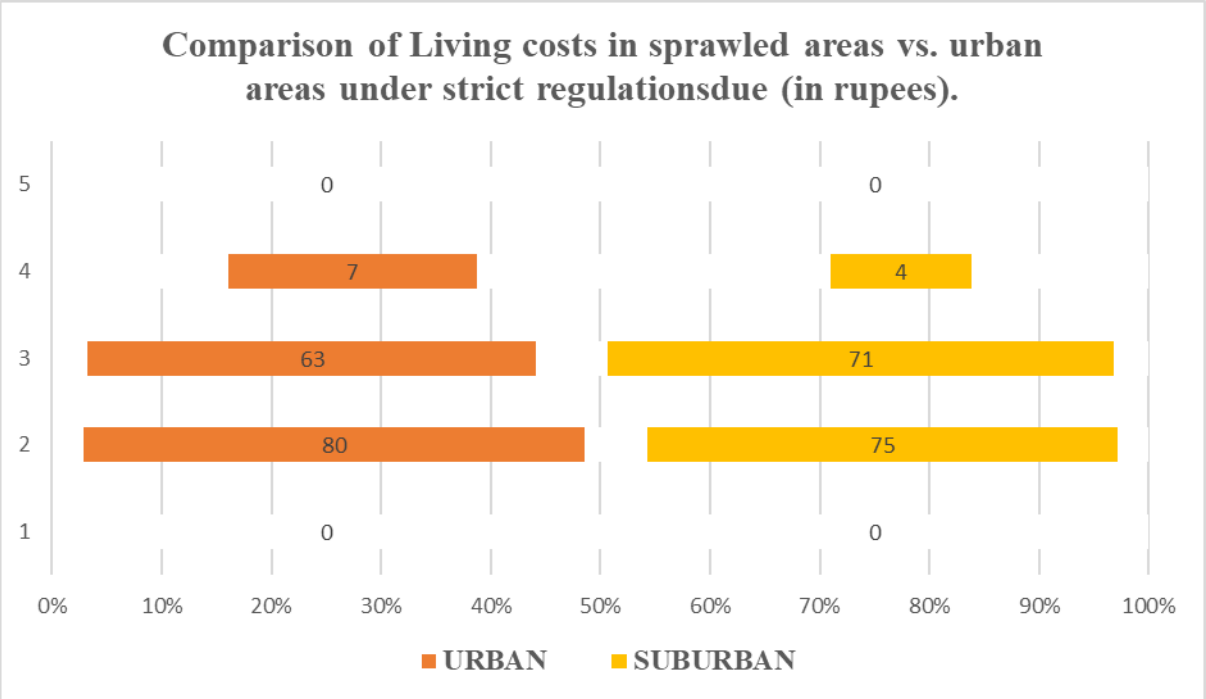


Figure 4.1 shows the distribution response to the statement representing that living standards in sprawled areas due to strict regulations, are costly (in rupees) as compared to urban areas. This is observed from responses in urban communities and sub-urban communities that a living standard in sprawled areas due to strict land use regulations is costly, and it is important for sustainable urban communities to make some relaxation in land use regulations. For example, in urban areas, 80/53.3% of respondents agreed that living in sprawled areas is slightly costly, and 63/42% are moderately costly to them, 7/4.66% agreed on costly. Similarly, in urban areas, 75/50% of respondents agreed that living in sprawled areas is slightly costly, and 71/49.3 % are moderately costly to them, 4/2.66% are agreed on it costly.

Figure 4.2: Impact of Strict Land-Use Regulations on Higher-Density Housing Development in Urban Areas

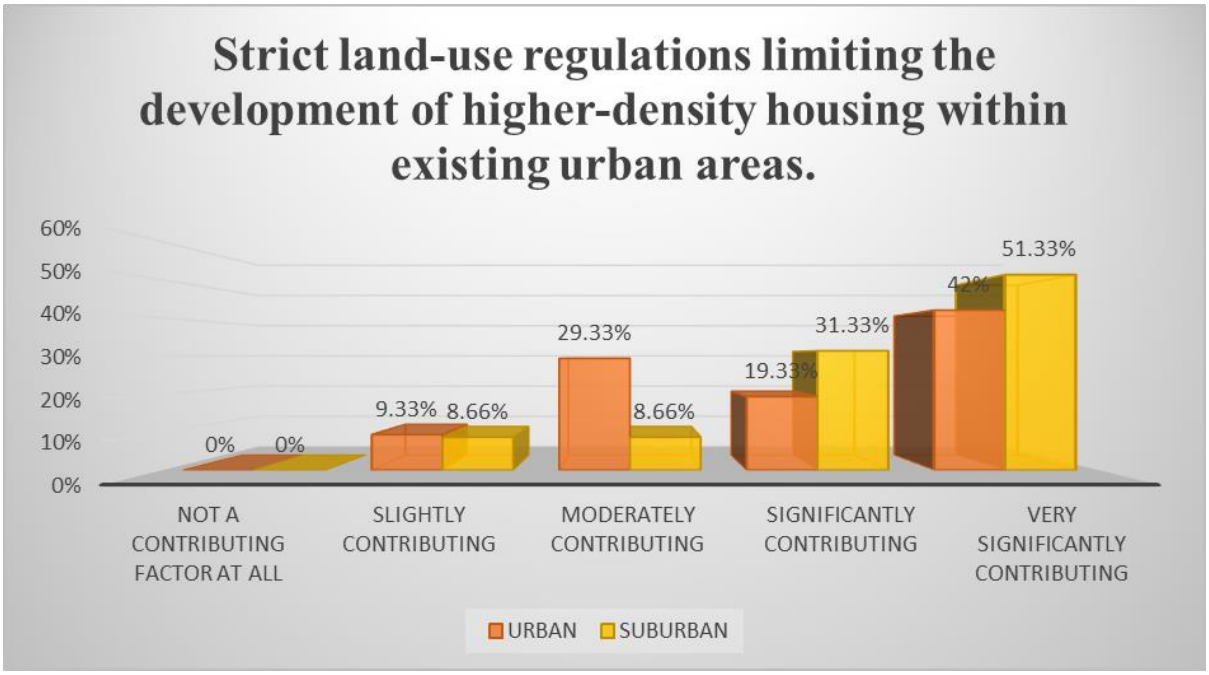


Fig shows the distribution response to the statement representing that Strict land-use regulations limit the development of higher-density housing within existing urban areas. This is observed from responses in urban communities and sub-urban communities that a strict land-use regulation limits the development of higher-density housing within existing urban areas, and it is important for sustainable urban communities to make some relaxations in

land-use regulations. For example in urban areas, 9.33% of respondents agreed that this statement is a slightly contributing factor at all, 29.33% are moderately contributing to them, 19.33% are on significantly contributing factors at all and 42% are on very significant contributing factors. Similarly in suburban areas, 8.66% of respondents agreed that this statement is a slightly contributing factor at all, 8.66% are moderately contributing to them, 31.33% are on significantly contributing factor at all, and 51% are on very significantly contributing factor.

Figure 4.3: Average Daily Travel Time (In Min) To Urban Centers

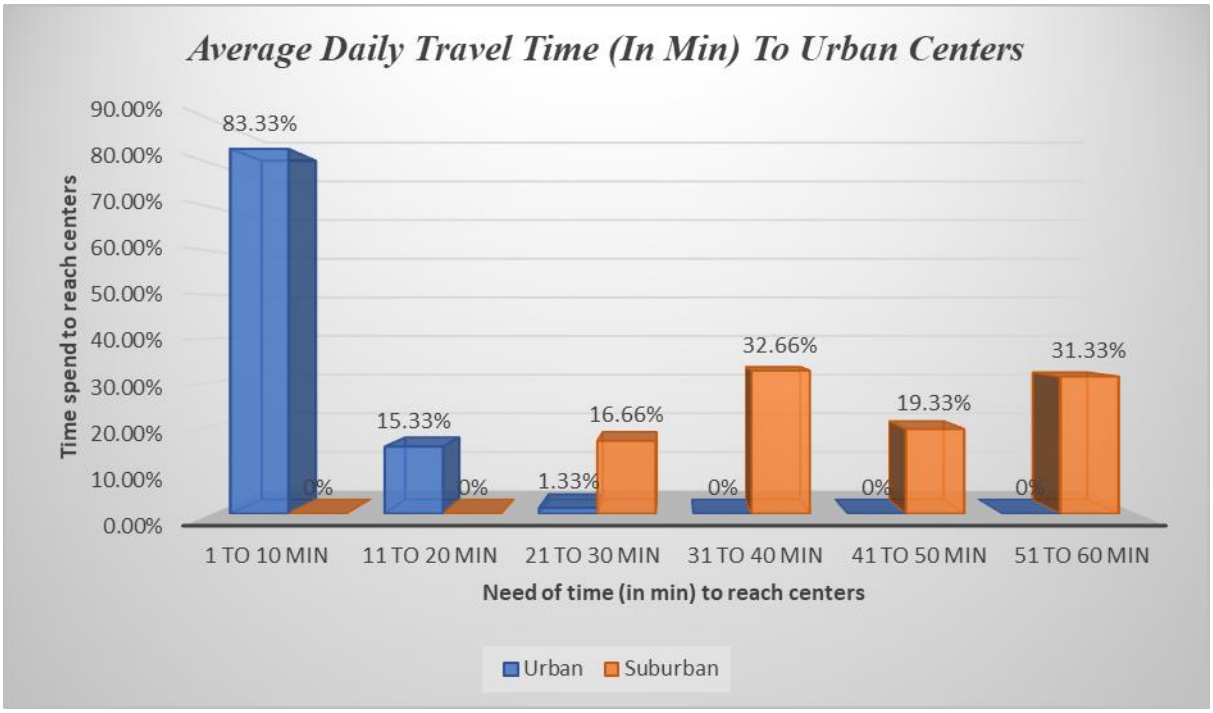


Fig shows the distribution response to the statement representing How much time (in min) it takes for people to reach centers. This is observed from responses in urban communities and sub-urban communities that how much time (in min) it takes for people to reach centers, and sustainable urban communities need to compare the time cost of urban and suburban areas to clarify how much more time cost in suburban areas due to urban sprawl. For example in urban areas, 83.33% of respondents agreed that 1 to 10 minutes are taken to reach the city centers, 15.33% of respondents agreed that 11 to 20 minutes are taken to reach the city

centers, 1.33% of respondents agreed that 21 to 30 minutes are taken to reach the city centers. In comparison, in Suburban areas, 16.66% of respondents are agreed that 21 to 30 minutes are taken to reach the city centers, 32.66% of respondents are agreed that 31 to 40 minutes are taken to reach the city centers, 19.33% of respondents agreed that 41 to 50 minutes are taken to reach the city centers and 31.33% of respondents are agreed that 51 to 60 minutes are taken to reach the city centers.

Figure 4.4: Daily Travel Costs (in rupees) to Urban Centers

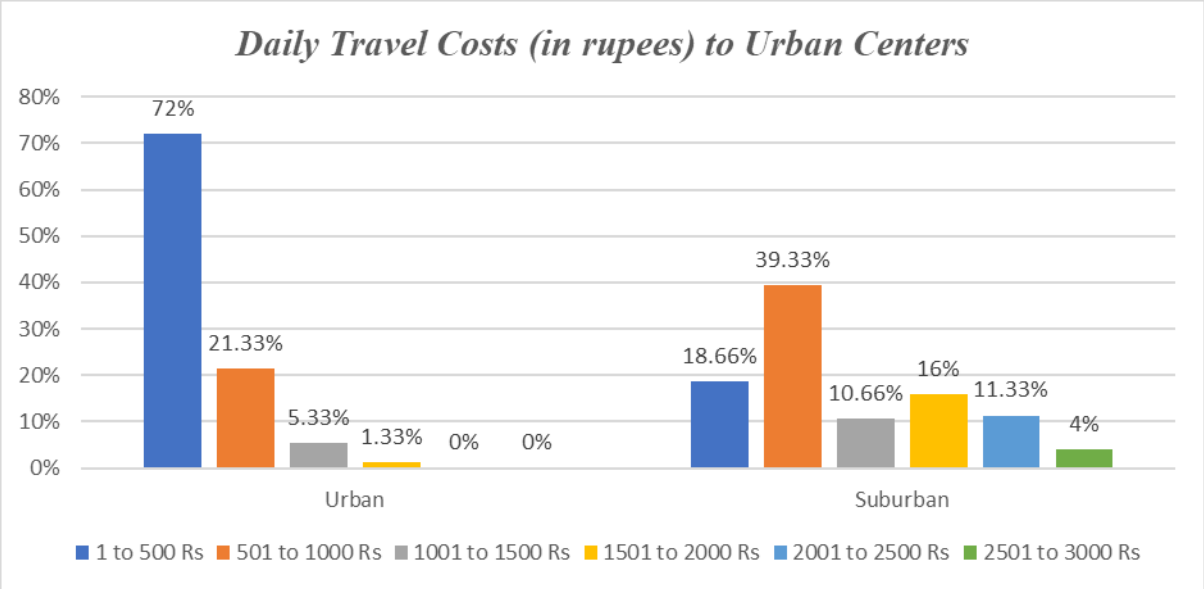


Fig shows the distribution response to the statement representing How much money (in Rupees) it takes for people to reach centers. This is observed from responses in urban communities and sub-urban communities that how much money (in Rupees) it takes for people to reach centers, and sustainable urban communities need to compare the Money cost of urban and suburban areas to clarify how much more Money cost in suburban areas due to urban sprawl. For example in urban areas, 72% of respondents agreed that 1 to 500 rupees cost are bear to reach the city centers, 21.33% of respondents agreed that 501 to 1000 rupees cost are bear to reach the city centers, 1.33% of respondents agreed that 1001 to 1500 rupees cost are bear to reach the city centers. In comparison, in Suburban areas, 18.66% of

respondents agreed that 1 to 500 rupees cost are bear to reach the city centers, 39.66% of respondents agreed that 501 to 1000 rupees cost are bear to reach the city centers, 10.66% of respondents agreed that 1001 to 1500 rupees cost are bear to reach the city centers, 16% of respondents are agreed that 1501 to 2000 rupees cost are bear to reach the city centers, 11.33% of respondents are agreed that 2001 to 2500 rupees cost are bear to reach the city centers and 4% of respondents are agreed that 2501 to 3000 rupees are bear to reach the city centers.

Figure 4.5: Stress Level (In %) and Accesses To Basic Life Amenities

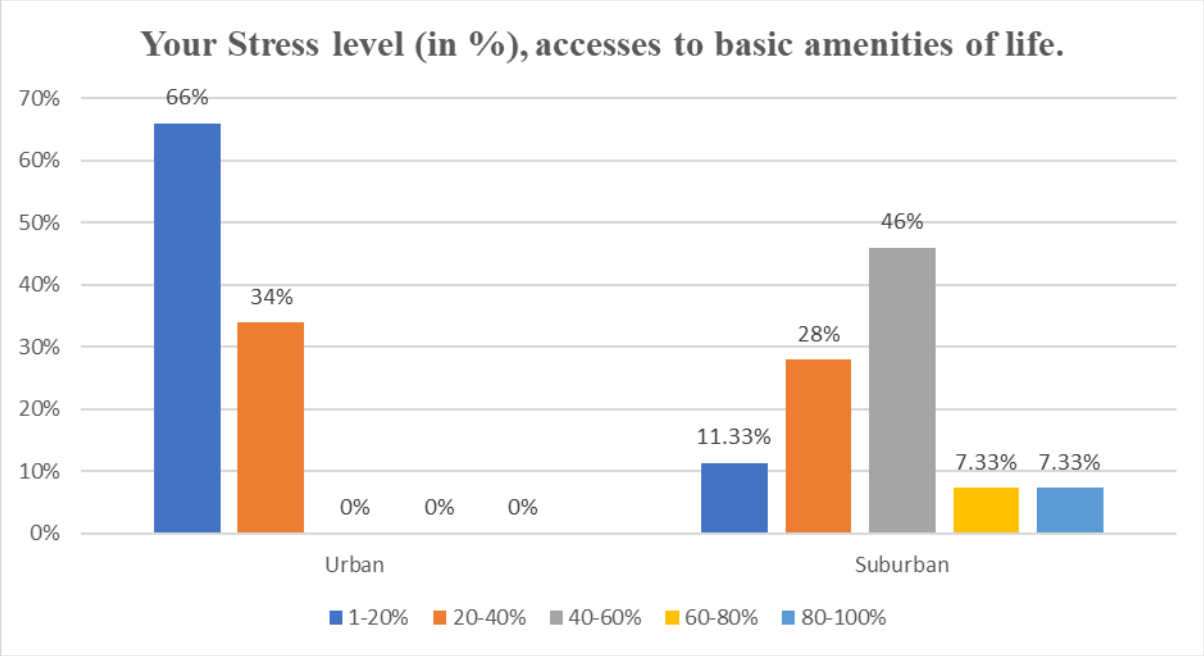


Fig. shows the distribution response to the statement representing your stress level (in %) and access to basic amenities of life. This is observed from responses in urban communities and sub-urban communities that your stress level (in %), access to basic amenities of life, and sustainable urban communities need to compare Stress levels of urban and suburban areas to clarify how much more stress levels are facing in suburban areas due to urban sprawl. For example in urban areas, 66% of respondents agreed that 1 to 20% of stress levels are bear to reach the basic amenities of life and 34% of respondents agreed that 20-40% of stress levels are bear to reach the basic amenities of life. In comparison, in Suburban areas, 11.33% of

respondents agreed that 1-20% of stress levels are bear to reach the basic amenities of life, 28% of respondents agreed that 20-40% of stress levels are bear to reach the basic amenities of life, 46% of respondents are agreed that 40-60% of stress level are bear to reach the basic amenities of life, 7.33% of respondents are agreed that 60-80% are bear to reach the basic amenities of life and 7.33% of respondents are agreed that 80-100% of stress level are bear to reach the basic amenities of life.

Figure 4.6: Effect of Flexible Land-use Policies on Controlling Urban Sprawl.

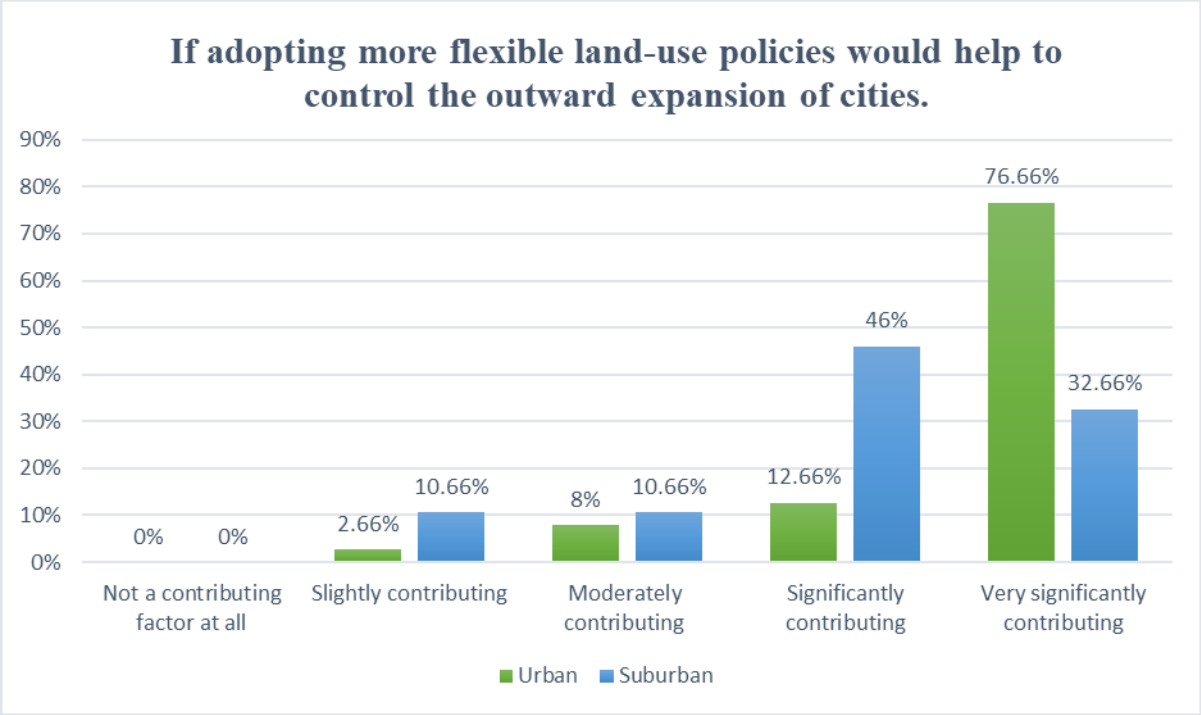


Fig. shows the distribution response to the statement representing that adopting more flexible land-use policies would help to control the outward expansion of cities. This is observed from responses in urban communities and sub-urban communities that adopting more flexible land-use policies would help to control the outward expansion of cities, and sustainable urban communities need to make some relaxation in land-use regulations. For example in urban areas, 2.66% of respondents agreed that this statement is a slightly contributing factor at all, 8% are moderately contributing to them, 12.66% are on significantly contributing factor at all, and 76.66% are on very significantly contributing factor. In comparison, in suburban

areas, 10.66% of respondents agreed that this statement is a slightly contributing factor at all, 10.66% moderately contributing to them, 46% are a significantly contributing factor at all, and 32.66% are on very significant contributing factor.

Figure 4.7: Monthly Household Saving (In Rupees) From Living In a High-Density City

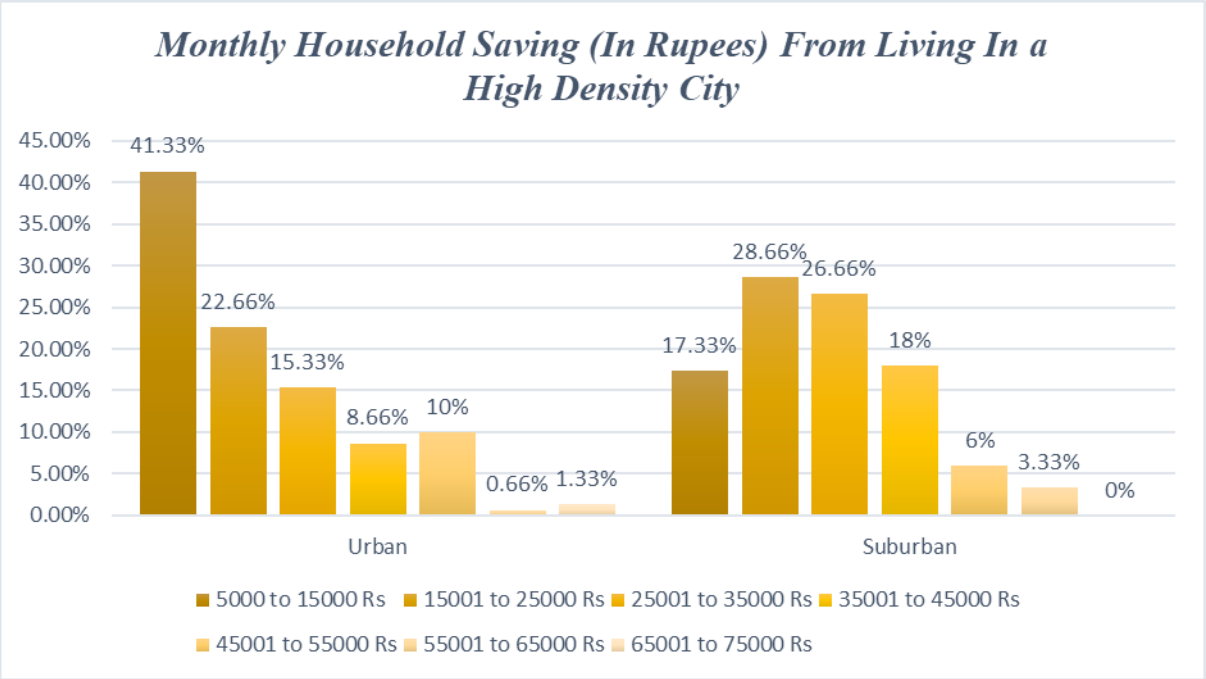


Fig shows the distribution response to the statement representing how much money (in rupees) could save households due to living in a High-density city. This is observed from responses in urban communities and sub-urban communities that how much money (in rupees) could save household due to living in a High-density city, and sustainable urban communities need to compare money costs of urban and suburban areas to clarify how much more money costs are facing in suburban areas due to urban sprawl. For example in urban areas, 41.33% of respondents agreed that 5000-15000 money could be saved due to living in a high-density city, 22.66% of respondents agreed that 15000-25000 money could save due to living in a high-density city, 15.33% of respondent are agreed that 25000-35000 money could save due to living in a high-density city, 8.66% of respondents are agreed that 35000-45000 money could save due to living in a high-density city,10% of respondent are agreed that

45000-55000 Rs money could save due to living in a high-density city, 0.66% of respondent are agreed that 55000-65000 Rs money could save due to living in a high-density city and 1.33% of respondents are agreed that 65000-75000 Rs money could save due to living in a high-density city. In comparison, in Suburban areas, 17.33% of respondents are agreed that 5000-15000 money could save due to living in a high-density city, 28.66% of respondents are agreed that 15000-25000 money could save due to living in a high-density city, 26.66% of respondents are agreed that 25000-35000 money could save due to living in a high-density city, 18% of respondents are agreed that 35000-45000 money could save due to living in a high-density city, 6% of respondents are agreed that 45000-55000 Rs money could save due to living in a high-density city and 3.33% of respondent are agreed that 55000-65000 Rs money could save due to living in a high-density city.

Figure 4.8: Commuting Costs (In Rs) for Attending Social Gatherings and Events**.**

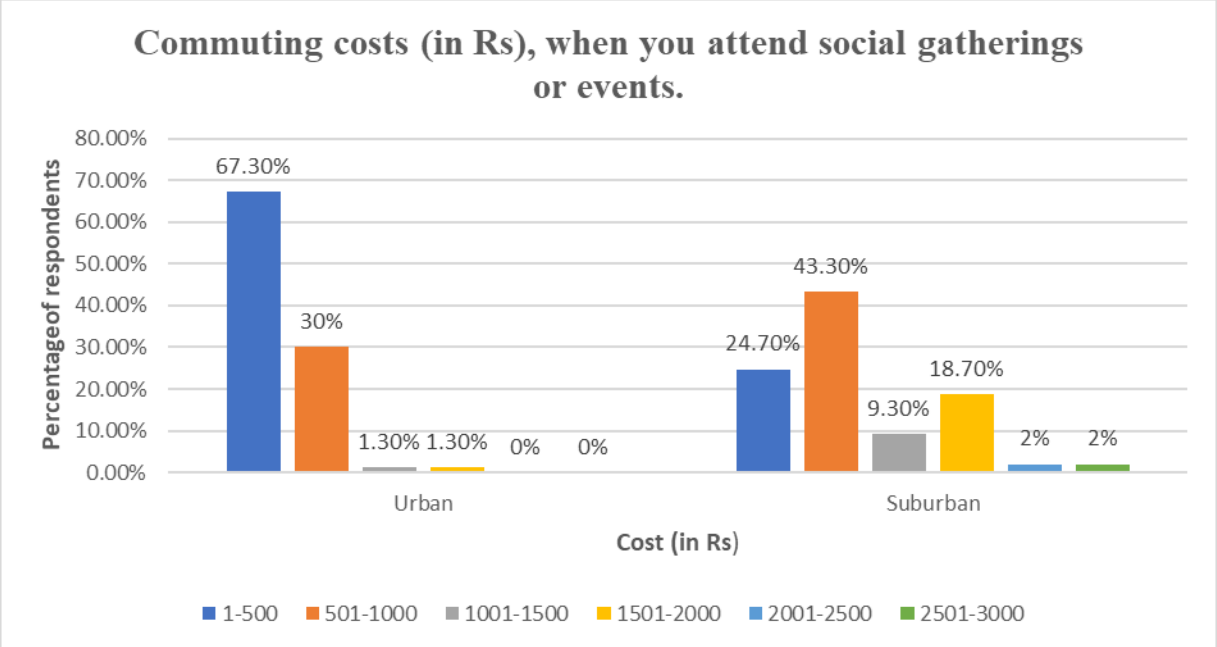


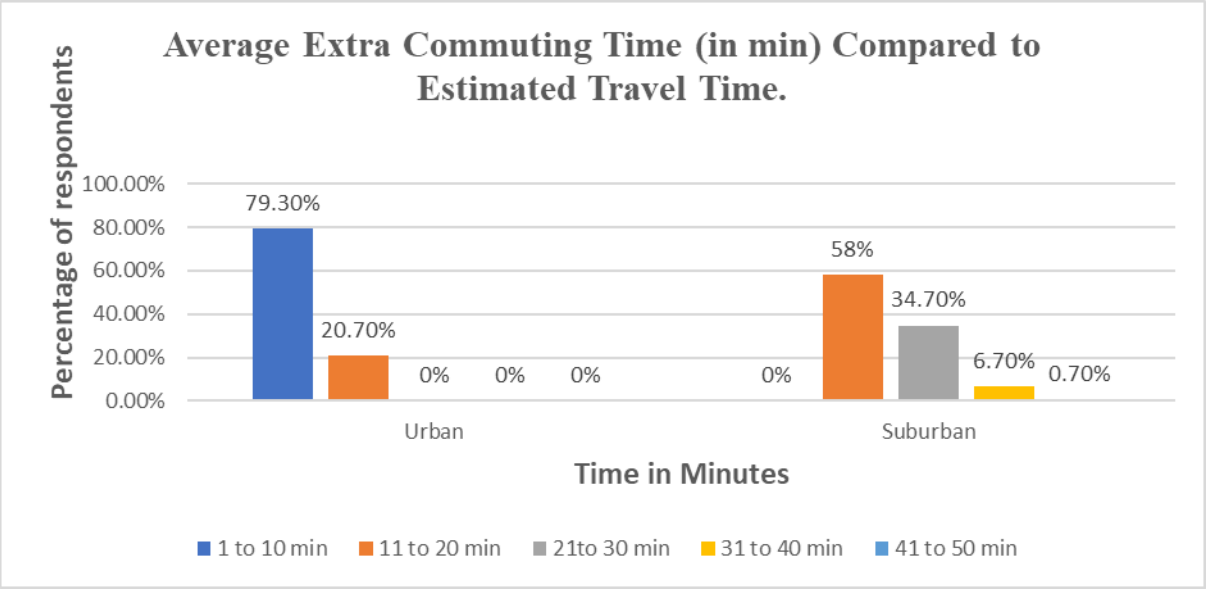
Fig shows that the bar graph displays the commuting costs (in Rupees) incurred by respondents when attending social gatherings or events in both urban and suburban areas. The data is segmented into different cost ranges and shows the percentage of respondents falling into each category.

Urban Area:1-500 Rs: 67.3% of respondents fall into this cost range 501-1000 Rs: 30% of respondents.1001-1500 Rs: 1.3% of respondents.1501-2000 Rs: 0.3% of respondents.2001-2500 Rs and 2501-3000 Rs: 0% of respondents.

Suburban Area:1-500 Rs: 24.7% of respondents fall into this cost range.501-1000 Rs: 43.3% of respondents.1001-1500 Rs: 9.3% of respondents.1501-2000 Rs: 18.7% of respondents.2001-2500 Rs: 2% of respondents.2501-3000 Rs: 2% of respondents. The majority of respondents in urban areas (67.3%) incur commuting costs in the lowest range (1-500 Rs), whereas in suburban areas, only 24.7% fall into this range. This suggests that commuting is generally cheaper in urban areas. A significant proportion of suburban respondents (43.3%) spend between 501-1000 Rs on commuting, compared to 30% in urban areas.

Higher cost ranges (1001-3000 Rs) see more respondents in suburban areas:1001-1500 Rs: 9.3% in suburban vs. 1.3% in urban.1501-2000 Rs: 18.7% in suburban vs. 0.3% in urban.2001-2500 Rs: 2% in suburban vs. 0% in urban.2501-3000 Rs: 2% in suburban vs. 0% in urban. These observations indicate that commuting costs for social gatherings and events are generally higher in suburban areas compared to urban areas. More respondents in suburban areas face higher commuting costs, while the majority in urban areas incur lower costs.

Figure 4.9: Average Extra Commuting Time (in min) Compared to Estimated Travel Time.



The graph illustrates the extra time (in minutes) spent on commuting compared to the estimated travel time for respondents in urban and suburban areas.

Urban Areas: 1 to 10 minutes: 79.3% of respondents report spending an extra 1 to 10 minutes on their commute. 11 to 20 minutes: 20.7% of respondents spend an extra 11 to 20 minutes. 21 to 50 minutes: 0% of respondents spend more than 20 minutes extra.

Suburban Areas: 1 to 10 minutes: 58% of respondents spend an extra 1 to 10 minutes. 11 to 20 minutes: 34.7% of respondents spend an extra 11 to 20 minutes. 21 to 30 minutes: 6.7% of respondents spend an extra 21 to 30 minutes. 31 to 40 minutes: 0.7% of respondents spend an extra 31 to 40 minutes. 41 to 50 minutes: 0% of respondents spend an extra 41 to 50 minutes

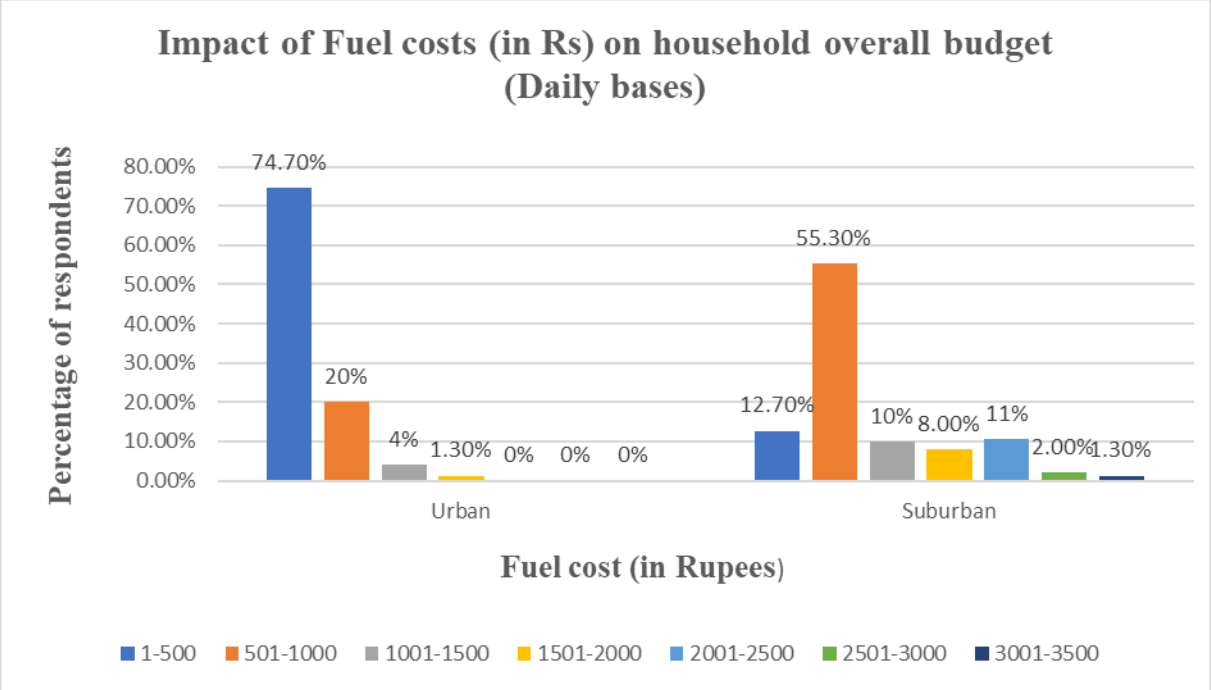
Comparison between Urban and Suburban Areas: In urban areas, a significant majority (79.3%) spend only an extra 1 to 10 minutes on their commute. This indicates that urban commutes are generally more predictable with minimal extra time needed. In suburban areas, only 58% of respondents spend an extra 1 to 10 minutes, which is lower than in urban areas.

This suggests that suburban commutes are less predictable, with more people experiencing delays.

Higher Extra Time in Suburban Areas: 34.7% of suburban respondents report spending an extra 11 to 20 minutes, compared to only 20.7% in urban areas. Additionally, 6.7% of suburban respondents spent 21 to 30 minutes extra, and 0.7% spent 31 to 40 minutes extra, whereas no urban respondents reported spending more than 20 minutes extra.

People in suburban areas tend to experience more significant delays in their commutes compared to their urban counterparts. This indicates that commuting in suburban areas is less predictable and often requires more extra time than commuting in urban areas.

Figure 4.10: Impact Of Fuel Costs (In Rs) On Daily Commuting Budget.



The graph depicts the impact of fuel costs (in Rupees) on the overall household budget daily for respondents in urban and suburban areas.

Urban Areas: 1-500 Rs: 74.7% of respondents report that their daily fuel costs fall within this range. 501-1000 Rs: 20% of respondents fall into this category. 1001-1500 Rs: 4% of

respondents are in this category. 1501-2000 Rs: 1.3% of respondents fall into this category. 2001-3500 Rs: 0% of respondents have daily fuel costs above 2000 Rs.

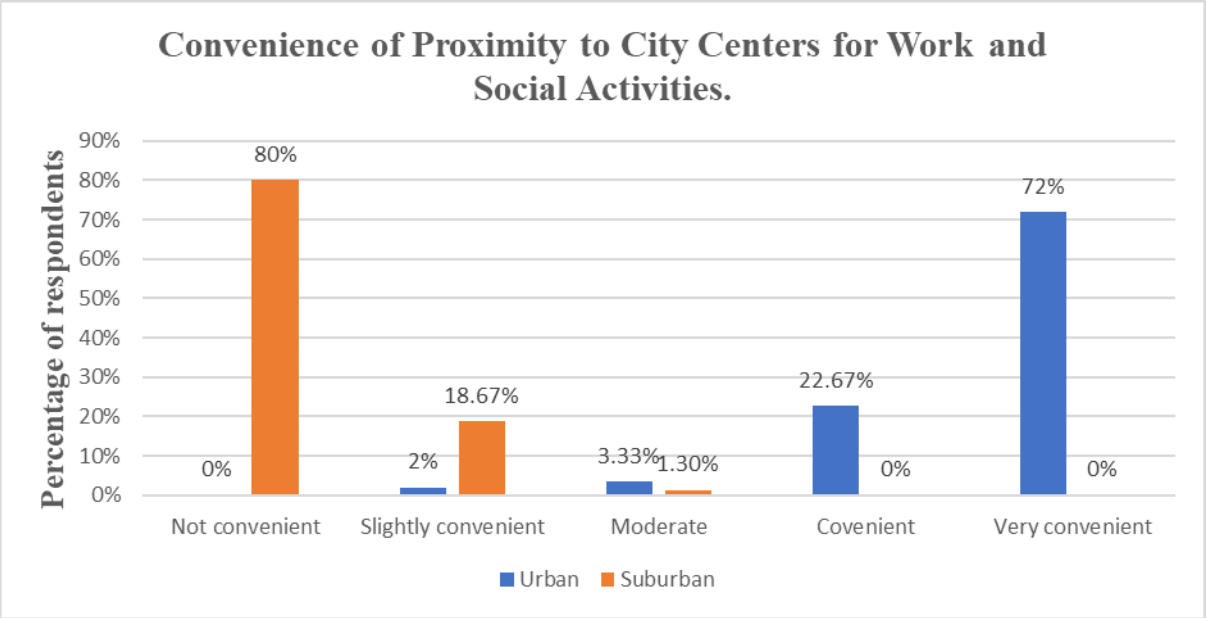
Suburban Areas: 1-500 Rs: 12.7% of respondents fall into this category. 501-1000 Rs: 55.3% of respondents have daily fuel costs in this range. 1001-1500 Rs: 10% of respondents report this level of expenditure. 1501-2000 Rs: 8% of respondents fall into this category. 2001-2500 Rs: 11% of respondents report daily fuel costs in this range. 2501-3000 Rs: 2% of respondents fall into this category. 3001-3500 Rs: 1.3% of respondents have daily fuel costs in this range.

Urban vs. Suburban Comparison: In urban areas, the majority (74.7%) of respondents spend between 1-500 Rs daily on fuel, indicating a relatively low impact on their household budget from fuel costs. In suburban areas, only 12.7% of respondents fall into the 1-500 Rs category, suggesting that fuel costs are generally higher for suburban residents.

Higher Fuel Costs in Suburban Areas: A significant portion (55.3%) of suburban respondents spend 501-1000 Rs daily on fuel, compared to 20% in urban areas. Additionally, suburban respondents report higher expenditures in the 1001-1500 Rs (10%), 1501-2000 Rs (8%), and 2001-2500 Rs (11%) ranges, whereas these costs are minimal or non-existent for urban respondents. Some suburban respondents even report spending between 2501-3000 Rs (2%) and 3001-3500 Rs (1.3%) daily, costs which are not present in the urban data.

Fuel costs have a significantly greater impact on the household budgets of suburban residents compared to urban residents. This is evidenced by the higher percentages of suburban respondents reporting greater daily expenditures on fuel, with a substantial portion spending over 1000 Rs daily. In contrast, urban respondents predominantly experience lower fuel costs, with the vast majority spending less than 500 Rs daily.

Figure 4.11: Convenience of Proximity to City Centers for Work and Social Activities.



The graph illustrates the perceived convenience of being close to city centers for both work and social activities, comparing responses from urban and suburban residents.

Urban Areas: Very Convenient: 72% of respondents find it very convenient to be close to city centers. Convenient: 22.67% of respondents find it convenient. Moderate: 3.33% of respondents find it moderately convenient. Slightly Convenient: 2% of respondents find it slightly convenient. Not Convenient: 0% of respondents find it not convenient.

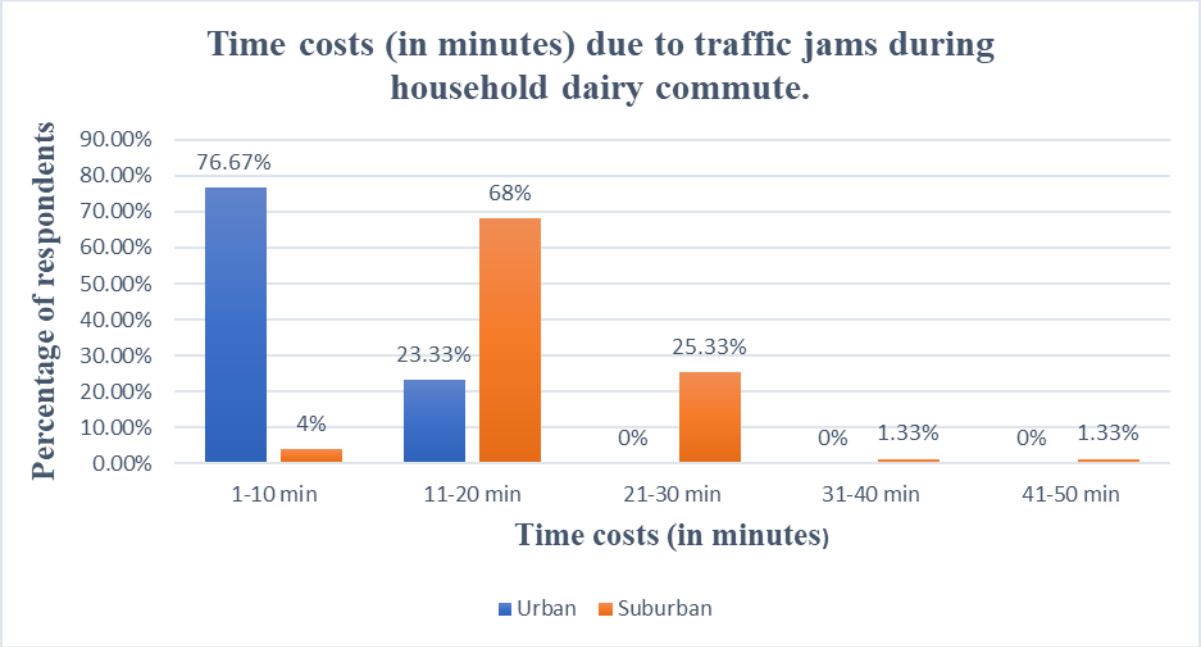
Suburban Areas: Very Convenient: 0% of respondents find it very convenient. Convenient: 0% of respondents find it convenient. Moderate: 1.3% of respondents find it moderately convenient. Slightly Convenient: 18.67% of respondents find it slightly convenient. Not Convenient: 80% of respondents find it not convenient.

Urban Residents: The majority (72%) of urban respondents find it very convenient to be close to city centers for work and social activities. This suggests that living in urban areas offers significant advantages in terms of accessibility and convenience. An additional 22.67% find it

convenient, and only a small percentage (3.33% and 2%) find it moderately or slightly convenient, respectively.

Suburban Residents: A striking 80% of suburban respondents find it not convenient to be close to city centers, indicating significant challenges related to distance and accessibility. 18.67% find it slightly convenient, and only 1.3% find it moderately convenient. No suburban respondents consider it convenient or very convenient to be close to city centers. The graph highlights a stark contrast between urban and suburban residents regarding the convenience of being close to city centers. Urban residents overwhelmingly find it convenient or very convenient, reflecting the benefits of proximity to city centers. In contrast, suburban residents predominantly find it not convenient, pointing to the difficulties and disadvantages of being further away from central urban areas. This discrepancy underscores the importance of location for daily activities and overall convenience.

Figure 4.12: Frequency of Time costs (in minutes) due to traffic jams during the daily commute.



The graph illustrates the time costs (in minutes) due to traffic jams during household daily commutes for urban and suburban respondents.

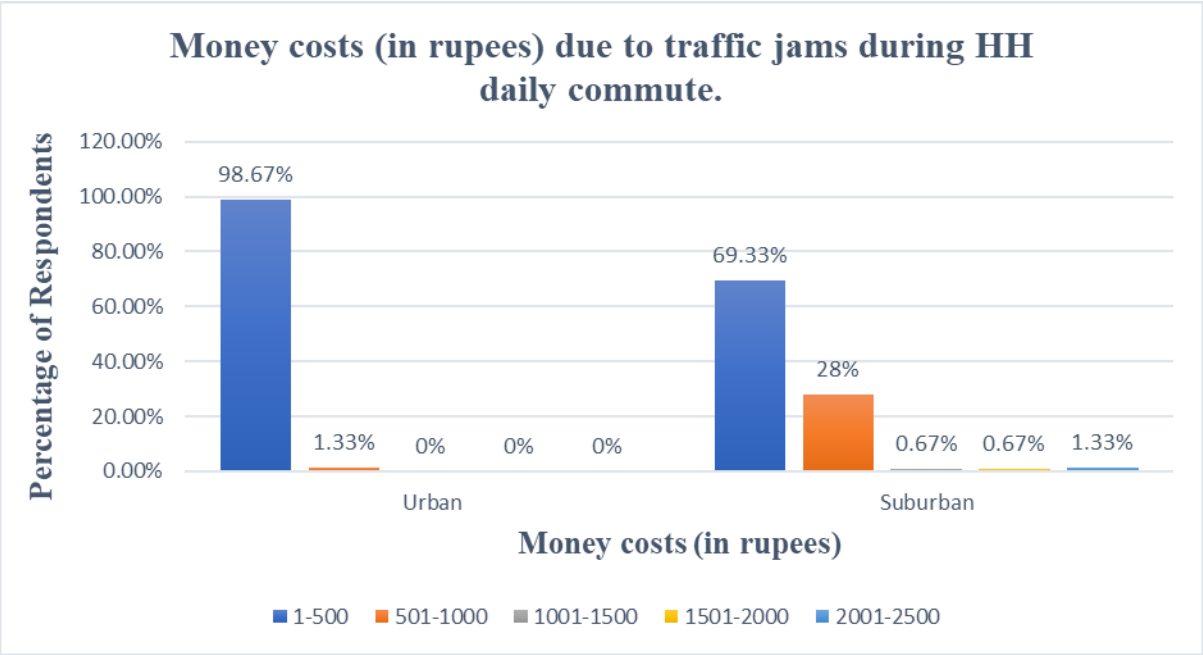
i. 1-10 minutes: Urban: 76.67% of respondents experience this time cost. Suburban: 4% of respondents experience this time cost.
ii. 11-20 minutes: Urban: 23.33% of respondents experience this time cost. Suburban: 68% of respondents experience this time cost.
iii. 21-30 minutes: Urban: 0% of respondents experience this time cost. Suburban: 25.33% of respondents experience this time cost.
iv. 31-40 minutes: Urban: 0% of respondents experience this time cost. Suburban: 1.33% of respondents experience this time cost.
v. 41-50 minutes: Urban: 0% of respondents experience this time cost. Suburban: 1.33% of respondents experience this time cost.

Urban Commuters: The majority (76.67%) spend 1-10 minutes in traffic jams, with a smaller portion (23.33%) spending 11-20 minutes. No urban respondents reported spending more than 20 minutes in traffic jams.

Suburban Commuters: Most suburban respondents (68%) spend 11-20 minutes in traffic jams. A significant portion (25.33%) spends 21-30 minutes, and a small percentage (4%) spends only 1-10 minutes. Very few suburban respondents experience longer traffic jams, with 1.33% each for the 31-40 and 41-50 minute categories.

Urban commuters generally experience shorter traffic jams compared to suburban commuters. A higher percentage of suburban commuters experience longer traffic jams, particularly in the 11-20 and 21-30 minute ranges. The time cost distribution shows that suburban commuters face more variability in traffic jam durations, whereas urban commuters mostly experience shorter, more consistent delays.

Figure 4.13: Frequency of Money costs (in rupees) due to traffic jams during the daily commute.



The graph illustrates the money costs (in rupees) due to traffic jams during household daily commutes for urban and suburban respondents.

i. 1-500 rupees: Urban: 98.67% of respondents experience this cost. Suburban: 69.33% of respondents experience this cost.

ii. 501-1000 rupees: Urban: 1.33% of respondents experience this cost. Suburban: 28% of respondents experience this cost.

iii. 1001-1500 rupees: Urban: 0% of respondents experience this cost. Suburban: 0.67% of respondents experience this cost.

iv. 1501-2000 rupees: Urban: 0% of respondents experience this cost. Suburban: 0.67% of respondents experience this cost.

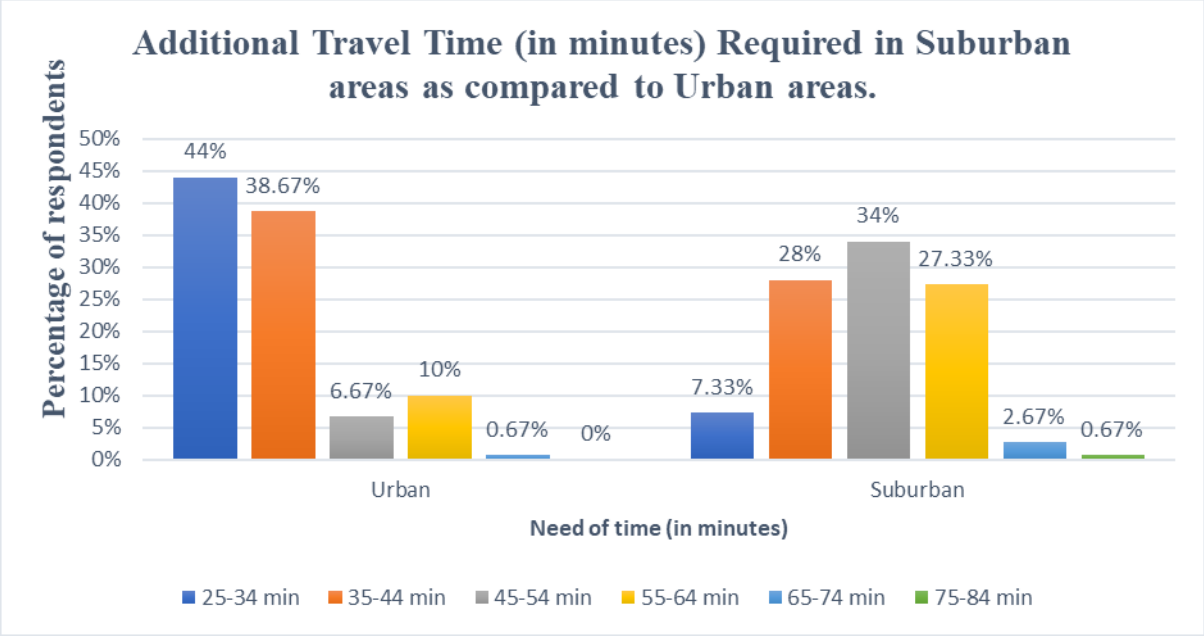
v. 2001-2500 rupees: Urban: 0% of respondents experience this cost. Suburban: 1.33% of respondents experience this cost.

Urban Commuters: The vast majority (98.67%) incur a cost of 1-500 rupees due to traffic jams. A very small percentage (1.33%) face costs of 501-1000 rupees. No urban respondents reported costs higher than 1000 rupees.

Suburban Commuters: The majority (69.33%) incur a cost of 1-500 rupees. A significant portion (28%) incur costs of 501-1000 rupees. A very small percentage (0.67% each) face costs of 1001-1500 and 1501-2000 rupees, and 1.33% incur costs of 2001-2500 rupees.

Urban commuters generally experience lower monetary costs due to traffic jams, with almost all respondents falling within the 1-500 rupee range. Suburban commuters face higher and more varied monetary costs, with notable percentages experiencing costs in the 501-1000 rupee range and small percentages facing even higher costs. The distribution indicates that suburban commuters are more likely to incur higher expenses due to traffic jams compared to urban commuters.

Figure 4. 14: Additional Travel Time (in minutes) Required in Suburban areas as compared to Urban areas.



The graph compares the need for travel time (in minutes) in suburban areas to urban areas based on respondent data.

Urban area:

i. 25-34 minutes: 44% of respondents need this travel time.

ii. 35-44 minutes: 38.67% of respondents need this travel time.

iii. 45-54 minutes: 6.67% of respondents need this travel time.

iv. 55-64 minutes: 10% of respondents need this travel time.

v. 65-74 minutes: 0.67% of respondents need this travel time.

vi. 75-84 minutes: 0% of respondents need this travel time.

Suburban area:

i. 25-34 minutes: 7.33% of respondents need this travel time.

ii. 35-44 minutes: 28% of respondents need this travel time.

iii. 45-54 minutes: 34% of respondents need this travel time.

iv. 55-64 minutes: 27.33% of respondents need this travel time.

v. 65-74 minutes: 2.67% of respondents need this travel time.

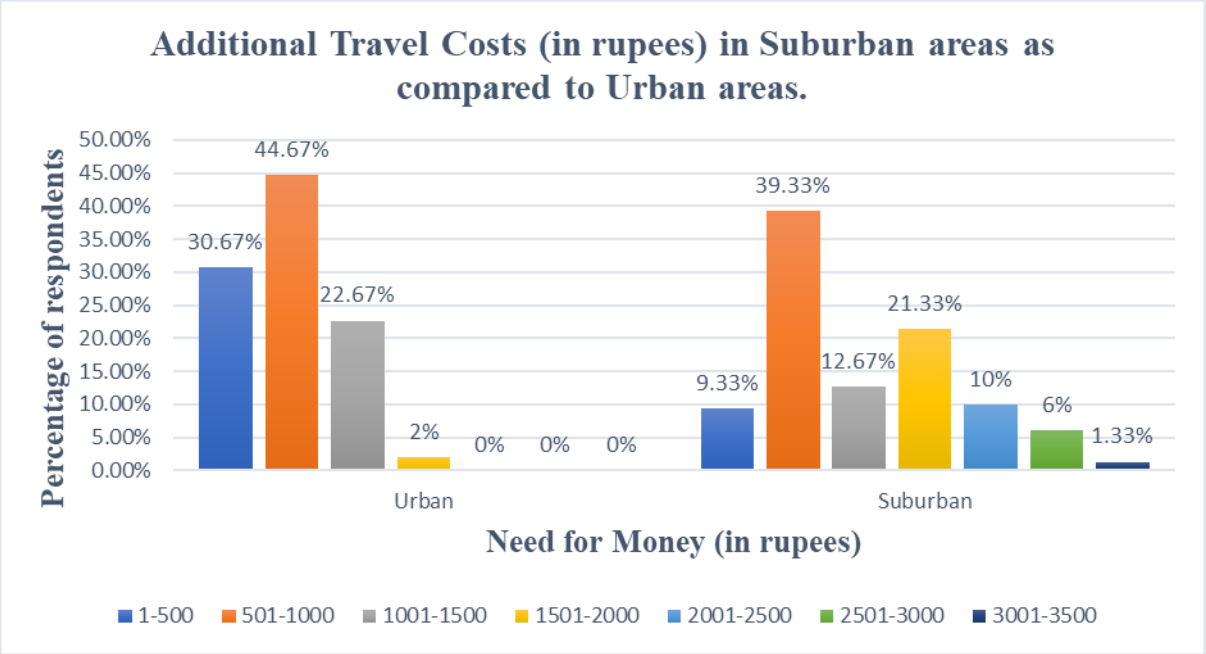
vi. 75-84 minutes: 0.67% of respondents need this travel time.

Urban Commuters: The majority of urban commuters (44%) need 25-34 minutes for travel, followed closely by 38.67% needing 35-44 minutes. A smaller percentage (10%) need 55-64 minutes, while 6.67% need 45-54 minutes. Very few urban commuters need more than 65 minutes for travel.

Suburban Commuters: The distribution of travel times is more spread out compared to urban commuters. The highest percentage (34%) of suburban commuters need 45-54 minutes, followed by 28% needing 35-44 minutes and 27.33% needing 55-64 minutes. A small percentage (7.33%) need 25-34 minutes, with very few requiring more than 65 minutes.

Travel Time: Urban commuters predominantly need less time for travel compared to suburban commuters. Suburban commuters are more likely to have longer travel times, with significant portions needing 45-54 minutes and 55-64 minutes. The data suggests that suburban areas may have longer travel distances or more traffic congestion, leading to increased travel times compared to urban areas.

Figure 4.15: Additional Travel Costs (in rupees) in Suburban areas as compared to Urban areas.



The graph compares the need for money (in rupees) for travel in urban and suburban areas.

Urban area:

i. 1-500 rupees: 30.67% of urban respondents spend this amount on travel.

ii. 501-1000 rupees: 44.67% of urban respondents spend this amount on travel.

iii. 1001-1500 rupees: 22.67% of urban respondents spend this amount on travel.

iv. 1501-2000 rupees: 2% of urban respondents spend this amount on travel.

v. 2001-2500 rupees: 0% of urban respondents spend this amount on travel.

vi. 2501-3000 rupees: 0% of urban respondents spend this amount on travel.

vii. 3001-3500 rupees: 0% of urban respondents spend this amount on travel.

Suburban Area:

i. 1-500 rupees: 9.33% of suburban respondents spend this amount on travel.

ii. 501-1000 rupees: 39.33% of suburban respondents spend this amount on travel.

iii. 1001-1500 rupees: 12.67% of suburban respondents spend this amount on travel.

iv. 1501-2000 rupees: 21.33% of suburban respondents spend this amount on travel.

v. 2001-2500 rupees: 10% of suburban respondents spend this amount on travel.

vi. 2501-3000 rupees: 6% of suburban respondents spend this amount on travel.

vii. 3001-3500 rupees: 1.33% of suburban respondents spend this amount on travel.

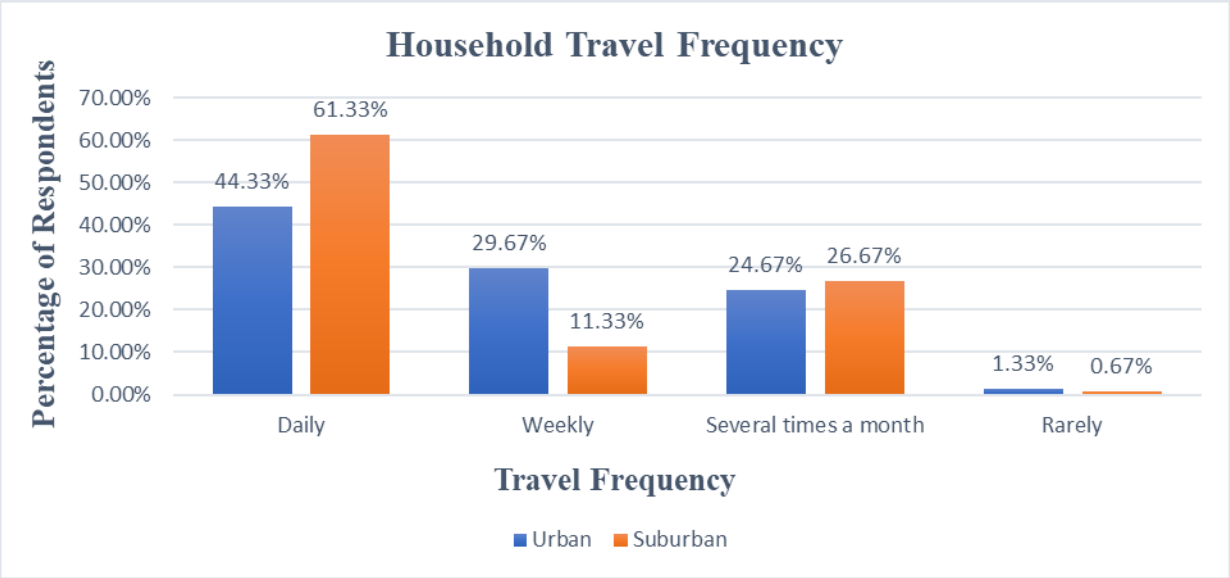
Lower Costs (1-500 and 501-1000 rupees): A significant portion of urban commuters (30.67%) spend 1-500 rupees on travel, compared to only 9.33% of suburban commuters. Both urban (44.67%) and suburban (39.33%) commuters have a substantial portion spending 501-1000 rupees, but the percentage is higher for urban commuters.

Moderate Costs (1001-1500 and 1501-2000 rupees): A higher percentage of urban commuters (22.67%) spend 1001-1500 rupees compared to suburban commuters (12.67%). Conversely, a much larger portion of suburban commuters (21.33%) spend 1501-2000 rupees compared to urban commuters (2%).

Higher Costs (2001-2500, 2501-3000, and 3001-3500 rupees): No urban commuters report spending more than 2000 rupees on travel. A notable percentage of suburban commuters report higher costs: 10% spend 2001-2500 rupees, 6% spend 2501-3000 rupees, and 1.33% spend 3001-3500 rupees.

Urban vs. Suburban Travel Costs: Urban commuters predominantly incur lower travel costs, with most spending 1-1000 rupees. Suburban commuters face more varied and generally higher travel costs, with significant portions spending over 1500 rupees and some even exceeding 2500 rupees. The data suggests that travel in suburban areas may be more expensive due to longer distances, fewer public transportation options, or higher fuel and vehicle maintenance costs.

Figure 4.16: Household Travel Frequency



The fig compares the travel frequency of respondents in urban and suburban areas.

Urban area:

i. Daily: 44.33% of urban respondents travel daily.

ii. Weekly: 29.67% of urban respondents travel weekly.

iii. Several times a month: 24.67% of urban respondents travel several times a month.

iv. Rarely: 1.33% of urban respondents travel rarely.

Suburban area:

1. Daily: 61.33% of suburban respondents travel daily.

2. Weekly: 11.33% of suburban respondents travel weekly.
3. Several times a month: 26.67% of suburban respondents travel several times a month.
4. Rarely: 0.67% of suburban respondents travel rarely.

Daily Travel: A higher percentage of suburban respondents (61.33%) travel daily compared to urban respondents (44.33%). This indicates that daily travel is more common among suburban residents, possibly due to longer commutes to work or school.

Weekly Travel: A larger portion of urban respondents (29.67%) travel weekly compared to suburban respondents (11.33%). This suggests that urban residents may have more frequent but less daily travel, potentially due to better access to nearby amenities or more flexible work arrangements.

Several Times a Month Travel: The percentages are relatively similar for both urban (24.67%) and suburban (26.67%) respondents, indicating that a comparable portion of both groups travel several times a month.

Rarely Travel: Both urban and suburban respondents have a very small percentage that travels rarely, with urban respondents at 1.33% and suburban respondents at 0.67%. This shows that infrequent travel is uncommon in both areas.

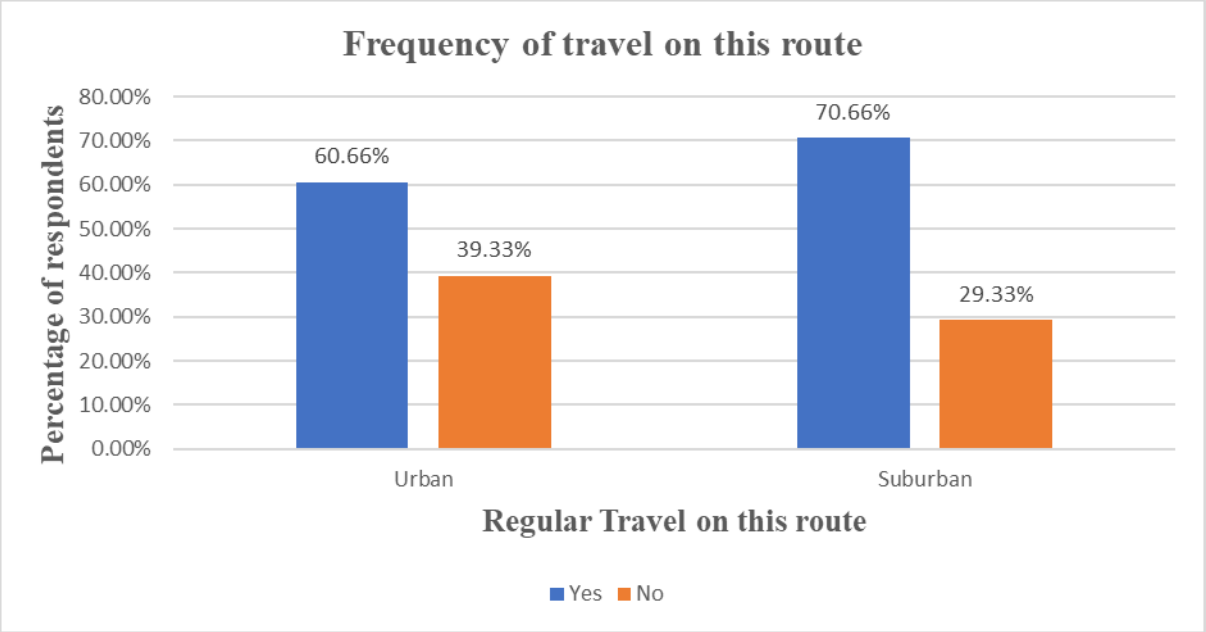
Higher Daily Travel in Suburban Areas: Suburban residents are more likely to travel daily compared to their urban counterparts, which could be due to factors such as longer commutes, fewer nearby amenities, or more reliance on personal vehicles.

More Frequent Weekly Travel in Urban Areas: Urban residents are more likely to travel weekly, which might be attributed to better access to public transportation, closer proximity to workplaces, and more localized amenities.

Comparable Monthly Travel: Travel frequency several times a month is similar in both urban and suburban areas, indicating a consistent pattern for less frequent but regular travel across both settings.

Infrequent Travel: Rare travel is uncommon in both urban and suburban areas, suggesting that most respondents, regardless of their living area, have a regular travel routine.

Figure 4.17: Frequency of travel on this route



The table compares the percentage of respondents in urban and suburban areas who regularly travel on a particular route.

Urban area: Yes (Regular travel on this route): 60.66% of urban respondents travel regularly on this route. No (No regular travel on this route): 39.33% of urban respondents do not travel regularly on this route.

Suburban area: Yes (Regular travel on this route): 70.66% of suburban respondents travel regularly on this route. No (No regular travel on this route): 29.33% of suburban respondents do not travel regularly on this route.

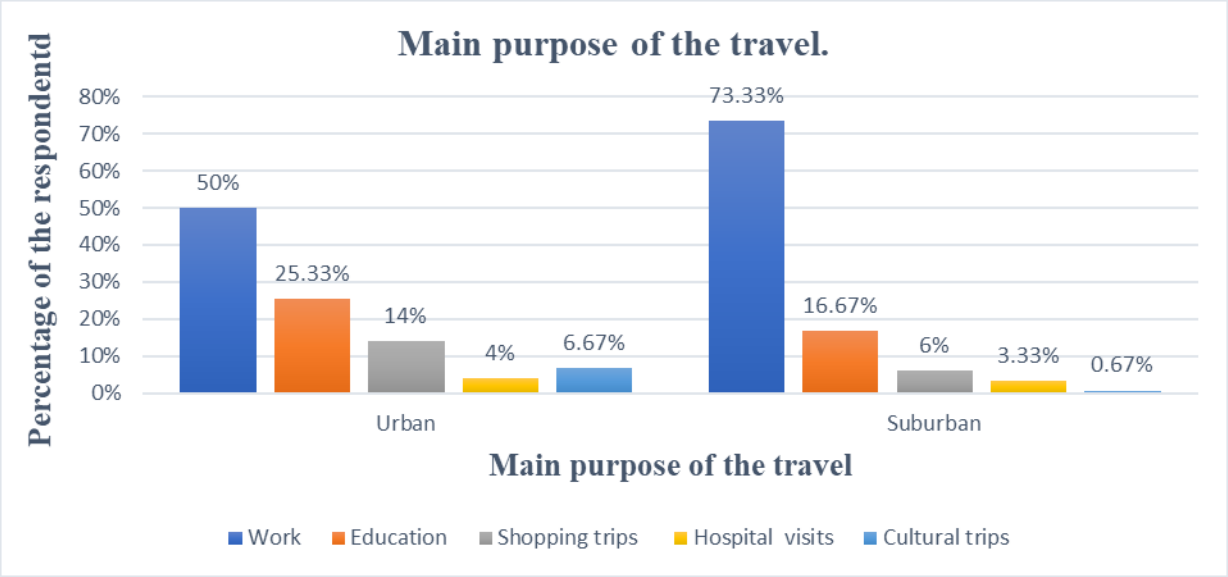
Regular Travel: A higher percentage of suburban respondents (70.66%) travel regularly on this route compared to urban respondents (60.66%). This indicates that regular travel on specific routes is more common among suburban residents. Urban respondents have a lower percentage (60.66%) of regular travel on this route, but it is still a significant majority.

Irregular Travel: A larger portion of urban respondents (39.33%) do not travel regularly on this route compared to suburban respondents (29.33%). This suggests that a higher percentage of urban residents might have more varied travel patterns or multiple routes they take regularly.

Suburban vs. Urban Regular Travel: Regular travel on specific routes is more prevalent among suburban residents, likely due to fewer alternative routes and greater dependence on specific roads for commuting to work, school, or other frequent destinations. Urban residents, while still having a majority who travel regularly on specific routes, show a more diverse pattern with a higher percentage not following a regular travel route. This could be due to better public transportation options, more route choices, and closer proximity to destinations.

Route Dependence: The higher regular travel percentage in suburban areas suggests a higher dependence on specific routes, which could be due to the layout and infrastructure of suburban areas that typically have fewer alternative routes compared to urban areas.

Figure 4.18: Purpose of the travel



The fig compares the purpose of travel between respondents in urban and suburban areas.

Urban area:

i. Work: 50% of urban respondents travel for work.

ii. Education: 25.33% of urban respondents travel for education.

iii. Shopping trips: 14% of urban respondents travel for shopping trips.

iv. Hospital visits: 4% of urban respondents travel for hospital visits.

v. Cultural trips: 6.67% of urban respondents travel for cultural trips.

Suburban area:

i. Work: 73.33% of suburban respondents travel for work.

ii. Education: 16.67% of suburban respondents travel for education.

iii. Shopping trips: 6% of suburban respondents travel for shopping trips.

iv. Hospital visits: 3.33% of suburban respondents travel for hospital visits.

v. Cultural trips: 0.67% of suburban respondents travel for cultural trips.

Travel for Work: A significantly higher percentage of suburban respondents (73.33%) travel for work compared to urban respondents (50%). This indicates that commuting for work is more prevalent among suburban residents. Urban respondents have a lower, but still substantial, percentage of traveling for work.

Travel for Education: A larger portion of urban respondents (25.33%) travel for education compared to suburban respondents (16.67%). This suggests that urban residents may have more educational institutions within accessible distance or more students among the respondents.

Travel for Shopping Trips: Urban respondents (14%) are more likely to travel for shopping trips compared to suburban respondents (6%). This could be due to urban areas having more shopping facilities and shorter distances to shops.

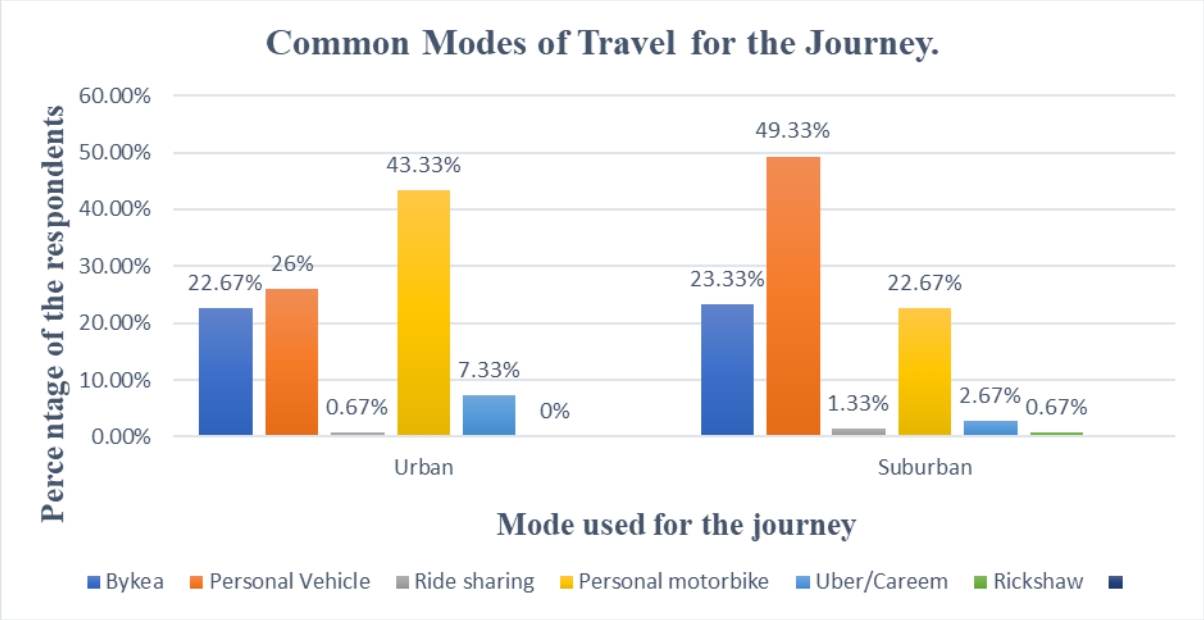
Travel for Hospital Visits: Both urban (4%) and suburban (3.33%) respondents have a low percentage of travel for hospital visits, indicating that such trips are less frequent for both groups.

Travel for Cultural Trips: A higher percentage of urban respondents (6.67%) travel for cultural trips compared to suburban respondents (0.67%). This suggests that urban areas might have more cultural attractions or events, or that urban residents participate more in cultural activities.

Purpose of Travel in Urban vs. Suburban Areas: Work: Suburban residents predominantly travel for work, reflecting the nature of suburban living where people often commute to urban centers for employment. Education: A higher percentage of urban residents travel for educational purposes, which could be attributed to the higher density of educational institutions in urban areas. Shopping: Urban residents travel more for shopping, likely due to better access to shopping facilities and shorter travel distances. Hospital Visits: Both groups

have a low percentage of hospital visits, indicating infrequent travel for medical reasons. Cultural Trips: Urban residents are more involved in cultural activities, which might be due to the greater availability of cultural venues and events in urban areas.

Figure 4.19: Common Modes of Travel for the Journey.



The fig compares the modes of transportation used by respondents in urban and suburban areas.

Urban area:

i. Walk: 0% of urban respondents walk.

ii. Bykea: 22.67% of urban respondents use Bykea.

iii. Personal Vehicle: 26% of urban respondents use a personal vehicle.

iv. Ride sharing: 0.67% of urban respondents use ride-sharing.

v. Personal motorbike: 43.33% of urban respondents use a personal motorbike.

vi. Uber/Careem: 7.33% of urban respondents use Uber/Careem.

vii. Rickshaw: 0% of urban respondents use a rickshaw.

Suburban area:

i. Walk: 0% of suburban respondents walk.
ii. Bykea: 23.33% of suburban respondents use Bykea.
iii. Personal Vehicle: 49.33% of suburban respondents use a personal vehicle.
iv. Ridesharing: 1.33% of suburban respondents use ride-sharing.
v. Personal motorbike: 22.67% of suburban respondents use a personal motorbike.
vi. Uber/Careem: 2.67% of suburban respondents use Uber/Careem.
vii. Rickshaw: 0.67% of suburban respondents use a rickshaw.

Walking: No respondents in either urban or suburban areas reported walking as their mode of transportation.

Bykea: Usage of Bykea is nearly identical in both urban (22.67%) and suburban (23.33%) areas, indicating similar adoption rates for this motorcycle-based ride-hailing service in both environments.

Personal Vehicle: A significantly higher percentage of suburban respondents (49.33%) use personal vehicles compared to urban respondents (26%). This indicates a greater reliance on personal vehicles in suburban areas, likely due to longer travel distances and less public transportation availability.

Ride Sharing: Ride-sharing usage is low in both areas, with 0.67% in urban and 1.33% in suburban areas. This suggests that ride-sharing services are not a primary mode of transportation for most respondents.

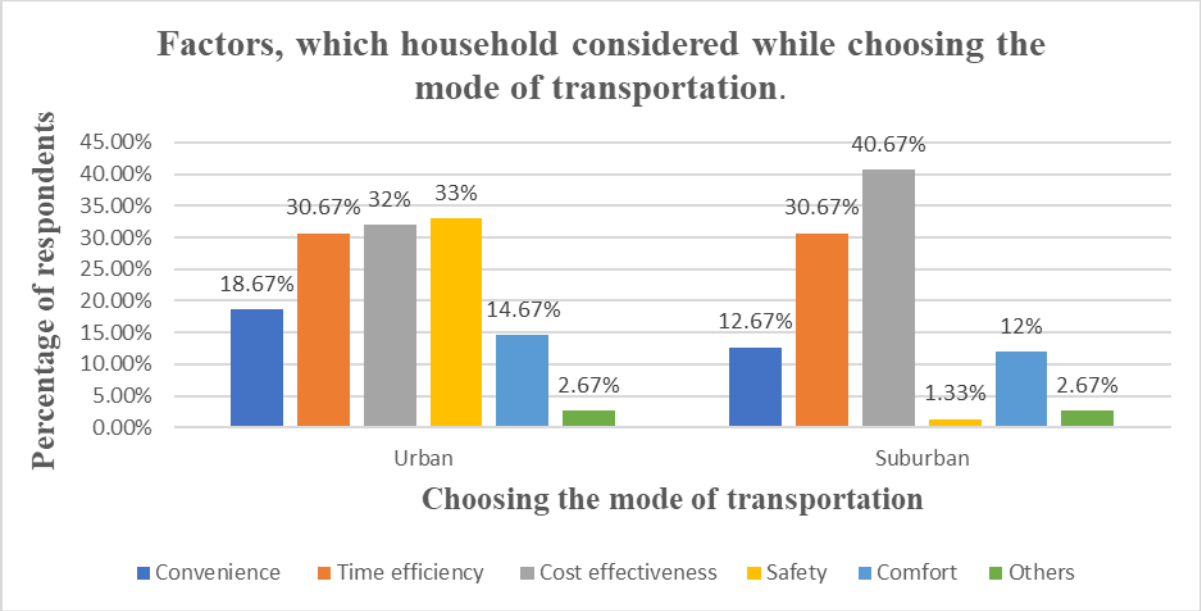
Personal Motorbikes: Urban respondents (43.33%) use personal motorbikes more frequently than suburban respondents (22.67%). This suggests that motorbikes are a popular and efficient mode of transportation in urban areas, possibly due to traffic congestion.

Uber/Careem: A higher percentage of urban respondents (7.33%) use Uber/Careem compared to suburban respondents (2.67%). This indicates that ride-hailing services like Uber and Careem are more popular in urban areas, possibly due to better availability and shorter wait times.

Rickshaw: Rickshaw usage is very low in both areas, with no urban respondents and 0.67% suburban respondents using this mode of transport. This suggests that rickshaws are not a common choice for most travelers.

Urban vs. Suburban Transportation Preferences: Personal Vehicle: Suburban residents predominantly use personal vehicles, reflecting the typical suburban lifestyle with greater reliance on cars. Personal Motorbike: Urban residents favor personal motorbikes, highlighting their suitability for navigating congested city traffic. Ride-Hailing Services: Urban residents use ride-hailing services like Uber and Careem more frequently than suburban residents, likely due to better service coverage and shorter wait times in urban areas. Bykea: The similar usage of Bykea in both areas suggests that this service is equally accessible and popular among urban and suburban residents. Walking and Rickshaw: Neither walking nor rickshaw is a significant mode of transportation in either area, indicating that most respondents prefer faster or more convenient transportation options. Overall, the data highlights the differences in transportation preferences and needs between urban and suburban residents, reflecting the varying infrastructure, travel distances, and availability of transportation options in these areas.

Figure 4.20: Factors considered when choosing a mode of transportation.



The fig shows the factors influencing the choice of transportation mode in urban and suburban settings, with combined percentages for each factor:

Convenience: This factor accounts for 18.67% in urban and 12.67% in suburban settings. It indicates that people in both areas prioritize transportation options that are easy to access and use.

Time efficiency: Equally important in both urban and suburban areas at 30.67%, suggesting that saving time is a significant consideration regardless of the location.

Cost-effectiveness: While 32% of urban dwellers prioritize cost, it rises to 40.67% in suburban areas. This highlights a greater concern for expenses among suburban commuters, possibly due to longer distances or fewer alternative transportation options.

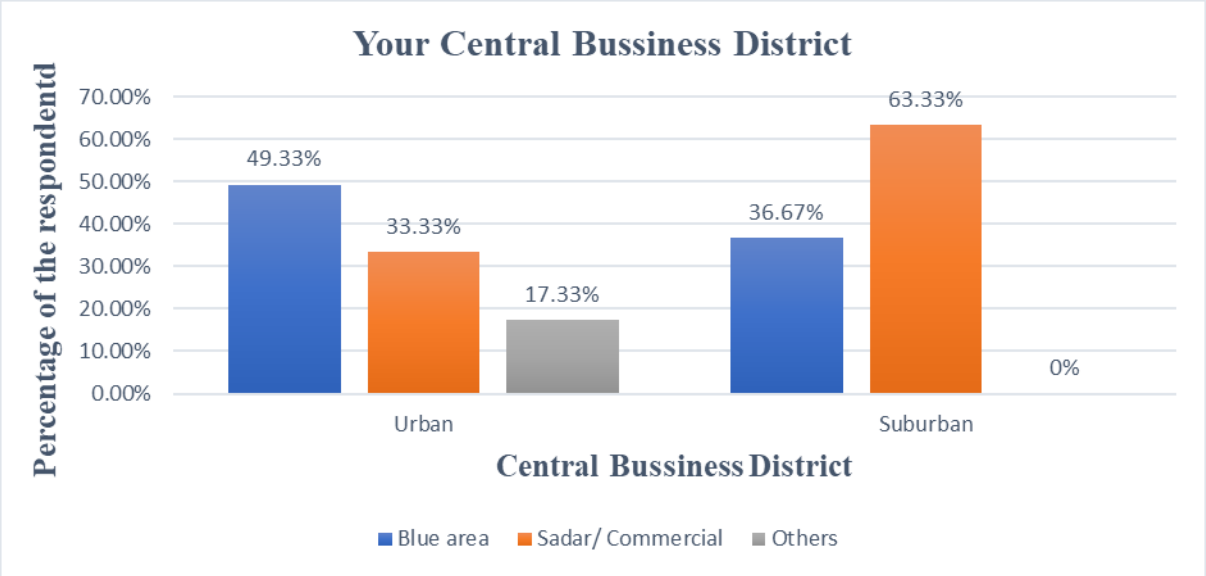
Safety: Safety is a more significant concern in urban areas at 33%, compared to just 1.33% in suburban settings. This disparity likely reflects the higher density and complexity of urban traffic.

Comfort: This factor is relatively similar between urban (14.67%) and suburban (12%) areas, indicating that people value a comfortable travel experience in both environments.

Others: Miscellaneous factors, such as environmental impact or personal preference, contribute 2.67% in both urban and suburban contexts.

In summary, while some priorities like time efficiency and comfort are consistently valued across both urban and suburban areas, differences emerge in factors like cost-effectiveness and safety, reflecting the distinct challenges and preferences associated with each environment.

Figure 4.21: Your Central Business District



The fig shows the distribution of CBD (Central Business District) areas between urban and suburban settings:

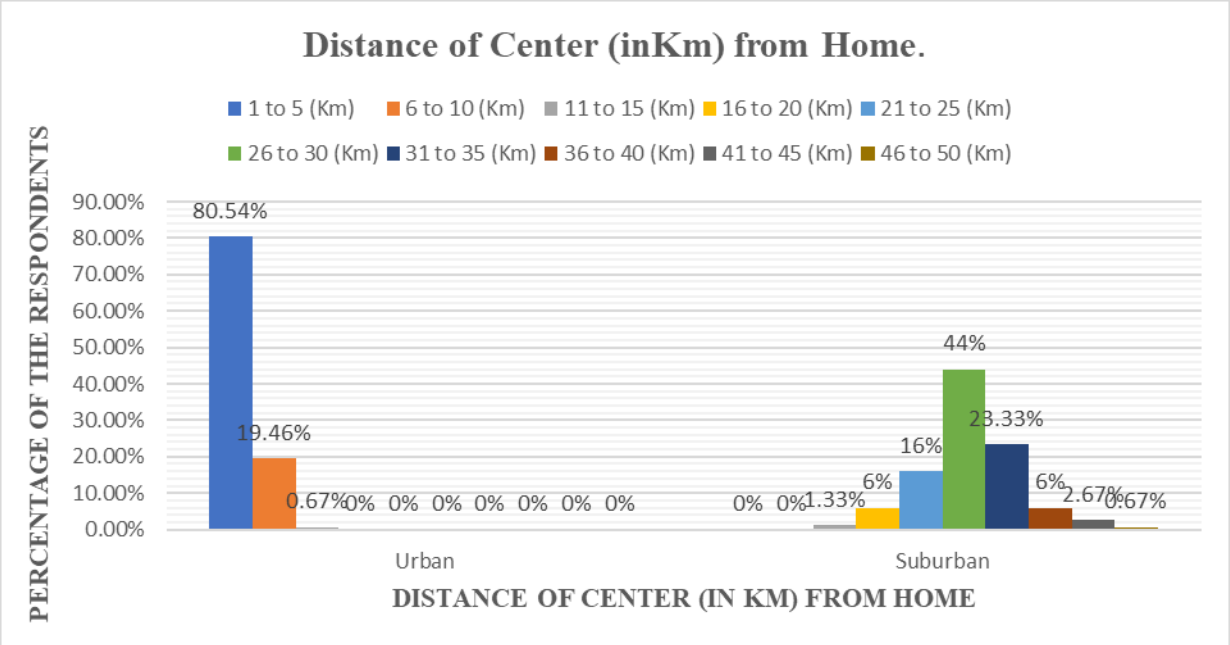
Blue area: In urban environments, 49.33% of the CBD is typically located in what is referred to as the "Blue area." In contrast, in suburban settings, 36.67% of the CBD is situated there. This suggests that a significant portion of the central business activities in urban areas are concentrated in the Blue area, while suburban CBDs might have a slightly lesser concentration there.

Sadar/ Commercial: This category shows a notable difference between urban and suburban settings. In urban areas, 33.33% of the CBD falls under Sadar or Commercial zones, whereas in suburban areas, a much larger proportion, 63.33%, is designated as such. This indicates that suburban CBDs often have a stronger focus on commercial activities compared to their urban counterparts.

Others: Interestingly, 17.33% of the CBD in urban areas falls into categories not specified as Blue area or Sadar/Commercial, whereas in suburban areas, no CBD falls into the "Others" category, implying a more concentrated and specialized zoning pattern.

Overall, these results illustrate how CBDs are structured differently in urban and suburban environments, with urban areas often featuring a more diversified distribution across various zones compared to the more commercially focused suburban CBDs.

Figure 4.22: Distance of Center (in Km) from Home



The fig provides the distribution of centers (locations) in kilometers between urban and suburban areas:

i. 1 to 5 km: In urban areas, 80.54% of centers are located within this distance range, indicating a high concentration of facilities close to the city center. In suburban areas, no centers fall within this range, suggesting a lack of proximity to the city core for suburban facilities.

ii. 6 to 10 km: Similarly, 19.46% of centers in urban areas are located between 6 to 10 km from the center, whereas in suburban areas, none fall within this range.

iii. 11 to 15 km: Urban areas have 0.67% of centers located in this range, indicating a small number of facilities extending slightly further from the city center. In suburban areas, 1.33% of centers fall within this range.

iv. 16 to 20 km: Suburban areas show 6% of centers in this range, marking a significant increase in facilities located further from the urban core compared to urban areas, where no centers fall in this range.

v. 21 to 25 km: Suburban areas have 16% of centers in this range, showing further decentralization of facilities compared to urban areas.

vi. 26 to 30 km: The majority of suburban centers, 44%, fall within this range, indicating a substantial distance from the urban core.

vii. 31 to 35 km: 23.33% of suburban centers are located within this range, continuing the trend of suburban facilities being located at greater distances from the city center.

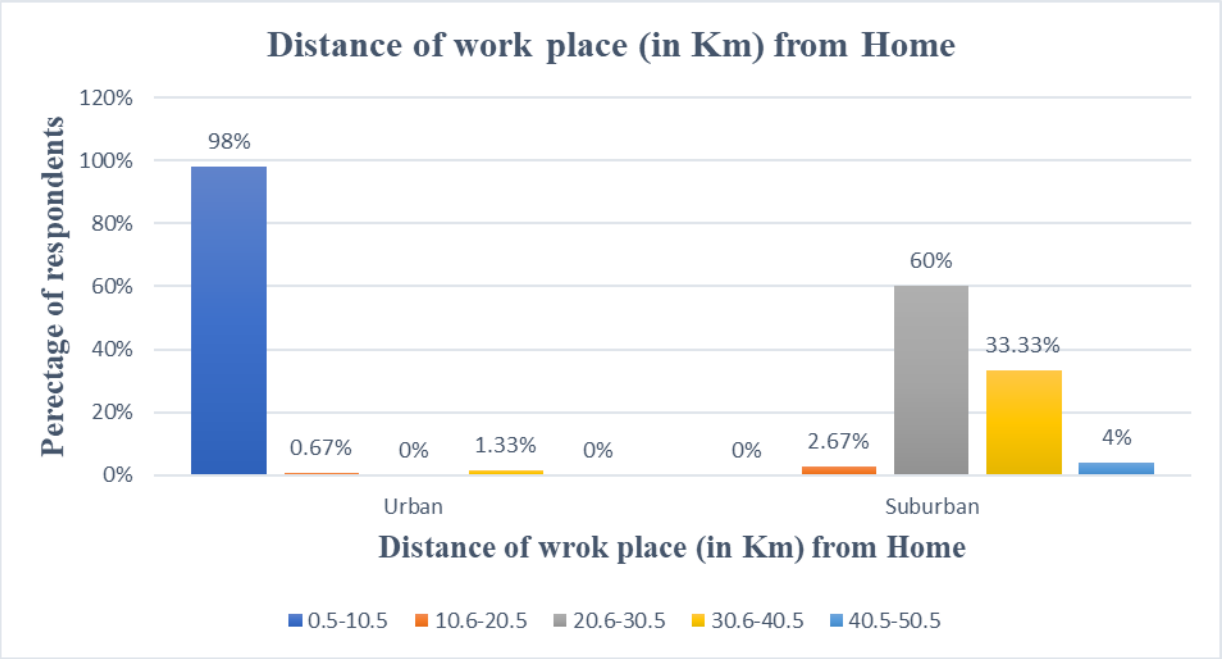
viii. 36 to 40 km: 6% of suburban centers fall within this range, further emphasizing the spread of facilities into more distant suburban areas.

ix. 41 to 45 km: 2.67% of suburban centers are located within this range, showing continued dispersion into even more distant suburban regions.

x. 46 to 50 km: A small percentage (0.67%) of suburban centers are located in this range, indicating very remote suburban locations.

In summary, the results illustrate a clear contrast in the distribution of centers between urban and suburban areas, with urban centers being concentrated closer to the city core within the first 10 km, while suburban centers are spread across greater distances, predominantly beyond 20 km from the urban core.

Figure 4.23: Distance of work place (in Km) from Home



The fig provides the distribution of workplace locations in kilometers between urban and suburban areas:

i. 0.5-10.5 km: In urban areas, 98% of workplaces are located within this range, indicating that the majority of work locations are close to the city center. In contrast, no workplaces are located in this range in suburban areas, suggesting a lack of proximity to the urban core for suburban workers.

ii. 10.6-20.5 km: Urban areas have 0.67% of workplaces in this range, indicating a small percentage of workplaces extending further from the city center. In suburban areas,

2.67% of workplaces fall within this range, suggesting some dispersion of workplaces into suburban regions.

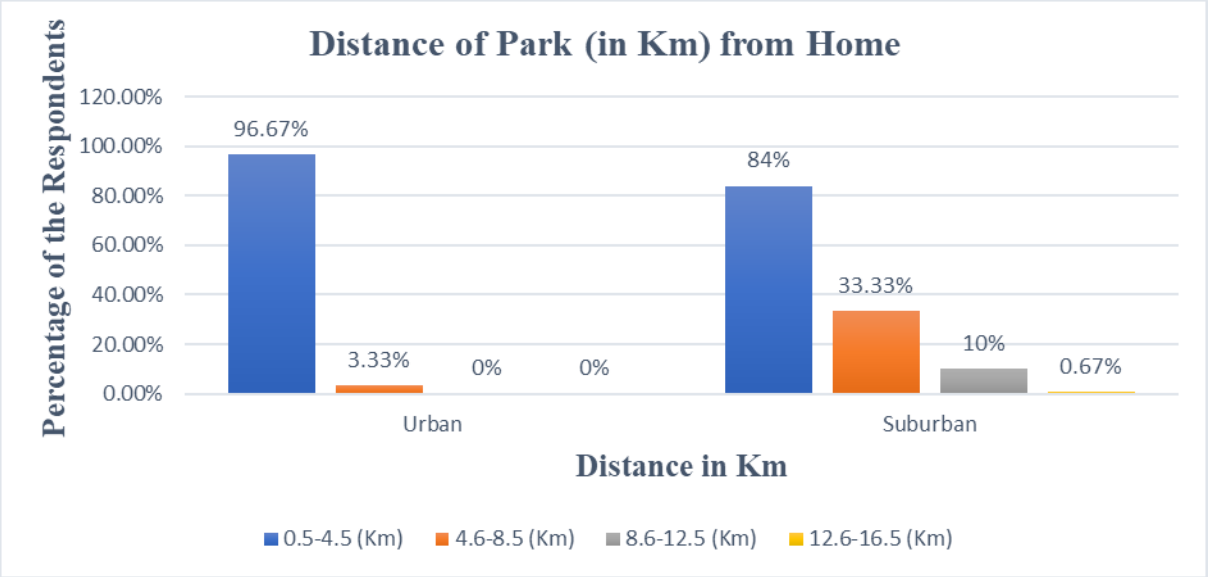
iii. 20.6-30.5 km: Suburban areas show a significant concentration of workplaces, with 60% falling within this range, indicating substantial decentralization of work locations compared to urban areas where none are located in this range.

iv. 30.6-40.5 km: In urban areas, 1.33% of workplaces are located within this range, showing a small number of workplaces located further from the city center. In suburban areas, 33.33% of workplaces fall within this range, indicating a considerable number of workplaces at greater distances from the urban core.

v. 40.5-50.5 km: Suburban areas have 4% of workplaces in this range, showing some workplaces located in very remote suburban locations. No workplaces fall within this range in urban areas.

In summary, these results highlight a stark difference in the distribution of workplaces between urban and suburban areas. Urban workplaces are heavily concentrated within the first 10.5 km from the city center, while suburban workplaces are spread across wider distances, predominantly beyond 20 km from the urban core, reflecting the commuting patterns and geographic spread of employment in both settings.

Figure 4.24: Distance of Park (in Km) from Home



The fig illustrates the distribution of park distances from home in kilometers between urban and suburban areas:

i. 0.5-4.5 km: In urban areas, 96.67% of parks are located within this range from home, indicating that the vast majority of residents have easy access to parks within a relatively short distance. In suburban areas, 84% of parks are within this range, showing that a significant portion of suburban residents also have nearby park access, though slightly less compared to urban areas.

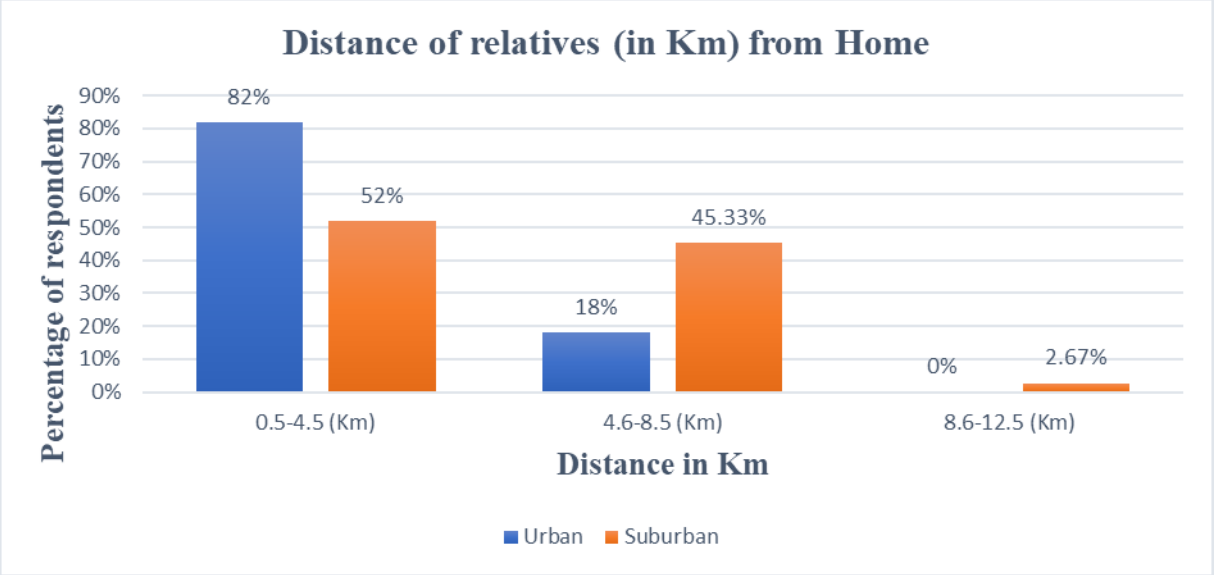
ii. 4.6-8.5 km: Urban areas have 3.33% of parks located within this range, suggesting some parks are located further from home but still within a reasonable distance for urban residents. In suburban areas, 33.33% of parks fall within this range, indicating a substantial number of parks are located further from home compared to urban settings.

iii. 8.6-12.5 km: Suburban areas show 10% of parks in this range, indicating further distance to parks compared to both closer ranges. No parks fall within this range in urban areas.

iv. 12.6-16.5 km: A small percentage (0.67%) of parks in suburban areas fall within this range, indicating some parks are located at greater distances from homes, though still relatively accessible compared to urban parks.

In summary, these results suggest that parks are generally more accessible within shorter distances from home in urban areas compared to suburban areas. Suburban residents typically have to travel further to access parks, with a significant proportion located beyond 4.5 km from home. This distribution reflects different urban planning strategies and population densities between urban and suburban environments, impacting the accessibility of recreational spaces.

Figure 4.25: Distance of relatives (in Km) from Home



The fig illustrates the relative distribution of locations (in kilometers) between urban and suburban areas:

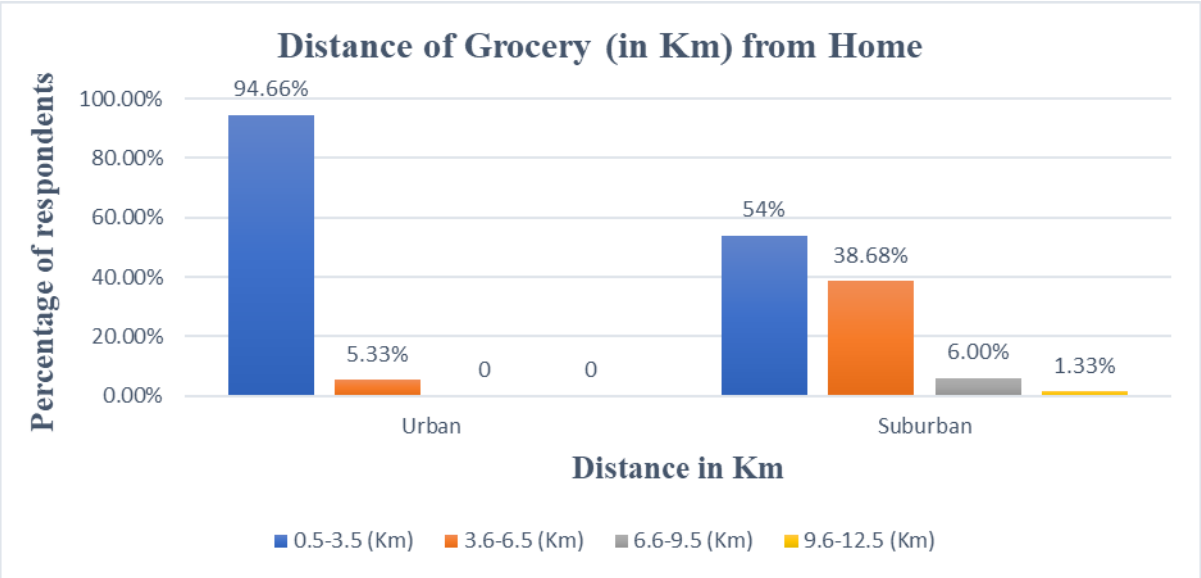
i. 0.5-4.5 km: In urban areas, 82% of locations fall within this range, indicating that a significant majority of facilities or destinations are relatively close to home. In suburban areas, 52% fall within this range, suggesting a lower but still substantial proportion of locations within a reasonable distance from residential areas.

ii. 4.6-8.5 km: Urban areas have 18% of locations in this range, indicating a significant but smaller proportion of destinations located further from home compared to the closer range. In suburban areas, 45.33% fall within this range, showing a higher proportion of locations located at a moderate distance from residential areas.

iii. 8.6-12.5 km: In suburban areas, 2.67% of locations fall within this range, indicating some destinations are located at a greater distance from residential areas. No locations fall within this range in urban areas.

These results suggest that in urban areas, a large majority of locations are accessible within a relatively short distance from home, while suburban areas have more destinations located at moderate distances. This distribution reflects different spatial planning and population density patterns between urban and suburban environments, influencing accessibility and travel patterns for residents.

Figure 4.26: Distance of Grocery (in Km) from Home

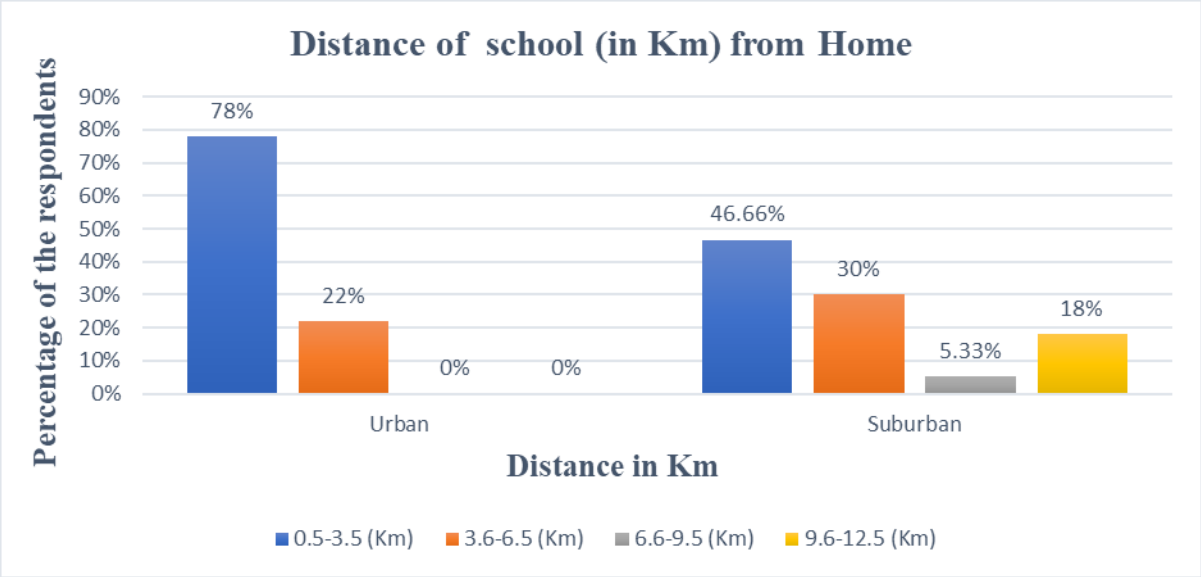


The fig provides the distribution of grocery store distances from home in kilometers between urban and suburban areas:

i. 0.5-3.5 km: In urban areas, 94.66% of grocery stores are located within this range from home, indicating that the vast majority of urban residents have easy access to grocery stores within a short distance. In suburban areas, 54% of grocery stores are within this range, showing a significant but lower proportion compared to urban areas.
ii. 3.6-6.5 km: Urban areas have 5.33% of grocery stores located within this range, suggesting some grocery stores are located further from home but still within a reasonable distance for urban residents. In suburban areas, 38.68% of grocery stores fall within this range, indicating a substantial number of stores are located at a moderate distance from residential areas.
iii. 6.6-9.5 km: In suburban areas, 6% of grocery stores are located within this range, indicating that some stores are further away compared to the closer ranges. No grocery stores fall within this range in urban areas.
iv. 9.6-12.5 km: A small percentage (1.33%) of grocery stores in suburban areas fall within this range, indicating that a few stores are located at greater distances from homes, though still accessible to some residents.

In summary, these results show that grocery stores are generally more accessible within shorter distances from home in urban areas compared to suburban areas. Suburban residents typically have to travel further to access grocery stores, with a significant proportion located beyond 3.5 km from home. This distribution reflects different urban planning strategies, population densities, and consumer behaviors between urban and suburban environments, impacting the accessibility of essential services like grocery stores.

Figure 4.27: Distance of school (in Km) from Home



The fig provides the distribution of school distances from home in kilometers between urban and suburban areas:

i. 0.5-3.5 km: In urban areas, 78% of schools are located within this range from home, indicating that a significant majority of urban residents have easy access to schools within a short distance. In suburban areas, 46.66% of schools are within this range, showing a substantial but lower proportion compared to urban areas.

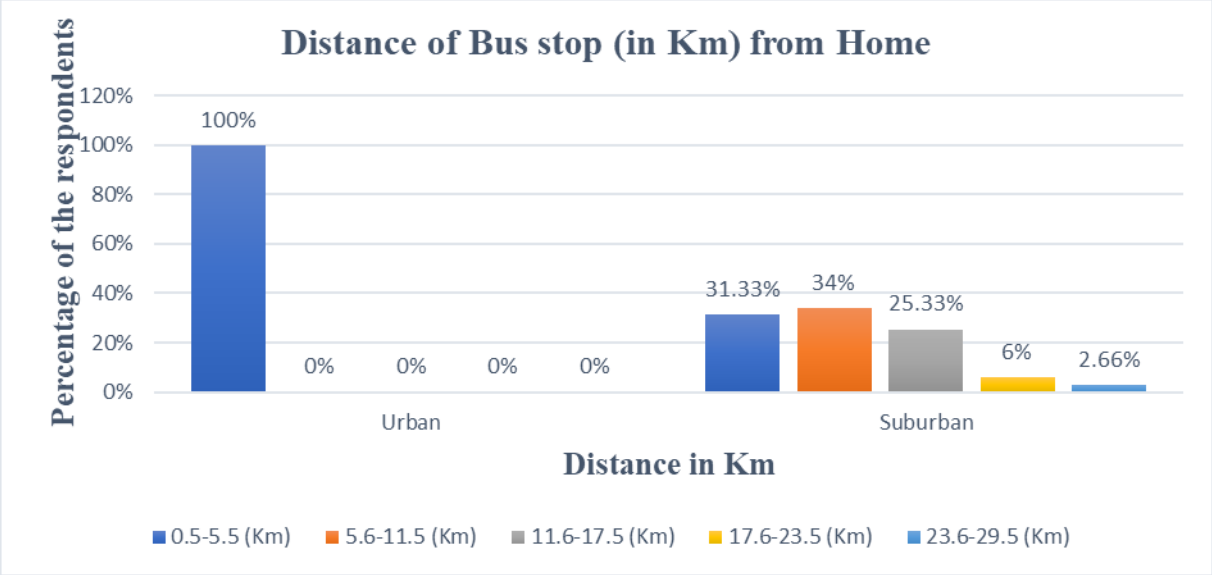
ii. 3.6-6.5 km: Urban areas have 22% of schools located within this range, suggesting that some schools are located further from home but still within a reasonable distance for urban residents. In suburban areas, 30% of schools fall within this range, indicating a significant number of schools are located at a moderate distance from residential areas.

iii. 6.6-9.5 km: In suburban areas, 5.33% of schools are located within this range, indicating that some schools are further away compared to the closer ranges. No schools fall within this range in urban areas.

iv. 9.6-12.5 km: A notable percentage (18%) of schools in suburban areas fall within this range, indicating that a significant number of schools are located at greater distances from homes, though still accessible to suburban residents.

In summary, these results show that schools are generally more accessible within shorter distances from home in urban areas compared to suburban areas. Suburban residents typically have to travel further to access schools, with a notable proportion located beyond 3.5 km from home. This distribution reflects different urban planning strategies, population densities, and educational infrastructure between urban and suburban environments, impacting the accessibility of educational institutions for residents.

Figure 4.28: Distance of Bus stop (in Km) from Home



The graph presents the distribution of bus stop distances from home in kilometers between urban and suburban areas:

i. 0.5-5.5 km: In urban areas, 100% of bus stops are located within this range from home, indicating that all urban residents have access to bus stops within a relatively short distance. In suburban areas, 31.33% of bus stops are within this range,

suggesting that a significant portion of suburban residents also have nearby bus access, although not as universally available as in urban settings.

ii. 5.6-11.5 km: No bus stops are located within this range in urban areas. In suburban areas, 34% of bus stops fall within this range, indicating that some bus stops are located at a moderate distance from residential areas.

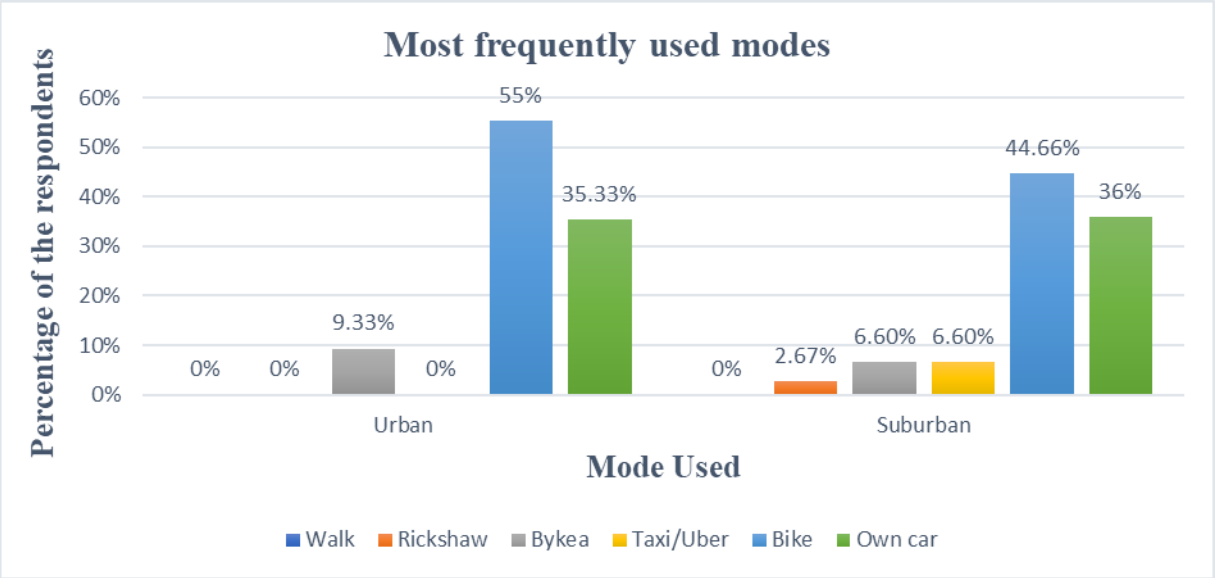
iii. 11.6-17.5 km: Similarly, no bus stops fall within this range in urban areas. In suburban areas, 25.33% of bus stops are located within this range, showing that a notable proportion of bus stops are further from residential areas.

iv. 17.6-23.5 km: No bus stops fall within this range in urban areas. In suburban areas, 6% of bus stops are located within this range, indicating further distance to bus stops compared to closer ranges.

v. 23.6-29.5 km: No bus stops fall within this range in urban areas. In suburban areas, 2.66% of bus stops fall within this range, showing that some bus stops are located at very remote distances from residential areas.

In summary, these results indicate that bus stops are generally more accessible within shorter distances from home in urban areas compared to suburban areas. Suburban residents typically have to travel further to access bus stops, with a significant proportion located beyond 5.5 km from home. This distribution reflects different urban planning strategies, population densities, and transportation infrastructure between urban and suburban environments, impacting the accessibility of public transportation for residents.

Figure 4.29: Frequently used modes.



The fig shows the most frequently used transportation modes in urban and suburban areas:

i. Walk: Neither urban nor suburban areas report using walking as the most frequent mode of transportation.

ii. Rickshaw: Suburban areas report 2.67% usage of rickshaws as the most frequent mode, while urban areas do not.

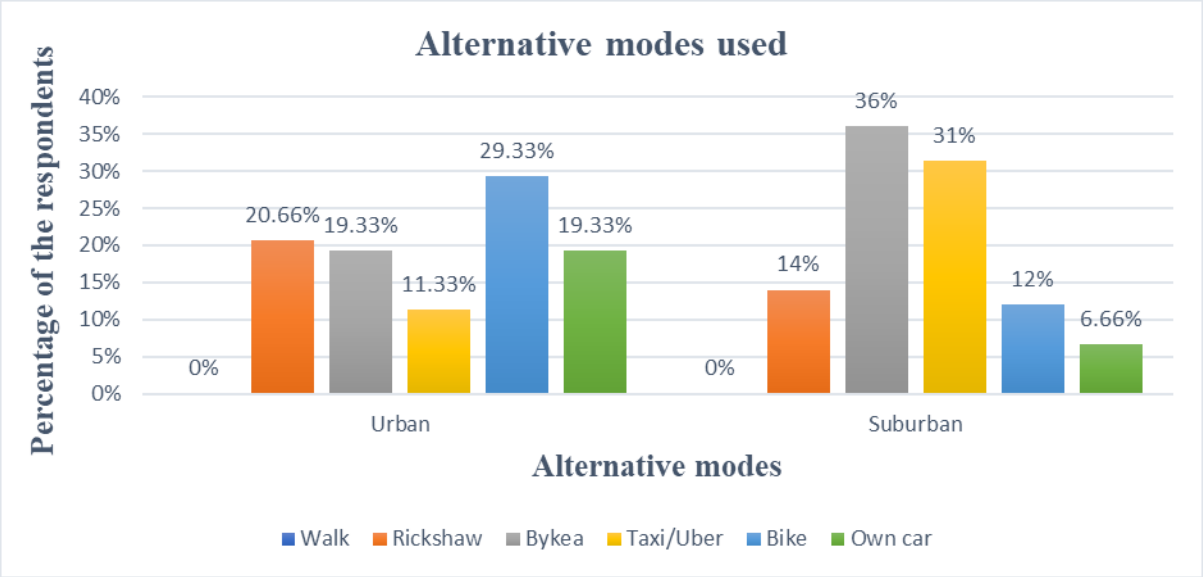
iii. Bykea: Bykea is reported as the most frequently used mode in urban areas with 9.33%, and 6.60% in suburban areas.

iv. Taxi/Uber: In suburban areas, 6.60% use taxis or Uber as the most frequently used mode, while urban areas do not report this.

v. Bike: Biking is the most frequent mode in urban areas, used by 55%, and in suburban areas by 44.66%.

vi. Own car: 35.33% of urban areas and 36% of suburban areas report using their car as the most frequent mode of transportation

Figure 4.30: Alternative modes.



The fig provides data on alternative modes of transportation used in urban and suburban areas:

i. Walk: Neither urban nor suburban areas report walking as an alternative mode of transportation.

ii. Rickshaw: Urban areas show 20.66% using rickshaws as an alternative mode, while in suburban areas, it's used by 14%.

iii. Bykea: Bykea is used as an alternative mode by 19.33% in urban areas and by 36% in suburban areas.

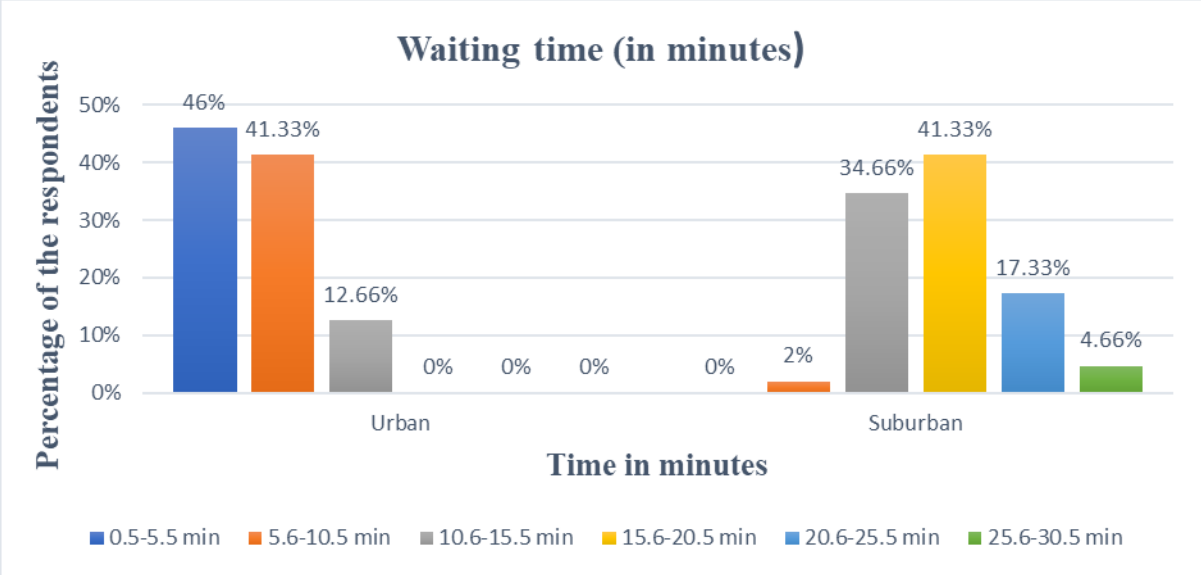
iv. Taxi/Uber: In urban areas, 11.33% use taxis or Uber as an alternative mode, whereas in suburban areas, it's used by 31%.

v. Bike: Biking is an alternative mode for 29.33% of urban residents and 12% of suburban residents.

vi. Own car: 19.33% of urban residents and 6.66% of suburban residents use their car as an alternative mode of transportation.

These results highlight different preferences and usage patterns for alternative modes of transportation between urban and suburban areas, influenced by factors such as infrastructure, distance, and lifestyle preferences.

Figure 4.31: Waiting time (in minutes)



The graph presents the waiting time distribution (in minutes) for transportation in urban and suburban areas:

i. 0.5-5.5 min: In urban areas, 46% of people experience waiting times within this range, indicating that a significant portion of commuters have relatively short wait times. In suburban areas, no one experiences wait times within this range.

ii. 5.6-10.5 min: Urban areas have 41.33% of people experiencing wait times in this range, indicating that a substantial number of commuters experience moderate wait times. In suburban areas, 2% of people experience wait times in this range.

iii. 10.6-15.5 min: In urban areas, 12.66% of people experience wait times in this range, indicating that a smaller but notable portion of commuters experience longer wait times. In suburban areas, 34.66% of people experience wait times in this range,

indicating that a significant portion of suburban commuters experience longer wait times compared to urban areas.

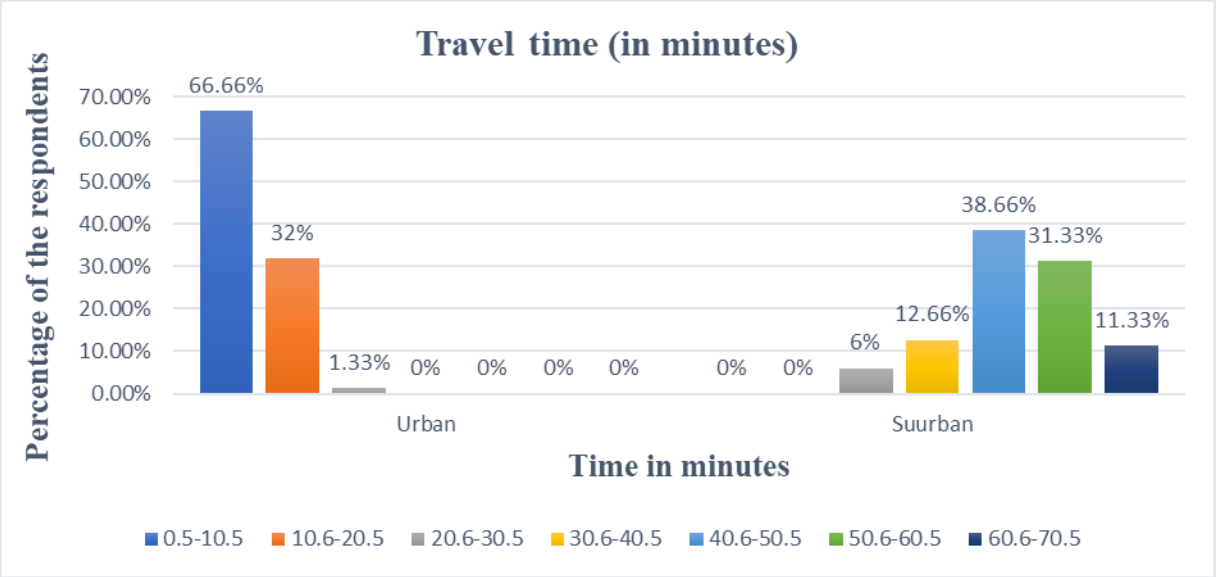
iv. 15.6-20.5 min: No one experiences wait times within this range in urban areas. In suburban areas, 41.33% of people experience wait times in this range, indicating that a substantial portion of suburban commuters experience even longer wait times.

v. 20.6-25.5 min: No one experiences wait times within this range in urban areas. In suburban areas, 17.33% of people experience wait times in this range.

vi. 25.6-30.5 min: No one experiences wait times within this range in urban areas. In suburban areas, 4.66% of people experience wait times in this range.

In summary, these results indicate that wait times for transportation tend to be shorter and more consistent in urban areas, with a majority experiencing wait times within shorter intervals. In contrast, suburban areas experience more variability and longer wait times on average, reflecting differences in transportation infrastructure and service frequency between urban and suburban environments.

Figure 4.32: Travel time (in minutes)



The graph presents the distribution of travel times (in minutes) for transportation in urban and suburban areas:

i. 0.5-10.5 min: In urban areas, 66.66% of travel times fall within this range, indicating that a majority of commuters have relatively short travel times. In suburban areas, no travel times fall within this range.

ii. 10.6-20.5 min: Urban areas have 32% of travel times falling within this range, indicating that a significant portion of commuters have moderate travel times. Suburban areas report no travel times in this range.

iii. 20.6-30.5 min: Urban areas have 1.33% of travel times falling within this range, indicating a small percentage of commuters with longer travel times. Suburban areas report 6% of travel times in this range.

iv. 30.6-40.5 min: No travel times fall within this range in urban areas. Suburban areas report 12.66% of travel times in this range, indicating a significant portion of commuters experience longer travel times.

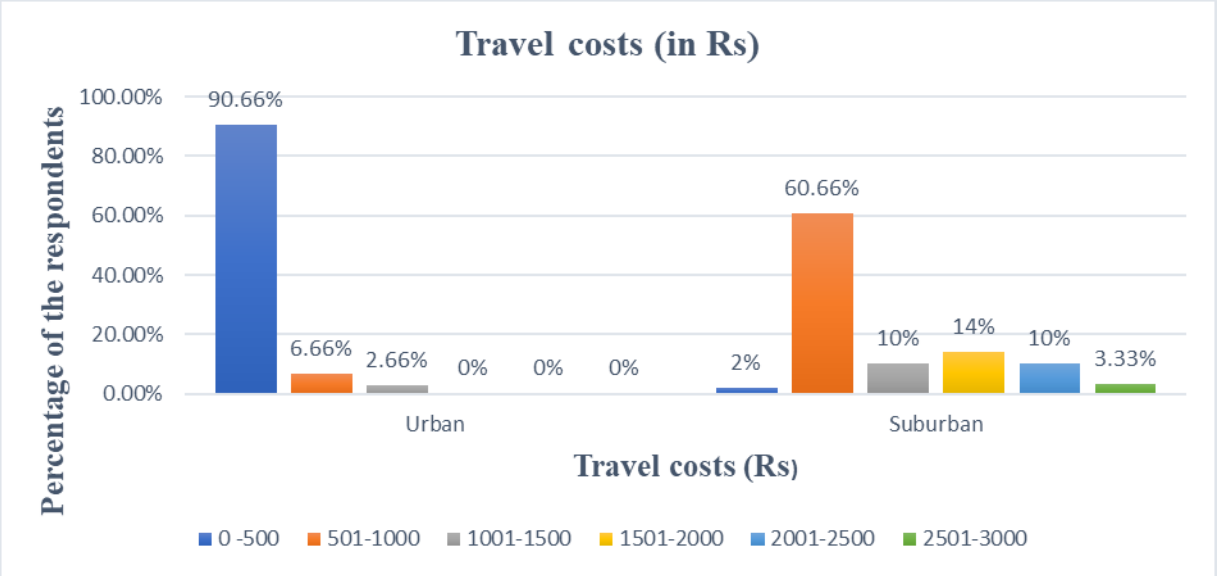
v. 40.6-50.5 min: No travel times fall within this range in urban areas. Suburban areas report 38.66% of travel times in this range, indicating a majority of commuters experience even longer travel times.

vi. 50.6-60.5 min: No travel times fall within this range in urban areas. Suburban areas report 31.33% of travel times in this range.

vii. 60.6-70.5 min: No travel times fall within this range in urban areas. Suburban areas report 11.33% of travel times in this range.

In summary, these results show significant differences in travel times between urban and suburban areas. Urban areas generally have shorter travel times, with a majority of commuters experiencing trips within 10.5 minutes. In contrast, suburban areas exhibit longer travel times, with a substantial portion of commuters experiencing trips lasting 30 minutes or more. These differences reflect the varying distances, transportation infrastructure, and congestion levels between urban and suburban environments.

Figure 4.33: Travel costs (in Rs)



The graph provides the distribution of travel costs (in Rs) for transportation in urban and suburban areas:

i. 0-500 Rs: In urban areas, 90.66% of commuters spend within this range on travel costs, indicating that the majority have relatively low transportation expenses. In suburban areas, only 2% of commuters fall within this range, suggesting that very few suburban commuters have such low travel costs.

ii. 501-1000 Rs: Urban areas show 6.66% of commuters spending between 501-1000 Rs on travel, indicating a small percentage with moderate travel expenses. In suburban areas, this range accounts for 60.66% of commuters, indicating that a significant majority of suburban commuters have moderate travel costs.

iii. 1001-1500 Rs: In urban areas, 2.66% of commuters spend between 1001-1500 Rs on travel, indicating a small percentage with higher travel expenses. In suburban areas, this range accounts for 10% of commuters.

iv. 1501-2000 Rs: No commuters in urban areas report spending within this range on travel costs. In suburban areas, 14% of commuters spend between 1501-2000 Rs, indicating that a notable portion of suburban commuters have higher travel costs.

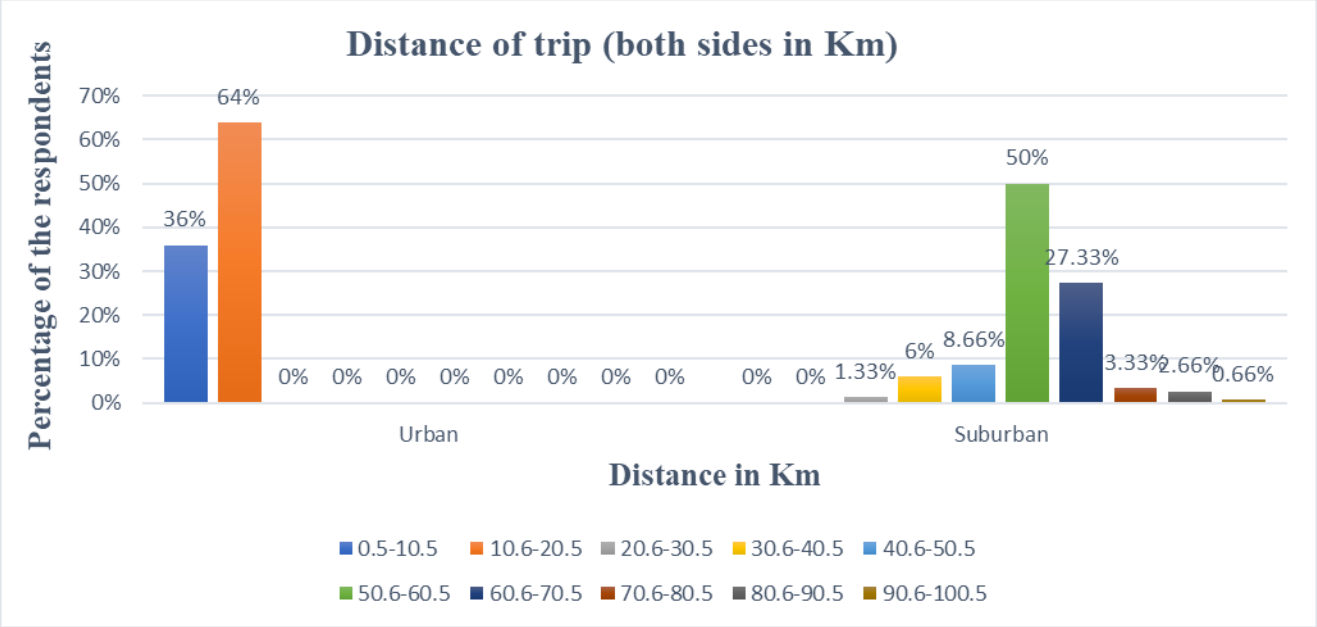
v. 2001-2500 Rs: No commuters in urban areas report spending within this range on travel costs. In suburban areas, 10% of commuters spend between 2001-2500 Rs.

vi. 2501-3000 Rs: No commuters in urban areas report spending within this range on travel costs. In suburban areas, 3.33% of commuters spend between 2501-3000 Rs.

These results highlight significant differences in travel costs between urban and suburban areas. Urban commuters generally have lower travel expenses, with the majority spending within the lower ranges. In contrast, suburban commuters often face higher travel costs, with a substantial proportion spending in the moderate to higher ranges. These differences can be

attributed to factors such as distance traveled, transportation modes used, and cost of living variations between urban and suburban environments.

Figure 4.34: Distance of trip (both sides in Km)



The graph provides the distribution of trip distances (in kilometers) between urban and suburban areas:

i. 0.5-10.5 km: In urban areas, 36% of trips fall within this range, indicating that a significant portion of trips are relatively short. In suburban areas, no trips fall within this range, suggesting that all suburban trips are longer than 10.5 km.

ii. 10.6-20.5 km: Urban areas have 64% of trips falling within this range, indicating that the majority of trips are of moderate distance. Similarly, no trips in suburban areas fall within this range, indicating all suburban trips are longer than 20.5 km.

iii. 20.6-30.5 km: In suburban areas, 1.33% of trips fall within this range, indicating some trips are in this moderate distance range. No trips fall within this range in urban areas.

iv. 30.6-40.5 km: 6% of trips in suburban areas fall within this range, indicating a notable portion of trips are longer distances. No trips fall within this range in urban areas.

v. 40.6-50.5 km: 8.66% of trips in suburban areas fall within this range, indicating that some trips are quite long. No trips fall within this range in urban areas.

vi. 50.6-60.5 km: 50% of trips in suburban areas fall within this range, indicating that a majority of trips are very long distances. No trips fall within this range in urban areas.

vii. 60.6-70.5 km: 27.33% of trips in suburban areas fall within this range, indicating a significant portion of trips are extremely long distances. No trips fall within this range in urban areas.

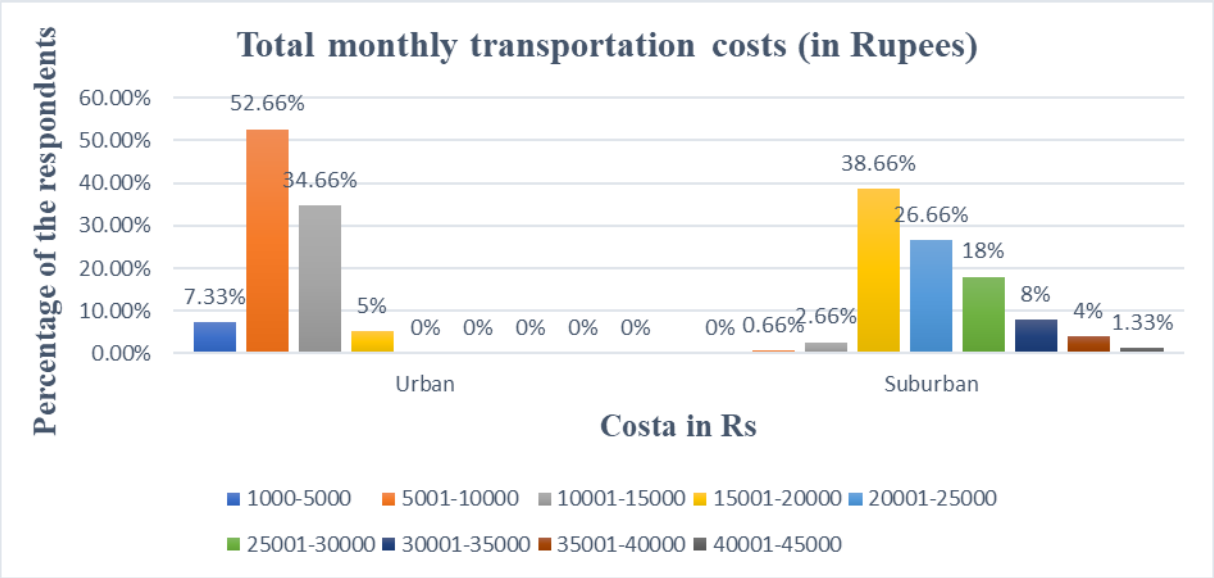
viii. 70.6-80.5 km: 3.33% of trips in suburban areas fall within this range. No trips fall within this range in urban areas.

ix. 80.6-90.5 km: 2.66% of trips in suburban areas fall within this range. No trips fall within this range in urban areas.

x. 90.6-100.5 km: 0.66% of trips in suburban areas fall within this range. No trips fall within this range in urban areas.

In summary, these results highlight significant differences in trip distances between urban and suburban areas. Urban trips tend to be shorter, with the majority falling within the 10.5 km range, while suburban trips are generally much longer, with the majority exceeding 20.5 km. This disparity reflects the different spatial layouts, commuting patterns, and transportation infrastructure between urban and suburban environments.

Figure 4.35: Transportation costs (in Rupees)



The graph presents the distribution of total monthly costs (in Rs) for transportation in urban and suburban areas:

i. 1000-5000 Rs: In urban areas, 7.33% of commuters spend between 1000-5000 Rs per month on transportation costs. No commuters in suburban areas fall within this range, indicating that very few suburban commuters have such low transportation costs.

ii. 5001-10000 Rs: Urban areas show 52.66% of commuters spending between 5001-10000 Rs per month on transportation, indicating a significant portion with moderate to higher transportation costs. In suburban areas, 0.66% of commuters fall within this range.

iii. 10001-15000 Rs: In urban areas, 34.66% of commuters spend between 10001-15000 Rs per month on transportation, indicating a substantial portion with higher transportation costs. In suburban areas, 2.66% of commuters fall within this range.

iv. 15001-20000 Rs: In urban areas, 5% of commuters spend between 15001-20000 Rs per month on transportation, indicating a smaller but notable portion with even higher transportation costs. In suburban areas, 38.66% of commuters fall within this range,

indicating that a significant majority of suburban commuters have higher transportation costs compared to urban areas.

v. 20001-25000 Rs: No commuters in urban areas report spending within this range on transportation costs. In suburban areas, 26.66% of commuters spend between 20001-25000 Rs per month.

vi. 25001-30000 Rs: No commuters in urban areas report spending within this range on transportation costs. In suburban areas, 18% of commuters spend between 25001-30000 Rs per month.

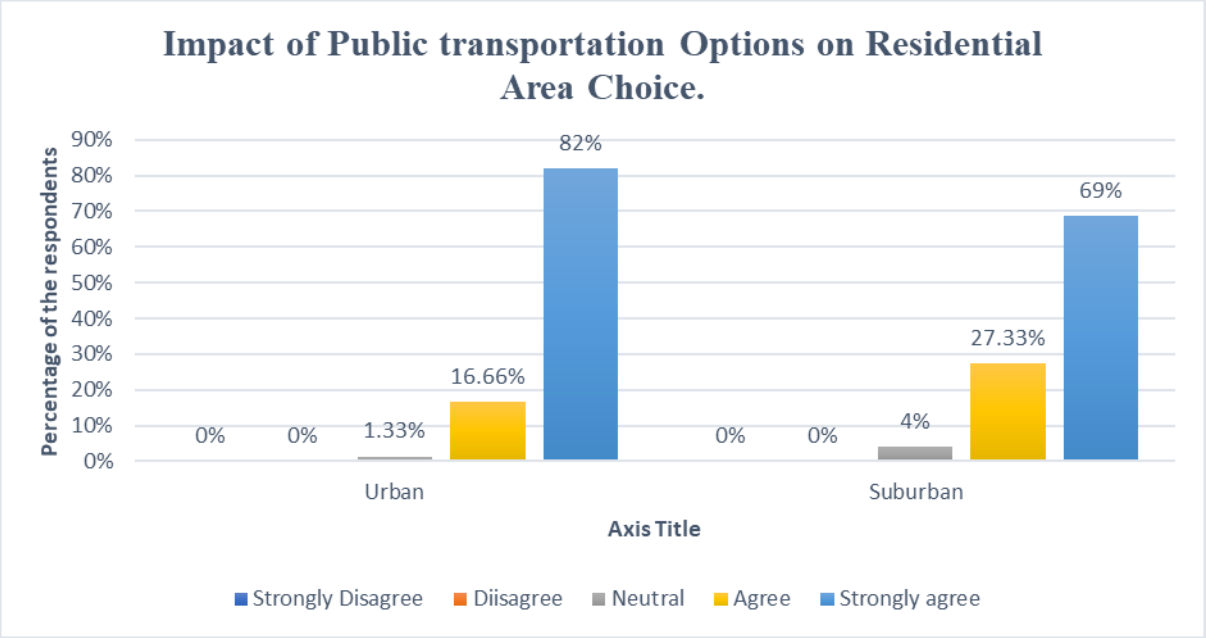
vii. 30001-35000 Rs: No commuters in urban areas report spending within this range on transportation costs. In suburban areas, 8% of commuters spend between 30001-35000 Rs per month.

viii. 35001-40000 Rs: No commuters in urban areas report spending within this range on transportation costs. In suburban areas, 4% of commuters spend between 35001-40000 Rs per month.

ix. 40001-45000 Rs: No commuters in urban areas report spending within this range on transportation costs. In suburban areas, 1.33% of commuters spend between 40001-45000 Rs per month.

These results illustrate substantial differences in monthly transportation costs between urban and suburban areas. Urban commuters generally have lower transportation costs, with the majority falling within the lower ranges. In contrast, suburban commuters often face higher transportation costs, with a significant proportion of spending in the moderate to higher ranges. These differences can be attributed to factors such as distance traveled, transportation modes used, cost of living variations, and commuting patterns between urban and suburban environments.

Figure 4.36: Impact of Public transportation Options on Residential Area Choice.



The graph indicates responses regarding the significance of public transportation for living in certain areas, comparing urban and suburban perspectives:

i. Strongly Disagree: None of the respondents in urban or suburban areas strongly disagree that public transportation is significant for living in certain areas.

ii. Disagree: Similarly, no respondents in either urban or suburban areas disagree with the statement.

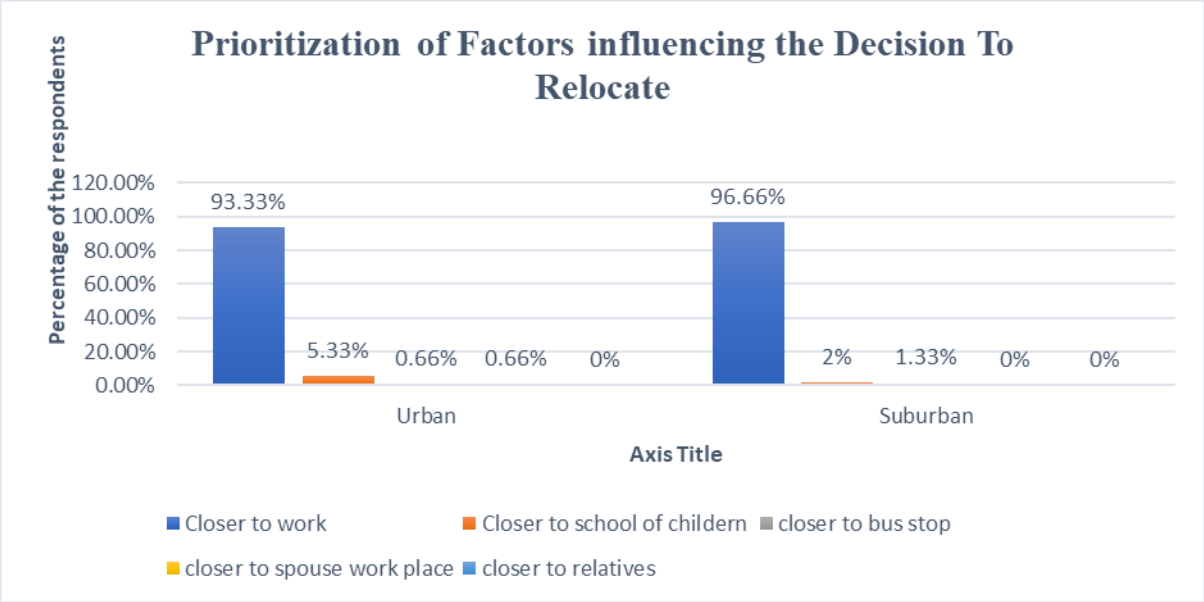
iii. Neutral: In urban areas, 1.33% of respondents are neutral about the significance of public transportation for living in certain areas. In suburban areas, 4% of respondents hold a neutral stance.

iv. Agree: In urban areas, 16.66% of respondents agree that public transportation is significant for living in certain areas. In suburban areas, 27.33% of respondents agree.

v. Strongly Agree: The majority of respondents in both urban (82%) and suburban (69%) areas strongly agree that public transportation is significant for living in certain areas.

These results indicate that while there is generally high agreement across both urban and suburban areas about the importance of public transportation for living in certain locations, urban residents tend to strongly agree more prominently than their suburban counterparts. This likely reflects the greater reliance on and integration of public transportation systems within urban planning and lifestyle compared to suburban areas, where car ownership and dependence may be higher due to lower density and different infrastructure planning.

Figure 4.37: Prioritization of Factors Influencing the Decision To Relocate



The graph presents the prioritization of factors influencing relocation decisions between urban and suburban areas:

i. Closer to work: Both urban and suburban respondents prioritize proximity to work highly. 93.33% of urban respondents and 96.66% of suburban respondents prioritize living closer to their workplace.

ii. Closer to school of children: A smaller proportion of respondents prioritize proximity to their children's school. In urban areas, 5.33% prioritize this factor, while in suburban areas, 2% do.

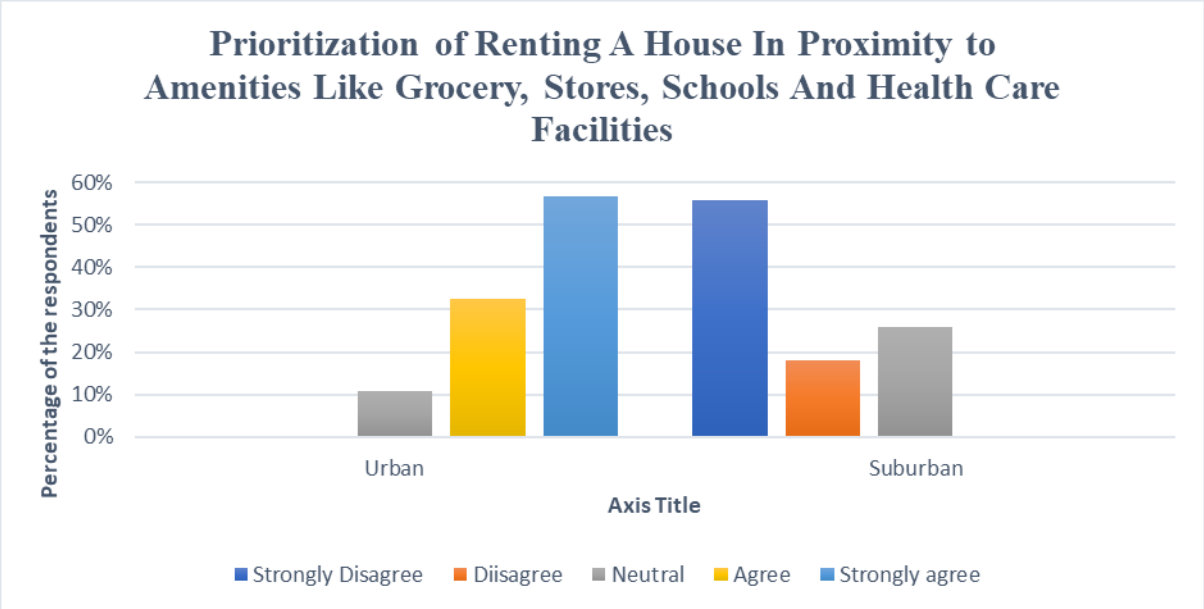
iii. Closer to bus stop: Very few respondents prioritize proximity to a bus stop. In urban areas, 0.66% consider this factor important, while in suburban areas, 1.33% do.

iv. Closer to spouse's workplace: Only a negligible percentage of respondents prioritize proximity to their spouse's workplace, with 0.66% in urban areas and none in suburban areas.

v. Closer to relatives: No respondents in either urban or suburban areas prioritize living closer to relatives.

These results indicate that both urban and suburban residents prioritize proximity to work as the most significant factor when considering relocation. Proximity to schools and bus stops also play a minor role in the decision-making process, albeit to a lesser extent compared to work location. Factors like proximity to spouse's workplace and relatives are least prioritized across both urban and suburban contexts.

Figure 4.38: Prioritization of Renting A House In Proximity to Amenities Like Grocery, Stores, Schools And Health Care Facilities.



The fig shows responses regarding access to basic amenities when renting a house, comparing urban and suburban perspectives:

i. Strongly Disagree: None of the respondents in urban areas strongly disagree that access to basic amenities is important when renting a house. However, 56% of suburban respondents strongly disagree, indicating a significant number do not prioritize amenities.

ii. Disagree: Similarly, no respondents in urban areas disagree with the statement, while 18% of suburban respondents disagree, suggesting some do not see amenities as essential.

iii. Neutral: In urban areas, 10.66% of respondents are neutral about the importance of amenities when renting a house. In suburban areas, this percentage is higher at 26%, indicating more uncertainty or mixed feelings about the importance of amenities.

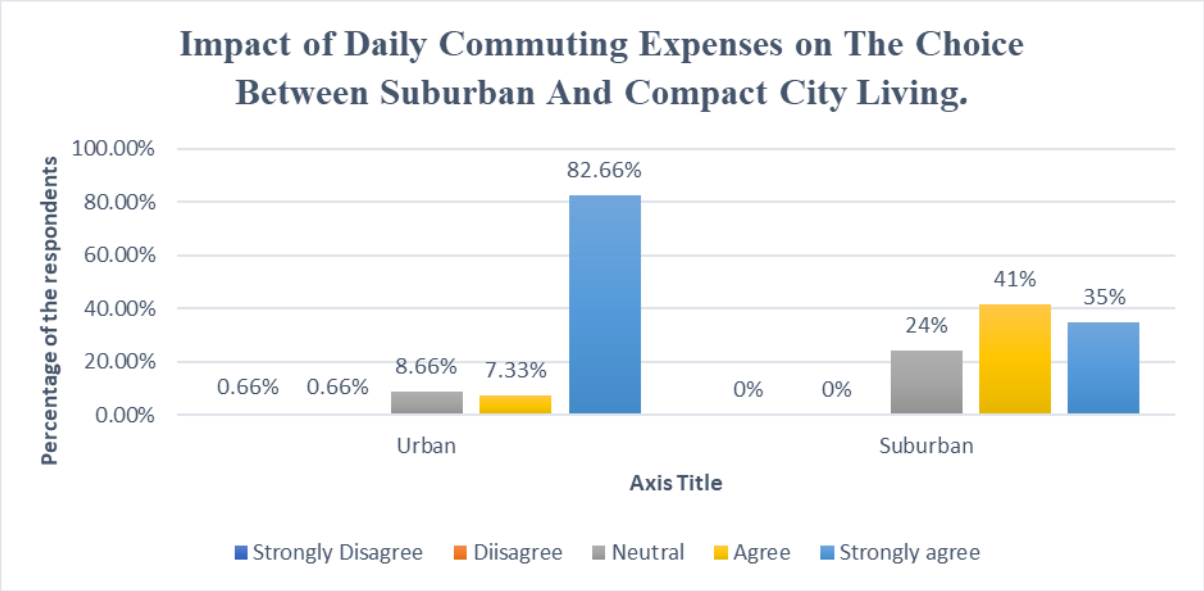
iv. Agree: 32.66% of urban respondents agree that access to basic amenities is important when renting a house. In suburban areas, none of the respondents agree, suggesting a lack of emphasis on amenities.

v. Strongly Agree: The majority of urban respondents (56.66%) strongly agree that access to basic amenities is important when renting a house. None of the suburban respondents strongly agree with this statement.

These results indicate a clear divergence in perspectives between urban and suburban residents regarding the importance of access to basic amenities when renting a house. Urban residents overwhelmingly prioritize amenities, with a majority strongly agreeing that they are essential. In contrast, suburban residents show a significant proportion who do not prioritize amenities, with a majority strongly disagreeing or disagreeing with the importance of

amenities when renting a house. This likely reflects differing expectations and preferences regarding lifestyle and access to services between urban and suburban living environments.

Figure 4.39: Impact of Daily Commuting Expenses on The Choice Between Suburban And Compact City Living.



The fig shows responses regarding the consideration of expenses as critical when choosing between urban and suburban living:

i. Strongly Disagree: A small percentage of respondents strongly disagree that expenses are a critical consideration. In urban areas, 0.66% strongly disagree, while none in suburban areas do.

ii. Disagree: Similarly, 0.66% of respondents in urban areas disagree that expenses are critical, with none in suburban areas disagreeing.

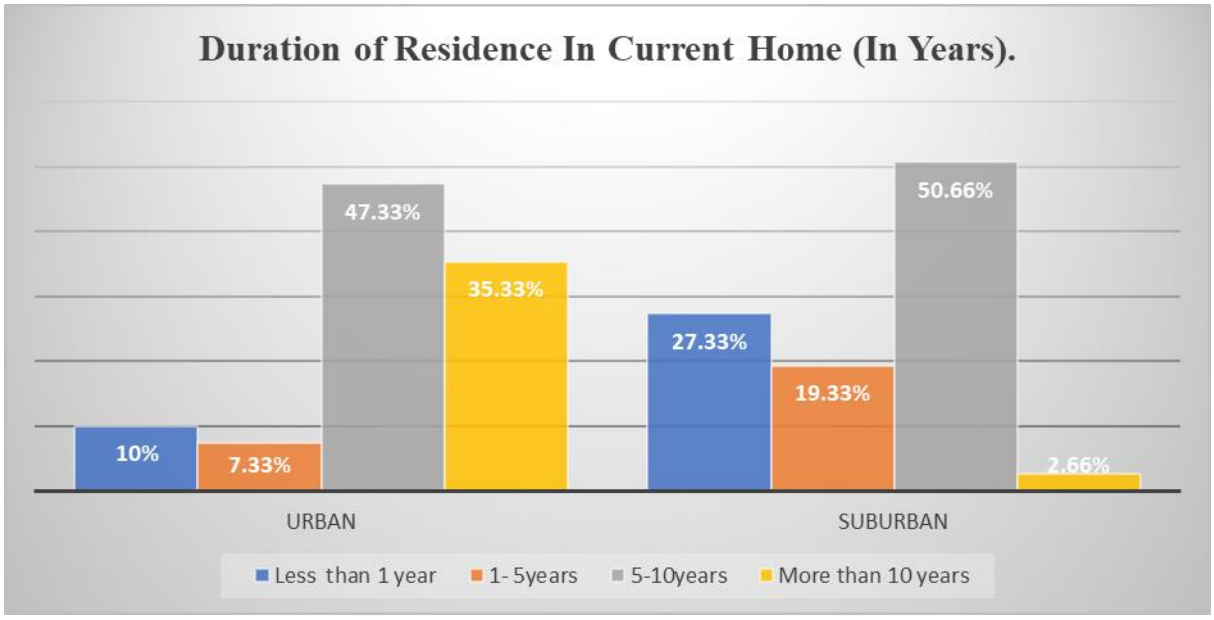
iii. Neutral: In urban areas, 8.66% of respondents are neutral about the importance of expenses when choosing between urban and suburban living. This percentage is significantly higher in suburban areas, where 24% are neutral.

iv. Agree: 7.33% of urban respondents agree that expenses are a critical consideration. In suburban areas, a larger proportion (41%) agree.

v. Strongly Agree: The majority of urban respondents (82.66%) strongly agree that expenses are a critical consideration when choosing between urban and suburban living. In suburban areas, 35% strongly agree.

These results indicate that while both urban and suburban residents generally agree that expenses are a critical consideration, there is a stronger sentiment among urban residents that expenses play a crucial role in decision-making. Suburban residents show a higher proportion of neutrality towards this consideration, suggesting a more varied perspective on the importance of expenses when choosing between urban and suburban living.

Figure 4.40: Duration of Residence In Current Home (In Years).



The fig presents the distribution of time spent in current residence (in years) for residents in urban and suburban areas:

i. Less than 1 year: In urban areas, 10% of residents have lived in their current residence for less than 1 year. In suburban areas, a higher percentage, 27.33%, fall into this category, indicating a greater turnover or movement among suburban residents.

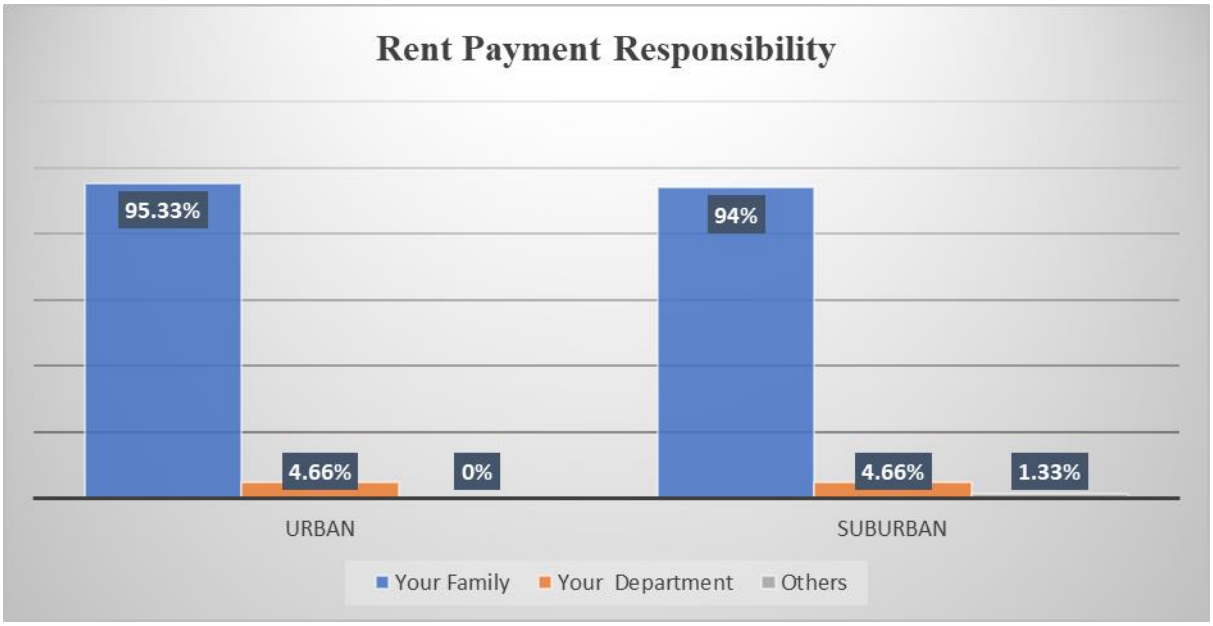
ii. 1-5 years: In urban areas, 7.33% of residents have lived in their current residence for 1-5 years. In suburban areas, 19.33% fall into this category.

iii. 5-10 years: The majority of residents in both urban (47.33%) and suburban (50.66%) areas have lived in their current residence for 5-10 years, indicating stability and longer-term residency in these categories.

iv. More than 10 years: In urban areas, 35.33% of residents have lived in their current residence for more than 10 years, indicating long-term residency. In contrast, only 2.66% of suburban residents have lived in their current residence for more than 10 years, suggesting a higher turnover or movement among suburban residents compared to urban areas.

These results suggest that while both urban and suburban residents show significant stability in the 5-10 years category, there are notable differences in shorter-term residency (less than 1 year and 1-5 years) and longer-term residency (more than 10 years). Suburban areas exhibit higher proportions of residents who have recently moved in (less than 1 year) and lower proportions of long-term residents (more than 10 years) compared to urban areas.

Figure 4.41: Rent Payment Responsibility



The figure shows the distribution of who pays the rent in urban and suburban areas:

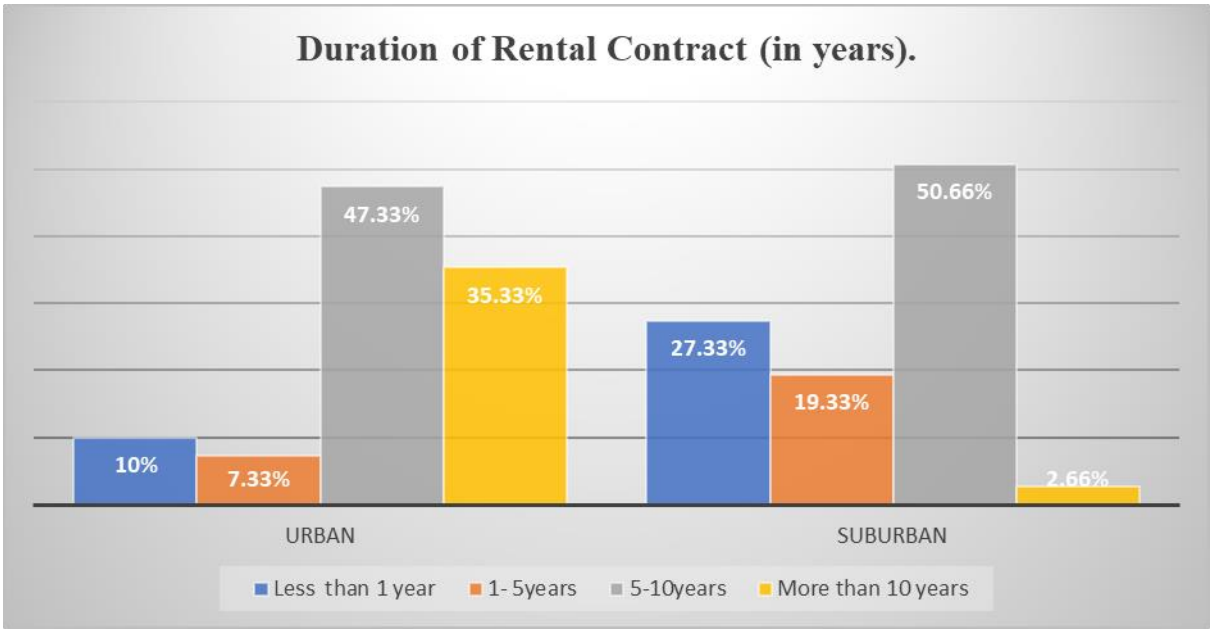
i. Your Family: In both urban and suburban areas, the vast majority of respondents (95.33% in urban and 94% in suburban areas) indicate that their family pays the rent. This suggests that personal or familial financial resources are the primary source for covering rent expenses for most respondents.

ii. Your Department: A small percentage (4.66%) of respondents in both urban and suburban areas indicate that their department pays the rent. This likely refers to situations where housing is provided or subsidized by an employer or institution.

iii. Others: None of the respondents in urban areas indicated that someone else pays the rent. In suburban areas, 1.33% of respondents stated that someone else pays the rent, which could include scenarios where rent is covered by relatives, friends, or other sources not specified.

iv. Overall, the results indicate a strong reliance on familial resources for paying rent in both urban and suburban areas, with a minority of respondents indicating other sources such as employer-provided housing or external payments.

Figure 4.42: Duration of Rental Contract (in years).



The graph presents the distribution of years of contracts for housing in urban and suburban areas:

i. 1 year: In urban areas, 14.66% of respondents have a housing contract for 1 year. In suburban areas, 11.33% of respondents have contracts for 1 year.

ii. 2 years: A small percentage of respondents have a housing contract for 2 years. In urban areas, 1.33% have contracts for 2 years, while in suburban areas, 0.66% do.

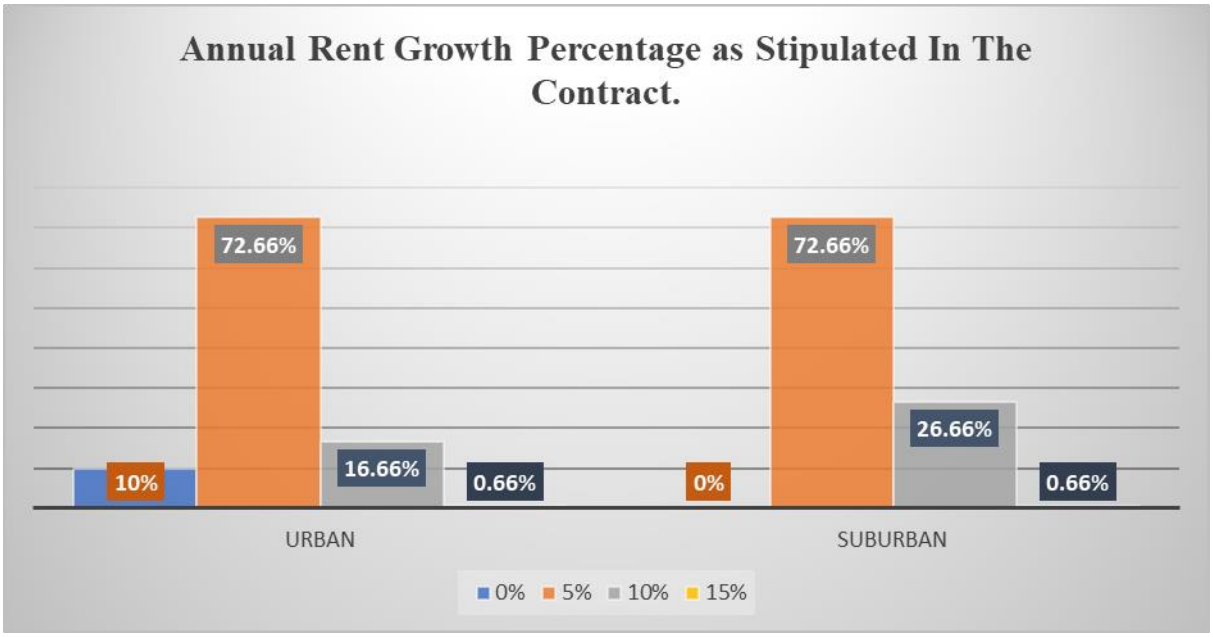
iii. 3 years: Similarly, a small percentage of respondents have a housing contract for 3 years. In urban areas, 0.66% have contracts for 3 years, while in suburban areas, 3.33% do.

iv. 4 years: The majority of respondents in both urban (81.33%) and suburban (77.33%) areas have had housing contracts for 4 years, indicating a high degree of stability with long-term contracts in these categories.

v. 5 years: A small percentage of respondents have a housing contract for 5 years. In urban areas, 2% have contracts for 5 years, while in suburban areas, 7.33% do.

These results suggest that while the majority of respondents in both urban and suburban areas have housing contracts for 4 years, there are variations in the lengths of contracts, with some opting for shorter or longer durations depending on personal circumstances and preferences. Long-term contracts (4 years) are particularly prevalent, indicating a preference for stability and security in housing arrangements among both urban and suburban residents.

Figure 4.43: Annual Rent Growth Percentage as Stipulated In The Contract.



The fig illustrates the distribution of annual growth rates in rent for urban and suburban areas:

i. 0% annual growth: In urban areas, 10% of respondents experience no annual increase in rent. None of the respondents in suburban areas report 0% annual growth in rent.

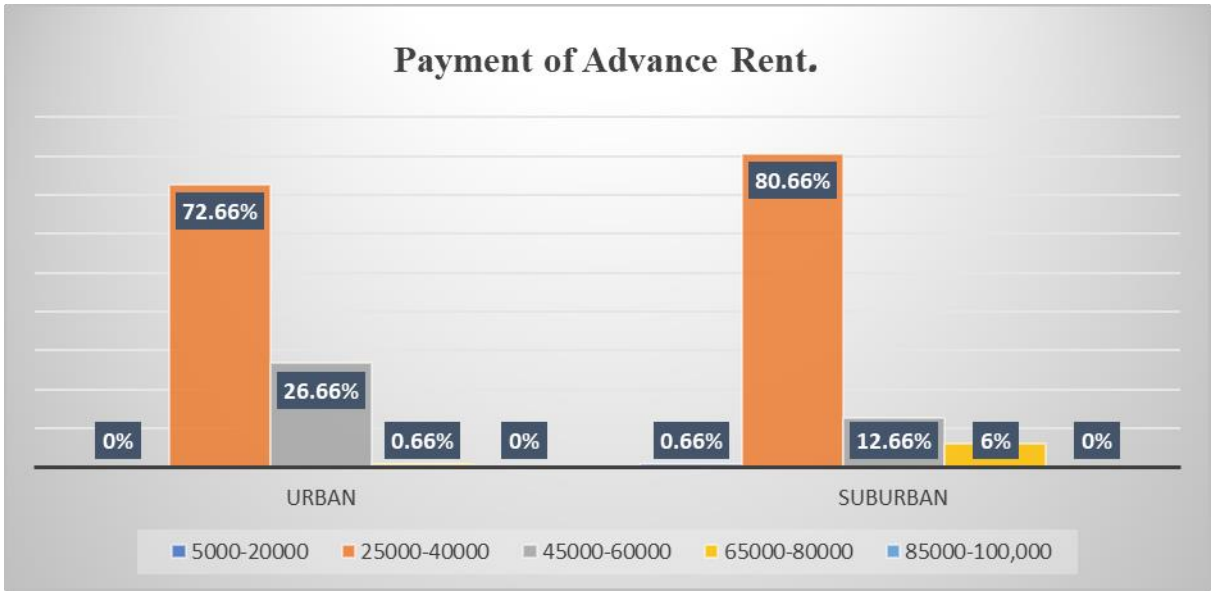
ii. 5% annual growth: The majority of respondents in both urban (72.66%) and suburban (72.66%) areas experience a 5% annual increase in rent, indicating consistency in rental price trends across these settings.

iii. 10% annual growth: In urban areas, 16.66% of respondents experience a 10% annual increase in rent, while in suburban areas, 26.66% experience the same rate of increase.

iv. 15% annual growth: A negligible percentage (0.66%) of respondents in both urban and suburban areas experience a 15% annual increase in rent.

These results suggest that while the most common annual rent increase for both urban and suburban areas is 5%, there are variations with some experiencing higher annual increases (10%) as well. Urban and suburban areas show similar patterns in rent growth rates, reflecting broader economic factors influencing housing costs across different residential settings.

Figure 4.44: Payment of Advance Rent.



The figure shows the distribution of monthly rent payments (in Rs) for urban and suburban areas:

i. 5000-20000 Rs: None of the respondents in urban or suburban areas pay rent within this range.

ii. 25000-40000 Rs: The majority of urban respondents (72.66%) and suburban respondents (80.66%) pay monthly rent in the range of 25000-40000 Rs. This indicates that a significant portion of renters in both areas are within this middle range of rent payments.

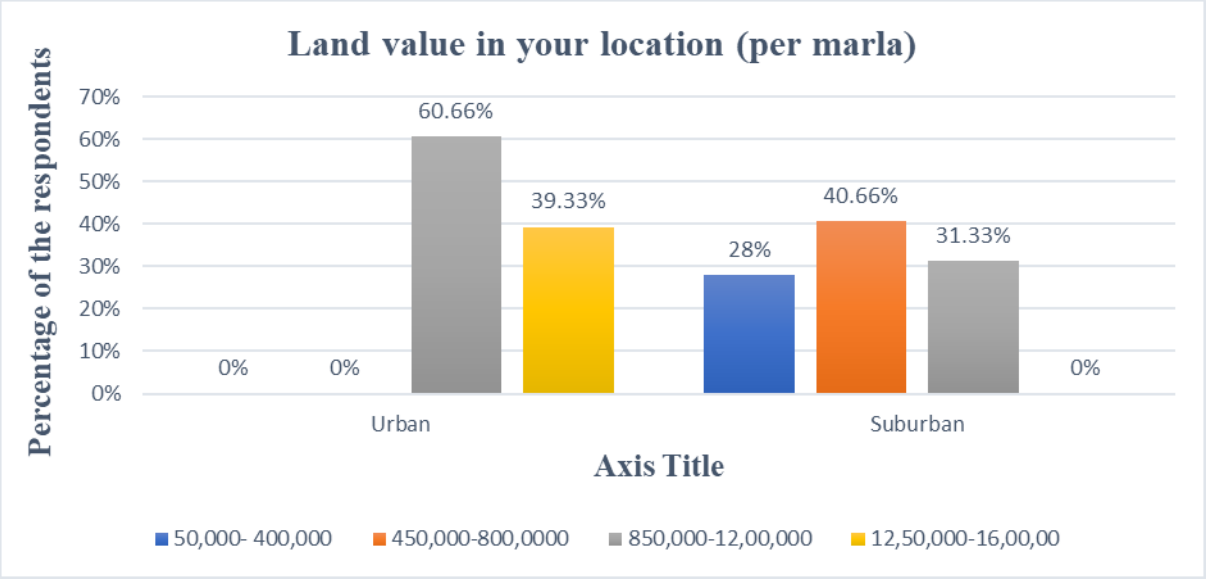
iii. 45000-60000 Rs: In urban areas, 26.66% of respondents pay monthly rent in the range of 45000-60000 Rs. In suburban areas, this percentage is lower at 12.66%.

iv. 65000-80000 Rs: A small percentage of urban respondents (0.66%) and suburban respondents (6%) pay monthly rent in the range of 65000-80000 Rs.

v. 85000-100,000 Rs: None of the respondents in urban or suburban areas pay rent within this highest range.

These results indicate that while the majority of renters in both urban and suburban areas pay rent in the middle range of 25000-40000 Rs per month, there are variations in higher rent brackets, with more urban respondents paying in the higher ranges compared to suburban areas. This reflects differences in rental costs and housing affordability between urban and suburban settings.

Figure 4.45: Land Value In Your Location (per Marla)



The table presents the distribution of land values (per marla) in urban and suburban locations:

i. 50,000-400,000 Rs per marla: None of the respondents in urban areas have land values within this range, while 28% of respondents in suburban areas do.

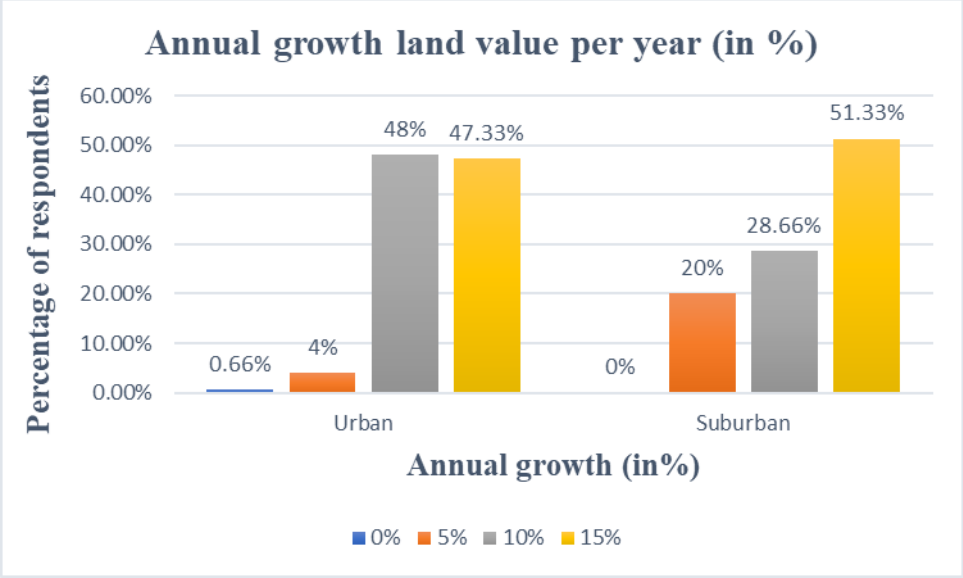
ii. 450,000-800,000 Rs per marla: None of the respondents in urban areas have land values within this range, while 40.66% of respondents in suburban areas do.

iii. 850,000-12,00,000 Rs per marla: 60.66% of respondents in urban areas have land values within this range, while 31.33% of respondents in suburban areas do.

iv. 12,50,000-16,00,000 Rs per marla: 39.33% of respondents in urban areas have land values within this range, while none of the respondents in suburban areas do.

These results indicate significant differences in land values between urban and suburban locations. In urban areas, higher percentages of respondents have land values in the higher ranges (850,000-12,00,000 Rs per marla and 12,50,000-16,00,000 Rs per marla) compared to suburban areas, where more respondents have land values in the lower to mid ranges (50,000-800,000 Rs per marla). This reflects variations in property values and cost of living between urban and suburban environments, influenced by factors such as infrastructure development, accessibility, and demand for real estate in different areas.

Figure 4.46: Annual Growth Rate of Land Value Per Year (In %)



The fig shows the annual growth rates of land values (in %) in urban and suburban areas:

i. 0% annual growth: 0.66% of respondents in urban areas report no annual increase in land value, while none in suburban areas report 0% growth.

ii. 5% annual growth: 4% of respondents in urban areas experience a 5% annual increase in land value, while 20% of respondents in suburban areas do.

iii. 10% annual growth: The majority of respondents in urban areas (48%) experience a 10% annual increase in land value, while 28.66% of respondents in suburban areas do.

iv. 15% annual growth: 47.33% of respondents in urban areas experience a 15% annual increase in land value, while 51.33% of respondents in suburban areas do.

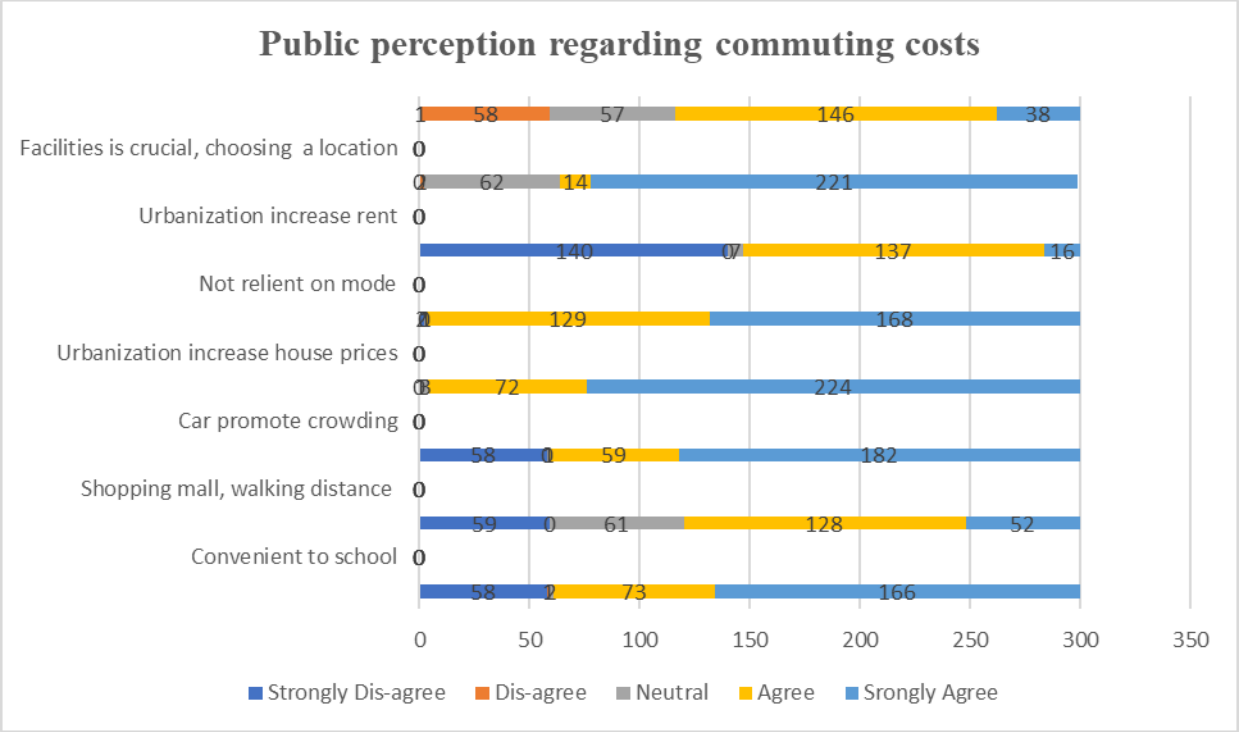
These results indicate that while both urban and suburban areas experience annual growth in land values, there are differences in the distribution of growth rates:

i. In urban areas, a significant portion of respondents experience higher growth rates (10% and 15% annually).

ii. In suburban areas, while a sizable portion also experiences growth, there is a notable segment experiencing lower growth rates (5% annually).

Overall, the data suggests that suburban areas may have more variability in annual growth rates of land values compared to urban areas, where higher growth rates are more prevalent. This variation likely reflects differences in real estate dynamics, development patterns, and market conditions between urban and suburban locations.

Figure 4.47: Public Perception Regarding Commuting Costs.



The graph depicts public perception regarding various factors affecting commuting costs. It categorizes responses into five levels of agreement: Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree. Each factor is shown as a horizontal bar, with different sections representing the number of responses for each level of agreement.

1. Facilities are crucial, in choosing a location:
    - Strongly Disagree: 1
    - Disagree: 58
    - Neutral: 57
    - Agree: 146
    - Strongly Agree: 38

    The majority of respondents (146) agree that facilities are crucial when choosing a location, followed by a substantial number who strongly agree (38).

2. Urbanization increases rent:

- Strongly Disagree: 0
- Disagree: 62
- Neutral: 14
- Agree: 221
- Strongly Agree: 0

Most respondents (221) agree that urbanization increases rent, with very few in the neutral or disagree categories.

3. Not reliant on mode:
    - Strongly Disagree: 0
    - Disagree: 0
    - Neutral: 140
    - Agree: 137
    - Strongly Agree: 16

    Responses are mixed, with a near-even split between neutral (140) and agree (137), and a smaller number strongly agreeing (16).

4. Urbanization increases house prices:
    - Strongly Disagree: 0
    - Disagree: 2
    - Neutral: 129
    - Agree: 168
    - Strongly Agree: 0

The majority of respondents (168) agree that urbanization increases house prices, with a significant number being neutral (129).

5. Car promotes crowding:
    - Strongly Disagree: 0
    - Disagree: 8
    - Neutral: 72
    - Agree: 224
    - Strongly Agree: 0

    Most respondents (224) agree that cars promote crowding, with a notable number neutral (72) on this issue.

6. Shopping mall within walking distance:
    - Strongly Disagree: 0
    - Disagree: 58
    - Neutral: 0
    - Agree: 59
    - Strongly Agree: 182

    A significant number of respondents (182) strongly agree that having a shopping mall within walking distance is important, with another substantial group agreeing (59).

7. Convenient to school:
    - Strongly Disagree: 0
    - Disagree: 59

- Neutral: 0
- Agree: 61
- Strongly Agree: 128

The majority of respondents (128) strongly agree that convenience to school is important, with another large group agreeing (61).

Overall Insights

i. There is strong agreement on the importance of facilities, urbanization's impact on rent and house prices, and the convenience of having amenities like schools and shopping malls within walking distance.

ii. Mixed feelings are evident on reliance on mode and the impact of cars promoting crowding.

iii. Few respondents strongly disagree with the statements, indicating overall positive or neutral perceptions toward the factors presented.

Policy Suggestions

i. Focus on Facilities: Since facilities are crucial for location choice, policymakers should prioritize the development of comprehensive amenities in residential areas.

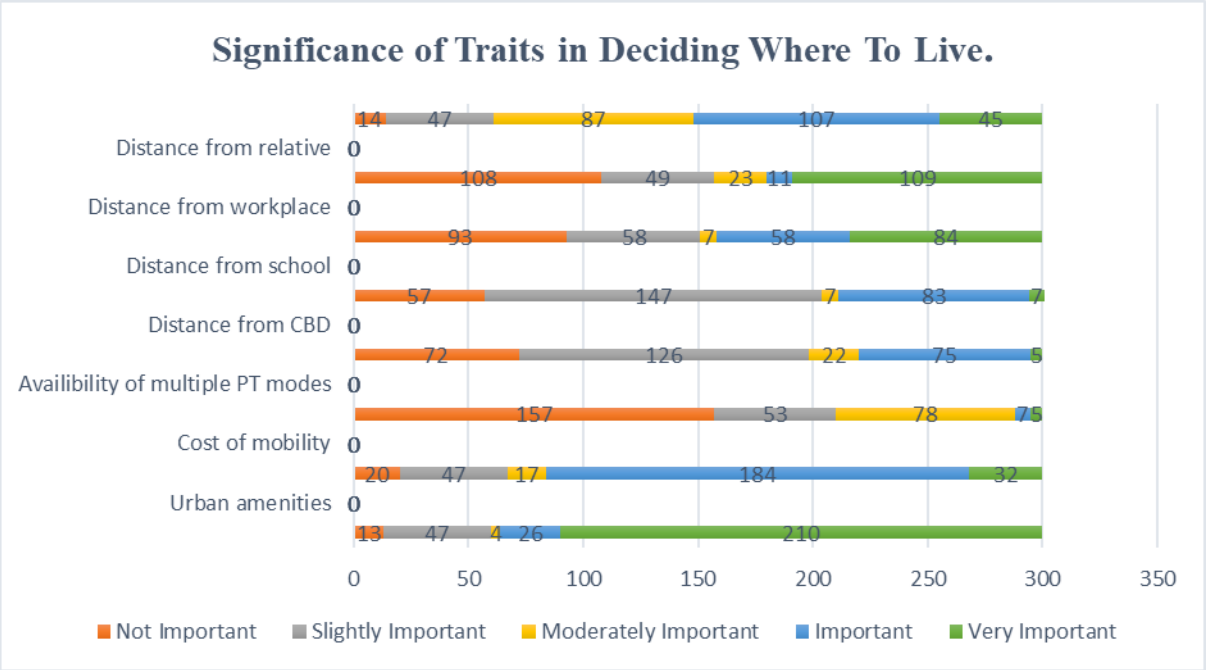
ii. Manage Urbanization: As urbanization is perceived to increase rent and house prices, there should be measures to manage housing affordability.

iii. Encourage Walking Distance Amenities: Policies to ensure essential amenities like shopping malls and schools are within walking distance can enhance public satisfaction and potentially reduce commuting costs.

iv. Address Car Crowding: Developing strategies to mitigate the crowding effect of cars, such as improving public transport, can be beneficial.

These insights can help policymakers understand public priorities and design urban development strategies accordingly.

Figure 4.48: Significance of Traits in Deciding Where To Live.



The graph illustrates public perceptions of the significance of various traits when deciding where to live. The responses are categorized into five levels of importance: Not Important, Slightly Important, Moderately Important, Important, and Very Important. Each trait is represented as a horizontal bar, with different sections indicating the number of responses for each level of importance.

1. Distance from relatives:
    - Not Important: 14
    - Slightly Important: 47
    - Moderately Important: 87

- Important: 107
- Very Important: 45

The majority of respondents consider the distance from relatives as important (107) or moderately important (87).

2. Distance from the workplace:
    - Not Important: 0
    - Slightly Important: 108
    - Moderately Important: 49
    - Important: 111
    - Very Important: 109

    Respondents are divided, with significant groups finding it important (111) or very important (109), and a notable number finding it slightly important (108).

3. Distance from school:
    - Not Important: 0
    - Slightly Important: 93
    - Moderately Important: 58
    - Important: 58
    - Very Important: 84

    Opinions vary, but many respondents rate this trait as very important (84) or slightly important (93).

4. Distance from CBD (Central Business District):

- Not Important: 0
- Slightly Important: 57
- Moderately Important: 147
- Important: 83
- Very Important: 7

Most respondents consider this trait moderately important (147) or important (83).

5. Availability of multiple PT (Public Transport) modes:
    - Not Important: 0
    - Slightly Important: 72
    - Moderately Important: 126
    - Important: 75
    - Very Important: 5

    The majority consider it moderately important (126), with fewer finding it important (75) or slightly important (72).

6. Cost of mobility:
    - Not Important: 0
    - Slightly Important: 157
    - Moderately Important: 53
    - Important: 78
    - Very Important: 75

Responses are mixed, with the largest group considering it slightly important (157), but many also rating it important (78) or very important (75).

7. Urban amenities:
    - Not Important: 0
    - Slightly Important: 20
    - Moderately Important: 47
    - Important: 184
    - Very Important: 32

    The majority of respondents consider urban amenities important (184), with a notable number finding them very important (32).

Overall Insights

i. Urban Amenities: Most respondents find urban amenities important or very important when choosing where to live.

ii. Distance from the Workplace: This is a significant factor, with many considering it important or very important.

iii. Cost of Mobility: While varied, many respondents rate the cost of mobility as slightly important, but a significant number also find it very important.

iv. Availability of PT Modes and Distance from CBD: These are generally considered moderately important.

v. Distance from School and Relatives: These traits receive mixed responses, but many consider them important or moderately important.

Policy Suggestions

i. Enhance Urban Amenities: Ensuring high-quality urban amenities could attract more residents.

ii. Workplace Proximity: Policies that promote residential areas near workplaces could be beneficial.

iii. Affordable Mobility: Implementing measures to keep mobility costs low could address the varied importance assigned to this factor.

iv. Public Transport: Enhancing public transport availability could appeal to those who find it moderately important.

Understanding these preferences can help policymakers tailor urban development and housing policies to meet public needs and improve living conditions.

4.4 Diagnostics

Before proceeding with the regression analysis, a diagnostics test for No heteroscedasticity, Multi collinearity, Specification error test, and Normality test. (Tables 6,7,8 and 9) We have applied Cameron & Trivedi's decomposition of IM-test for the detection of heteroskedasticity and regression run with the Breusch–Pagan/Cook–Weisberg test for heteroskedasticity, vif test for no multicollinearity problem, kdensity e, normal test for normality and linktest for No specification-error in the model. Since all probability values (p-values) are rejected, the null hypotheses concluded that variables have no issue with heteroscedasticity and the vif is less than 3 it means that there is no multicollinearity problem or detected. The value of linktest t-statistics and F-statistics p-values is greater than 0.05 which shows that there is no specification error in the model. Kdensity e, normal shows the graph that data is normally distributed. This study uses Stata-version17 to check the consistency of different variables.

4.5 Result and Discussion of Simple Linear Regression Models

These coefficients show how each factor influences Household monthly Transportation costs based on the given models. Positive coefficients generally indicate factors that increase cost, while negative coefficients indicate factors that decrease costs. The "t-Statistic" and "Prob." values assess the statistical significance of each coefficient — whether the relationship is likely to be real or just due to random chance.

In the statistical results of table 4.2, when we used linear regression Model to check the impact of independent variables on dependent variable which is basically monthly transportation costs of household in two different areas of Islamabad which is divided into Urban and Suburban areas.

In urban analysis, first we looking to the impact of (Need of Time to reach the centers), if 1 unit increase in time will brings 10.58% decrease in transport cost. The reason is, Income Effect and Low-Income Household Adaptation which means Urban households with lower incomes often endure longer commutes but use cheaper modes (bus, metro, etc.). (Litman, 2008) shows that lower-income groups often have longer commutes but significantly lower per-trip or monthly transport expenses, due to minimal car ownership. The next impact of (Mode used for the journey) is when 1% more journey, it will be 0.16% decrease in cost. The reason is Proximity and Accessibility in High-Density Areas(Litman & Steele, 2017) witch means High-density housing is usually located in areas with better accessibility to jobs, services, and public transit witch leading to lower monthly transport costs. (Travel frequency), 1 unit increase will brings 3.96% decrease in cost because of Frequent Travel in Urban Areas Is Often via Low-Cost Modes. (Crane & Crepeau, 1998) In dense urban environments, frequent travel does not necessarily mean higher monetary cost, because the trips are often made via walking, cycling, or public. (Relative KM), 1 km increase will brings 5.62% decrease in cost because of (Crane & Crepeau, 1998) shows that as travel distance

increases, especially in cities with developed networks, transit use increases, reducing per-trip cost. (Extra time spent) brings +1.27%, (Time for suburban travel) brings +0.34%, (Travel on this route) brings +5.36%, (Grocery KM) brings +2.89% and (Log of travel cost) brings +0.13%.

In Suburban analysis, first we looking to the impact of (Travel on this route), if 1 unit increase in travel will brings 3.74% decrease in cost because According to (Ben, 1984), habitual route choice leads to better travel decisions and lower costs as users learn from experience. (Taylor & Fink, 2003) emphasize that reliable and consistent route usage often corresponds with access to public subsidies or lower fixed travel costs, particularly for daily commuters. The next all variables brings positive impact on commuting costs which means that they become a cause of more costs for urban households. The impact of (Extra time spent) is +0.34% and the reason is More time, longer distance or inefficient modes. (Traffic cost (log)) is +0.07% and the reason is Congestion raises fuel/time costs. (Travel frequency) is +5.20% and the reason is More trips make higher fuel. (Purpose of travel) is +2.29% and the reason is Non-optional purposes cost more. (Travel cost (log)) is +0.11% and the reason is Direct expenditure impact. (Who pays rent) is +10.69% and the reason is Renters likely live farther witch made costlier commutes.

4.6 Review of Islamabad Bylaws, building codes, and zoning regulations by CDA from 1993 to 2020

The review of Islamabad's land use regulations from 1993 to 2020 (Table 10) reveals that there has been minimal change in zoning and building codes over the 30 years. This lack of substantial modification suggests that the city's regulatory framework has not kept pace with the evolving urban landscape, contributing to urban sprawl (Fig 40 & 41). Here's a critical analysis of the key aspects:

The zoning regulations for residential development in Islamabad from 1993 to 2020 show that only minor changes have been made over three decades. Despite massive population growth during this time, the city's land use policies have remained mostly static.

Key Observations:

1. Plot Sizes and Housing Types:
    - The categorization of residential dwellings into Terraced Houses (Type A & B) and Detached Houses (Type C & D) has remained the same.
    - Plot sizes, maximum number of stories, building heights, setbacks, and coverage ratios (FAR and build-up area) have barely changed since 1993.
2. No Adaptation to Urban Growth:
    - Islamabad’s population has grown many times over the last 30 years, but zoning regulations have not been updated to absorb this pressure.
    - As a result, the city is facing uncontrolled urban sprawl, pushing development to the outskirts and increasing reliance on private transport.
3. Missing Middle-Density Options:
    - The current regulations promote either low-density detached homes or narrow terraced units, without offering middle-density housing like low-rise apartments or townhouses which are more efficient for growing cities.

Policy Recommendations for Sustainable Urban Growth:

1. Introduce Zoning Flexibility:
    - Allow for mixed-use development and vertical expansion in selected sectors.

- Create zoning overlays that permit higher density in already urbanized areas.

2. Promote Transit-Oriented Development (TOD):
    - Encourage housing projects near major transport corridors with higher FAR and reduced parking requirements to reduce car dependence.
3. Update Regulations for Middle-Income Housing**:**
    - Develop inclusionary zoning policies that support a mix of housing types and income levels.
    - Incentivize mid-rise apartments, duplexes, and affordable rental units.
4. Regular Zoning Reviews:
    - Set up a framework for periodic review and adjustment of zoning laws, ideally every 5-10 years, to respond to changes in population, housing demand, and infrastructure.
5. Digital Zoning Maps and Public Access:
    - Improve transparency and planning efficiency by creating interactive online zoning maps with clear, updated regulations for each sector.

In conclusion, the data shows a clear disconnect between population growth and zoning policy. Without proactive reform, Islamabad will continue to suffer from inefficient land use and sprawling development. A long-term, flexible, and sustainable urban policy is urgently needed to manage growth and protect the city's livability and environment.

Table 4.2: Regression Model Analyzing Monthly Transportation costs of Households in two Different Areas.

VARIABLES	Coefficient (Urban)	t	P>|t|	VARIABLES	Coefficient (Suburban)	t	P>|t|
Time to reach Centers	-.105784***	-3.31	0.001	Time to reach Centers	.0001511	0.25	0.805
Mode used for the journey	-.0218353***	-2.25	0.016	Mode used for the journey	-.0060262	-1.20	0.230
Extra time spent on travel	.0127004***	3.64	0.000	Extra time spent on travel	0.0033974***	3.21	0.002
logMoney costs due to traffic	-.5535526*	-1.41	0.161	logMoney costs due to traffic	.0737077***	2.97	0.004
Time for travel in suburban	.0033962***	2.94	0.004	Travel frequency	.0520496***	5.08	0.000
logMoney for travel in Suburban	.2250384***	4.35	0.000	Factors while choosing the mode	-.0027837	-0.53	0.595
Travel frequency	-.0395789***	-2.97	0.004	Purpose of travel	.0229284***	2.71	0.008
Travel on this route	.0535751***	2.40	0.018	logTravel cost	.11475 ***	3.33	0.001
Factors while choosing the mode	.001757	0.18	0.860	Who pays the rent	.106914***	5.38	0.000
Relative KM	-.0561742***	-6.11	0.000	_cons	3.479046	24.46	0.000
Grocery KM	.0289238**	2.34	0.021				
logTravel	.132304***	2.42	0.017				

cost							
Years of contract	-.0080727	-1.11	0.268				
_cons	3.471978***	12.94	0.000				

Note: Values in parentheses show odd ratios.

* 10 % Significance level.

** 5 % significance level.

*** 1 % significance level.

Table 4.3: Heteroscedasticity Test for Regression Model.

Breusch–Pagan/Cook–Weisberg test for Heteroskedasticity (Urban)		**IM-Test for Heteroskedasticity (Suburban)**			
Variable: Fitted values of Monthly transportation costs		Cameron & Trivedi's decomposition of the IM-test			
chi2(1)	0.06	Source	chi2	df	p
Prob > chi2	0.8070	Heteroskedasticity	149.90	146	0.3953
		Skewness	18.39	19	0.4968
		Kurtosis	5.26	1	0.029
		Total	173.55	166	0.3283

Table 4.4: Autocorrelation Test for Regression Model

Vif Test for Autocorrelation (Urban)	**Vif Test for Autocorrelation (Suburban)**
Mean VIF | 1.68	Mean VIF | 1.74

Table 4.5: Specification error Test for Regression Model

Specification error test (Urban)				**Specification error test (Suburban)**			
linktest				linktest			
Monthly transportation costs	Coefficient	t	P>|t|	Monthly transportation costs	Coefficient	t	P>|t|
_hat	1.011025	2.91	0.004	_hat	1.067318	2.64	0.009
_hatsq	-5.52E-07	-0.03	0.974	_hatsq	-1.28E-06	-0.17	0.866
_cons	-50.90701	-0.03	0.976	_cons	-840.38	-0.16	0.872

Table 4.6: Normality Test for Regression Model

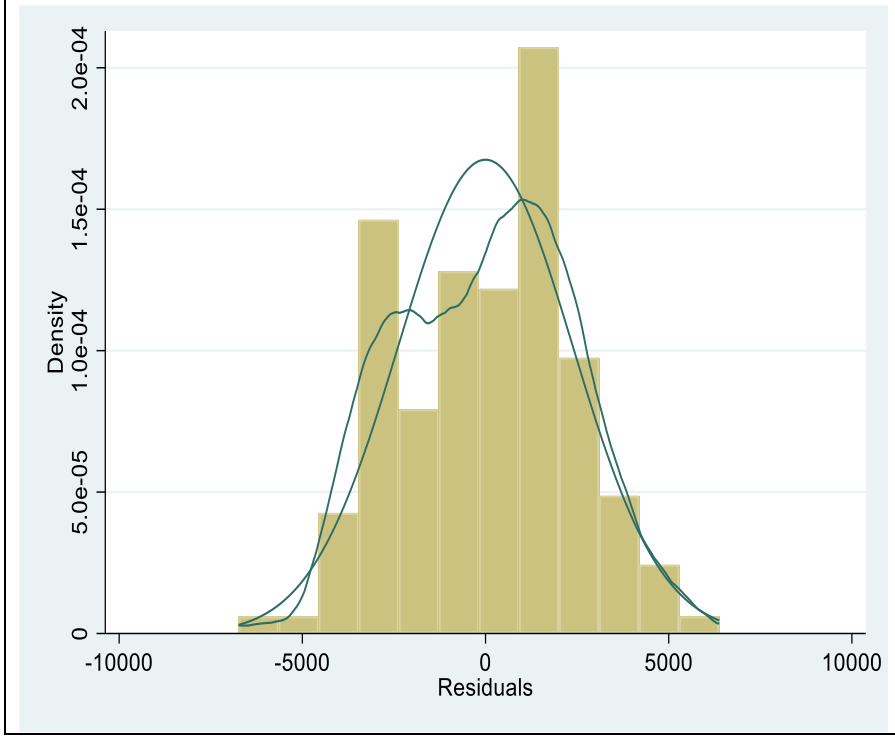
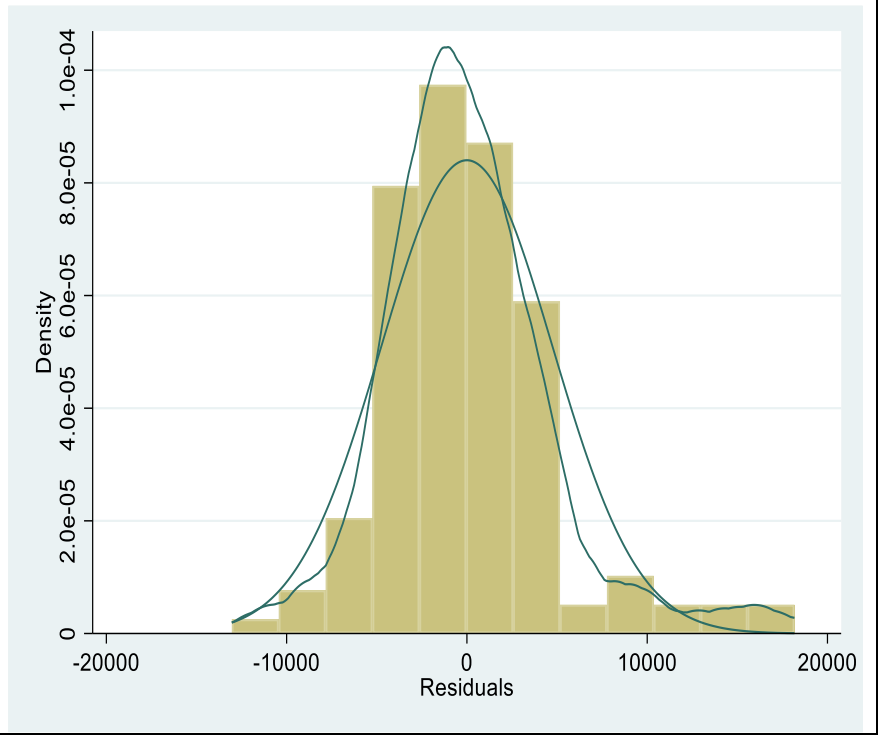
For Urban	**For Suburban**
Graph for Normality Test Kdensity e, Normal 	**Graph for Normality Test** Kdensity e, Normal 

Table 4.7: Review of Islamabad Bylaws, building codes, and zoning regulations by CDA from 1993 to 2020

Zoning District 1993/2020	Type of property development	Plot size		Max Housing units	Building				Min. set back				Max permissible area
		Area in sq. yds	Frontage in feet		max no. of stories	Height of story(ft) G/1st floor	FAR	Max buildup area on G floor	Front	Side 1	Side 2	Rare	
All private residential plots in Islamabad allowed by the authority except those in the Diplomatic	Terraced dwelling houses TYPE 'A' 1993/2020	Upto-150 /upto-150	20-29 /20-29	/One	2/2	30'/30'	1.2	60%	5' /5'			7' /5'	150sq.ft /200sq.ft
		150-200 /150-200	25-30/ 25-30	/One	2/2	30'30'	1.2	60%	6' /5'			8' /5'	150sq.ft/350sq.ft
		-/300-450	-/40-40	/One	2/2	30'/30'			/6'				150sq.ft/350sq.ft
	Terraced dwelling houses TYPE 'B' 1993/2020	201-625	30-49 /40-45	/One	2/2	30'/30'	1.05	60%	10' /10'	/4'		10' /5'	200sq.ft /350sq.ft
	Detached dwelling houses	400-1000/400-1000	50-59 /50-59	/One	2/2	30'/30'	0.90	50%	10' /3'	5' /4'	10' /5'	10' /5'	250sq.ft /400sq.ft

Enclave	**TYPE 'C' 1993/2020**	**530-1335/530-1335**	**60-69 /60-69**	**/Two**	**2/2**	**30'30'**	**0.90**	**50%**	**10' /15'**	**10' /5'**	**10' /5'**	**10' /5'**	**----------**
		700-1670/700-1670	**70-79 /70-79**	**/Two**	**2/2**	**30'30'**	**0.90**	**50%**	**20' /20'**	**10' /10'**	**10' /10'**	**10' /10'**	**----------**
	Detached dwelling houses TYPE 'D' 1993/2020	**885-2670/885-2670**	**80-89/ 80-89**	**/Two**	**2/2**	**30'/30'**	**0.85**	**50%**	**20' /25'**	**10' /10'**	**10' /10'**	**15' /10'**	**250sq.ft /400sq.ft**
		800-2900/800-2900	**90-99/ 90-99**	**/Two**	**2/2**	**30'/30'**	**0.85**	**50%**	**20' /30'**	**10' /10'**	**10' /10'**	**15' /10'**	**----------**
		1770-2720/1770-2720	**100& Above / 100& above**	**/Two**	**2**	**30'**	**0.85**	**50%**	**30' /35'**	**15' /10'**	**15' /10'**	**15' /10'**	**----------**

Type of property	Size of Area	Allowed Area	Height of story (ft) G/1ST floor	Height of building	Set back (feet) Front/Back/Side	Arcade /FAR/building line (feet)
Marakiz	1000 sq yds	Along roads		No restriction		0/1:6/0
	3000 sq yds					0/1:8/0
	Larger than 300& less than					0/1:9/0

	5000					
	Larger 5000 sq yds					0/1:10/0
Trade center				Basement, Ground +1 story		
The existing buildings in the blue area			Up to 6			0/1:6/0
High-rise buildings	300 sq yds	Blue area				
	300 sq yds	Sector G8				
	300 sq yds	Sector G 11				
	300 sq yds	Kashmir highway				
Class 3 shopping centers		Along roads		Ground plus one story		

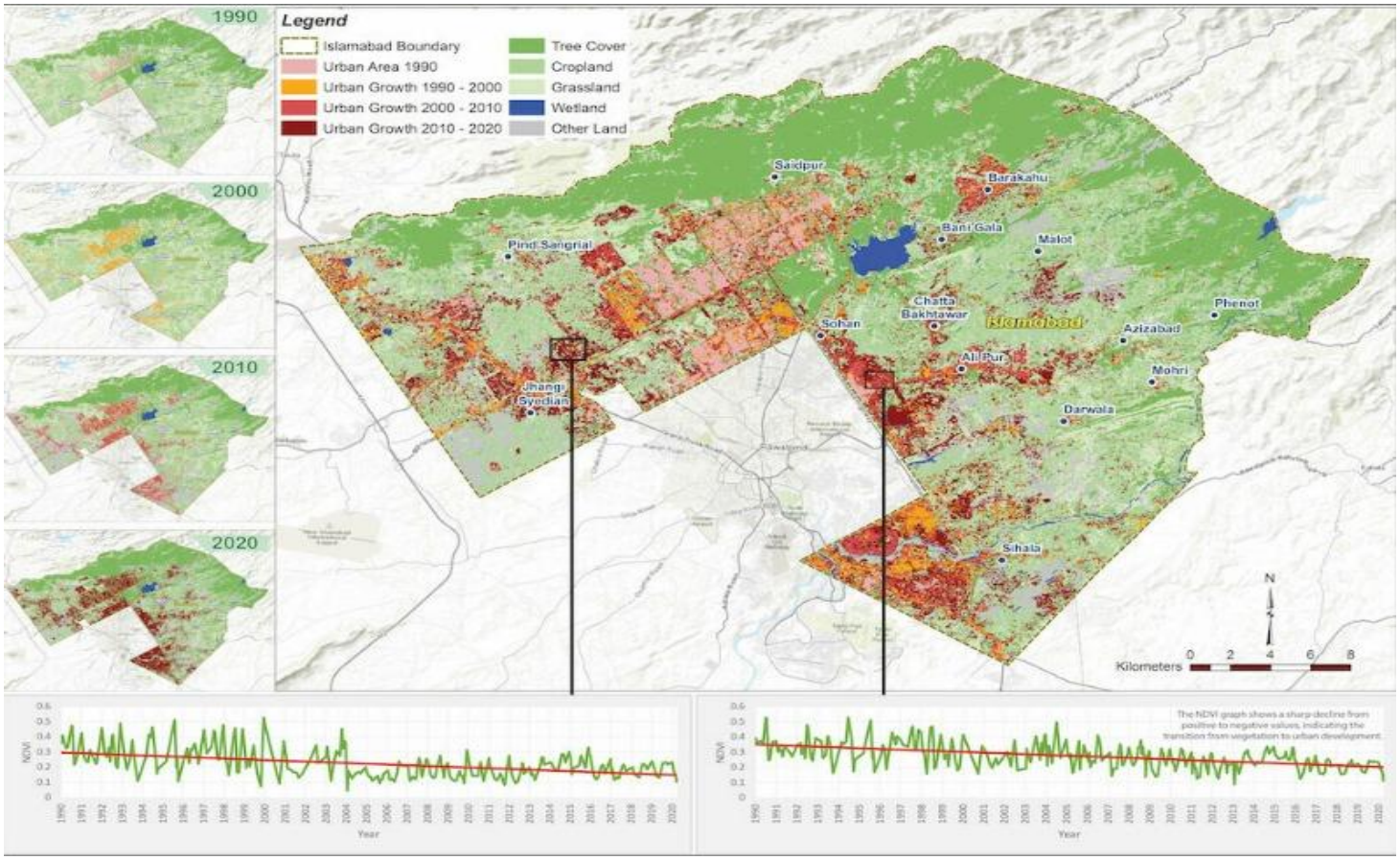
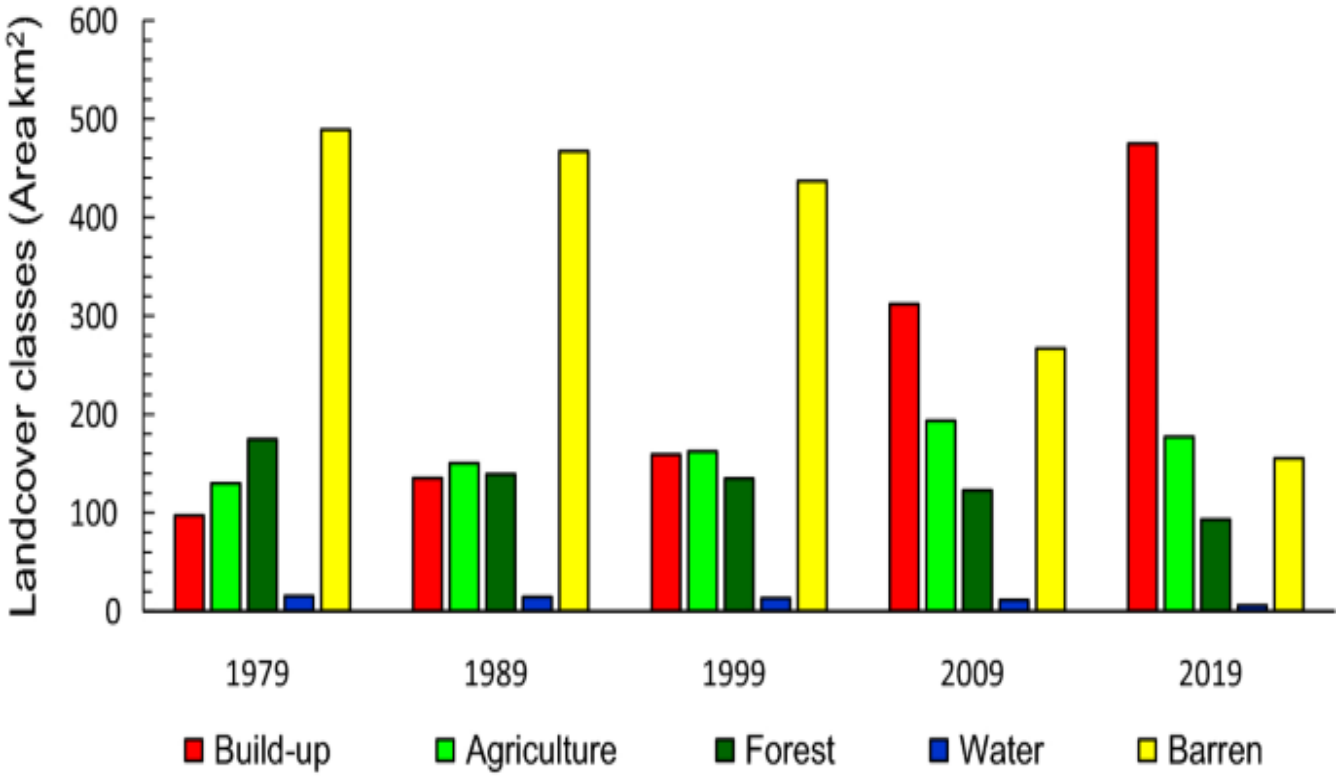

1990
2000
2010
2020
Legend
Islamabad Boundary
Urban Area 1990
Urban Growth 1990 - 2000
Urban Growth 2000 - 2010
Urban Growth 2010 - 2020
Tree Cover
Cropland
Grassland
Wetland
Other Land
Saidpur
Barakahu
Bani Gala
Malot
Pind Sangrial
Chatta Bakhtawar
Islamabad
Phenot
Azizabad
Sohan
Ali Pur
Mohri
Jhangi Syedian
Darwala
Sihala
N
Kilometers
0 2 4 6 8
NDVI
Year
The NDVI graph shows a sharp decline from positive to negative values, indicating the transition from vegetation to urban development.

Figure 4.49: Land Cover Classes



Source: (Nizami, 2021)

CHAPTER 5

CONCLUSION AND POLICY RECOMMENDATIONS

5.1 Conclusion

The study concluded that, the rapid expansion of Islamabad or we can say that the urban sprawl of Islamabad due to restrictive zoning policies has experienced a threefold increase in impervious surfaces. This trend is not only unsustainable but also inefficient, leading to wasteful use of valuable urban land (Hasan et al., 2021). Among other reasons, inefficient land use regulations and prevalent informal processes are significant hurdles in the way of the smooth pace of compact city development in Pakistan (Planning Commission, 2011). The industry of construction in Pakistan faces unbeatable regulatory barriers that may negatively influence the socially important piece of work and add extra economic costs. One study from the south of the border has suggested that excessive regulation is "Gumming up the economy" (Watson, 2017). As the city spreads out, it becomes tough to connect to different areas. This causes problems with transportation, people getting along, and giving important services to everyone (Sarfraz, 2023). In other words, the expansion of urban areas has led to increased demand for housing and land, which has been beneficial for many households. However, this growth has also resulted in some negative consequences and challenges related to efficiency and fairness that have arisen as a result of urban sprawl: traffic congestion, reduced social interaction, cost of more time and money on transportation, cost of fuel, limited employment accessibility, the uneven distribution of public goods and services throughout sprawling metropolitan suburbs contributes to the emergence of residential segregation and Marginalization. This study is interesting to show some similarities and differences between the two communities in the same city Travel Time and Cost: Transportation costs in suburban areas tend to be higher due to factors like increased travel

frequency, traffic-related expenses, and time to reach centers. This aligns with findings from (Jun et al., 2018), which highlight that Suburban commuters face significant challenges in accessing transport facilities and employment centers Professional workers with greater accessibility tend to have higher levels of excess commutes, reflecting the imbalance between suburban living and workplace locations. Urban sprawl is widely recognized as an inefficient urban form, as supported by Andrew's research. This inefficiency translates into higher costs for transportation infrastructure, public services (e.g., schools, hospitals, public transport), and utilities. Over the past three decades, debates on sprawl's consequences have remained limited, particularly regarding transportation costs. (Trubka et al., 2010) emphasizes that these costs extend beyond roads and utilities to affect broader public services and community planning. High-density urban development, by contrast, offers a more sustainable alternative to sprawl, reducing costs and inefficiencies.

Travel Frequency and Purpose: Suburban residents travel more frequently, especially for work and business purposes, compared to their urban counterparts. Urban areas benefit from shorter distances, efficient public transportation, and possibly lower travel frequency, which collectively reduce transportation costs. Excess commuting—defined as the difference between actual and optimal commute times—is significantly higher in suburban areas. In monocentric cities, where jobs are concentrated in central areas, excess commutes are lower compared to decentralized cities (Chowdhury et al., 2013).

Monthly Transportation Costs: Suburban households bear greater transportation expenses, primarily due to their distance from key hubs such as Saddar, Commercial, and Blue Area. Suburban households exhibit greater reliance on personal vehicles and longer travel times, leading to elevated expenses, especially for commuting to centers or workplaces.

Land Use Policies and Population Growth: The study highlights Islamabad's restrictive land use regulations, which have seen minimal changes over the past 30 years despite significant

population growth. (Xiao et al., 2021) research demonstrates that flexible land-use policies could alleviate transportation costs by promoting mixed-use developments and reducing commute distances. This study demonstrates the pressing need for thoughtful urban planning and land use reforms in Islamabad. By promoting mixed-use development, high-density urbanization, and efficient public transport, policymakers can address the challenges of urban sprawl, reduce transportation costs, and create more sustainable and livable communities. These changes are not just critical for suburban areas but for the overall development and functionality of the city in the long run. The regression results highlight how zoning patterns affect transportation costs, travel time, and access to services. Static, outdated zoning rules have failed to adapt to the reality of population growth in Islamabad.

5.2 Policy Recommendations for Future Zoning Laws in Islamabad

My research can help policymakers when a policy is made for the future of Islamabad so that these problems do not arise in the future. The study highlights critical challenges posed by suburban living and urban sprawl, including financial strain, environmental degradation, and inefficiencies in urban design. These findings emphasize the need for integrated policies to promote sustainable urban development.

1. Shift Toward Mixed-Use Zoning (Urban & Suburban Areas)

Issue Identified:

- People in suburban areas spend more money on commuting and are more affected by traffic costs.
- Urban residents save more money in high-density zones.

Policy Action:

- Revise zoning laws to allow mixed-use developments, especially in suburban sectors. This means residential, commercial, and institutional uses can co-exist within a single neighborhood.
- For example, sectors like G-14, I-12, and D-13 could be redesigned to include mid-rise apartment buildings above ground-floor retail, community clinics, and coworking spaces.

2. Introduce "15-Minute Neighborhoods"

Issue Identified:

- Long travel times to city centers and essential services, particularly for suburban residents.

Policy Action:

- Design new developments based on the 15-minute city model — ensuring that schools, grocery stores, clinics, parks, and workplaces are accessible within 15 minutes on foot or bike.
- This could be done by rezoning areas like B-17 or Gulberg Greens to allow clustered development around public service nodes.

3. Incentivize Transit-Oriented Development (TOD)

Issue Identified:

- Extra time spent on travel and frequency of travel both significantly affect household transport costs.

Policy Action:

- Amend zoning codes to encourage higher-density development within 500 meters of planned or existing BRT/Mass Transit stations.

- Provide incentives (like tax breaks or faster approvals) for developers who build apartments and services near public transport hubs.

4. Introduce Density Bonuses and FAR Flexibility

Issue Identified:

- Current regulations impose uniform FARs (e.g., 0.85–1.2), regardless of infrastructure capacity or demand.

Policy Action:

- Adjust FAR (Floor Area Ratio) based on location and public service availability. For instance:
    - Core urban areas: Increase FAR to 2.0 or 2.5 for multi-family housing.
    - Suburban nodes near highways or future metro stops: Allow up to 1.5 FAR with a mix of residential and commercial use.

5. Affordable Housing Mandates in New Zones

Issue Identified:

- High travel costs and rental burden linked to who pays the rent and the distance from relatives, workplaces, etc.

Policy Action:

- Introduce inclusionary zoning: Require new developments (especially in prime zones) to allocate 15–20% of units for affordable housing.
- Offer density bonuses to builders who include these units voluntarily.

6. Plan Infrastructure Before Expansion

Issue Identified:

- Suburban expansion is not matched with access to services like parks, groceries, and schools.

Policy Action:

- Before approving new housing zones, enforce a “service-first” policy: zoning permissions will only be granted if master plans include a balanced mix of green spaces, grocery stores, schools, and medical facilities within proximity.

7. Establish a Zoning Review Commission

Issue Identified:

- Zoning policies have not been reviewed in line with demographic growth and urban needs.

Policy Action:

- Create a permanent commission to review zoning laws every 5 years. It should include:
    - Urban planners
    - Economists
    - Environmental experts
    - Community representatives

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APPENDIX 1

CITIES	Type of property	Size of Area	Allowed Area	Height of story (ft) G/1ST floor	Height of building	Set back (feet) Front/Back/Side	Arcade /FAR/building line (feet)	Footprint (%) GF/ above GF
PESHAWAR	Commercial -cum- Residential	2.6-5 Marla		9.5/9.5	7 story including Mezzanine	0/3/0	0/1:6/0	100
		5.1-8.3 Marla				0/5/0	0/1:6/0	95
		8.3-13.2 Marla				0/7.5/0	0/1:6/0	90
		13.2-20 Marla				0/7.5/5	0/1:6/0	85/75
		20-33 Marla				0/8/5	8/1:6/0	80/70
		33-66 Marla				0/10/7.5	8/1:6/0	70/65
	Public building in approved housing Scheme	Less than 10 Marla				0/5/0	0/0/7	
		Less than 1 Kanal				0/5/5	0/1:3/10	
		1-2 Kanal				0/10/7	0/1:3/20	
		Above 2 Kanal					0/1:3/20	
	Apartment				4 story		40&60 (condition-	

							based)/20/20	
					Above 4 story		40&60 (condition-based)/20/20	
ISLAMABAD	Marakiz	1000 sq yds	Along roads		No restriction		0/1:6/0	
		3000 sq yds					0/1:8/0	
		Larger than 300& less than 5000					0/1:9/0	
		Larger 5000 sq yds					0/1:10/0	
	Trade center				Basement ground +1 story			
	The existing building in the blue area			Up to 6			0/1:6/0	
	High-rise buildings	300 sq yds	Blue area					
		300 sq yds	Sector G8					
		300 sq yds	Sector G 11					
		300 sq yds	Kashmir					

			highway					
	Class 3 shopping centers				Ground plus one story			
LAHORE	Commercial activity		Burk road		No restriction			
			Raiwind road from thokar niaz baig		---			
			Mulana shoukat road		---			
			Johar town bypass		---			
			Raiwind road from shukat khanam		---			
			Defense road		---			
			From link raiwind road		---			
			Zafar Ali road		---			

			Central bank road		---			
	Apartment/ Commercial	10 marla to 1 kanal			48/50			
		1-2 Kanal			90/90			
		2-4 Kanal			120/120			
		4-8 Kanal			200/200			
		More than 8 kanal			300/300			
	Apartment/ Residential tower/Industrial	Min 10 marla/0/8 kanal			0/120/60-90			
QUETTA	Residential plot	Up to 2 Marla				No restriction	0/1:2/0	Min 90
		2-5 marla				No restriction	0/1:2/0	90
		5-8 marla				7/5/0	0/1:1.8/0	65
		8-10 marla				10/10/5 (oneside)	0/1:1.25/0	70
		10-20 marla				10/10/5 (oneside)	0/1:1.15/0	70
		20- 40 marla				15/10/5	0/1:1.25/0	70
		Above 40				20/15/10	0/1:1.25/0	60

	Commercial	2.6-5 marla		9.5		0/3/0	1.33/1:6/0	100/100
		5.1-8.3		9.5		0/5/0	1.33/1:6/0	95/95
		8.4-13.2		9.5		0/7.5/0	1.33/1:6/0	90/90
		13.2-20		9.5		8/7.5/5	1.33/1:6/0	85//75
		20-33		9.5		8/8/5	1.33/1:6/0	80/70
		33-66		9.5		8/10/7.5	1.33/1:6/0	70/65
KARACHI	Bungalow	13.19 marla			Ground + 2 floor			
Category 1	Other buildings	4 marla			33 ft			
	Non-obnoxious warehouse				35 ft		0/1:5/0	
Category 2	All bungalows							
	Other buildings	74 marla			50 ft			
Category 3	All buildings	More than 74 marla			50 ft			
Category 4	Public				Above 3 floors (including ground floor)			
	Industrial	More than 51.4			15 ft (including			

		marla			ground floor)			
Category 5	Work & land development	2.5 acre						

APPENDIX 2

QUESTIONNAIRE

Regulatory Barriers, Urban Sprawl and Economic Cost Nexus: A Case Study of Islamabad

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(All the information provided here will be kept confidential and will only be used for research work)

Interviewer Home location: _____

Age of the Respondent: _____

No. of bikes: _____ No. of cars: _____

Relationship of the respondent with the head of Household

Relation with the head of Household:

1. Self
2. Wife/Husband
3. Son/Daughter
4. Mother/Father
5. Brother/Sister
6. Other relatives

A. DEMOGRAPHIC AND HOUSEHOLD PROFILE

Table A1

Gender		**Education**							**Designation**					**Type of household**		**Family unit**			**Monthly earnings**					**Medical problem**						
1	2	1	2	3	4	5	6	7	1	2	3	4	5	1	2	1	2	3	1	2	3	4	5	1	2	3	4	5	6	7

Gender: male=1, female=2

Education: Illiterate=1, primary=2, secondary=3, matric=4, intermediate=5, graduate=6, masters=7

Designation: employed=1, unemployed=2, student=3, housewife=4, other=5

Type of household: Home owner=1, tenants=2

Family unit: Joint=1, Nuclear=2, other=3

Monthly earnings: <30,000=1, 30,000-50,000=2, 50,000-1, 00000=3, 1, 00000-1, 50,000=4, 1, 50,000>=5

Medical problems: Pregnancy=1, Arthritis/Gout=2, allergies=3, infections=4, mental health=5, respiratory disease =6, other=7_____

B: LAND-USE REGULATIONS & URBAN SPRAWL

TableB1:

B11	B12	B13	B14	B15	B16	B17
Do strict land-use regulations, limit the development of higher-density housing within existing urban areas?	Is living standard in sprawled areas due to strict regulations, more costly (in rupees) as compared to urban areas?	How much time (in min) does it take for people to reach the centers? (Daily bases)	How much money (in rupees) does it take for people to reach the centers? (Daily bases)	What is your stress level (in %), and access to basic amenities of life?	If adopting more flexible land-use policies would help to control the outward expansion of cities?	If it significantly contributes then how much money (in Rs) could save households due to living in a High-density city? (Monthly bases)

Codes:

B11: Not a contributing factor at all=1, Slightly contributing=2, Moderately contributing=3, Significantly contributing=4, Very significantly contributing=5

B12: Not costly(0)=1, Slightly costly (10,000- 30,000)=2, Moderately costly (30,000-70,000) =3, Costly(70,000-100,000) =4, Very costly (More then 100,000)=5

B15: 1-20%=1, 20-40%=2, 40-60%=3, 60-80%=4, 80-100%=5

B16: Not a contributing factor at all=1, Slightly contributing=2, Moderately contributing=3, Significantly contributing=4, Very significantly contributing=5

C. ECONOMIC PERSPECTIVE

Table C1: FACTORS INFLUENCING ECONOMIC COST

C11	C12	C13	C14
How much do you have to bear commuting costs (in Rs) when you attend social gatherings or events?	On average, how much extra time (in min) do you spend on commuting, compared to your estimated travel time?	How do you recognize the fuel cost (In Rs) impact on your overall budget in your daily routine commuting?	Estimate how convenient it is to be close to city centers for both work and social activities.

Codes:

C14: Not Convenient=1, Slightly Convenient=2, moderate=3, Convenient=4, Very Convenient=5

Table C2: COST OF TIME AND MONEY DUE TO TRAFFIC CONGESTION AND AREAS DISTANCE.

C21	C22	C23	C24
How often do you experience time cost (in min) due to traffic jams during your daily commute?	How often do you experience Money costs (in Rs) due to traffic jams during your daily commute?	How much more do you think the need of time (in Min) for travel is in suburban areas compared to compact city areas?	How much more do you think the need for money (in Rs) for travel is in suburban areas compared to compact city areas?

D. COMMUTING CHOICES

Table D1: TRAVELING PRACTICES

D11	D12	D13	D14	D15	D16	D17
How much is your travel frequency?	Do you regularly travel on this route?	What is the main purpose of the travel?	How do you typically travel for the journey?	What factors do you consider while choosing the mode of transportation?	Have you ever been denied transportation services?	If yes, why?

D11: Daily=1, weekly=2, several times a month=3, rarely=4

D12: yes=1, No=2.

D13: work=1, education=2, shopping trips=3, hospital visits=4, cultural trips=5

D14: walk=1, bykea=2, personal vehicle=3, ride sharing=4, personal motorbike=5, uber/careem=6, rickshaw=7

D15: convenience=1, time efficiency=2, cost effectiveness=3, safety=4, comfort=5, other=6

D16: yes=1, no=2

D17: disability=1, safety from crime=2, discrimination=3, affordability=4, age factor=5, medical conditions=6, Others=7

Table D2: DISTANCE OF (Nearest / More frequently used) FROM YOUR HOUSE

D21			D22	D23	D24	D25	D26	D27	D28
Your CBD			Center (In Km)	Workplace (In Km)	Park (In Km)	Relative (In km)	Grocery (In km)	School (In km)	Bus stop (In km)

D21: Blue area =1, Sadar/Commercial=2, Others=3

Table D3: OVER ALL TRAVEL COST

D31	D32						D33	D34	D35	D36	D37
Most frequently used modes	Alternative modes						Waiting time (minutes)	Travel time (minutes)	Travel cost (Rs)	Distance of Trip (both sides in Km)	Total monthly cost (in PKR)
	1	2	3	4	5	6					

D31 & D32: Modes: walk=1, Rickshaw=2, Bykea=3, Taxi/Uber=4, Bike=5, Car=6, Other=7_____

Table D4: LOCATIONAL CHOICE REGARDING CONVENIENT MODE

D41					D42					D43					D44	D45				
Are public transportation options a significant factor in your decision to live in a certain area?					Please prioritize the following factors influencing the decision to relocate.					Will you prioritize renting a house in an area with easy access to amenities like grocery stores, schools, and healthcare facilities?					If you strongly disagree with this statement, then please prioritize that access to these amenities is less costly (in Rs) rather than renting a house in that area.	Daily commuting expenses are a critical consideration when choosing between suburban and compact city living.				
1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		1	2	3	4	5

D41: strongly disagree=1, disagree=2, neutral=3, agree=4, strongly agree=5

D42: 1= closer to work, 2= closer to schools of children, 3= closer to bus stop, 4= closer to spouse work place 5= closer to relatives

D43: strongly disagree=1, disagree=2, neutral=3, agree=4, strongly agree=5

D45: strongly disagree=1, disagree=2, neutral=3, agree=4, strongly agree=5

Table D5: RENT & LAND VALUE IN LOCALITY

D51				D52			D53	D54				D55		D56	D57	D58	D59			
How long you have been living in the current residence? (in Years)				Who Pay the Rent?			How many years of contract do you have?	What is the annual growth in rent decided in the contract? (in %)				Did you pay any advance rent?		If yes, how much amount you paid advance rent? (in rupees)	How much rent do you pay Monthly? (in rupees)	What is the land value in your location? (per Marla)	What is the annual growth land value per year? (in %)			
1	2	3	4	1	2	3		1	2	3	4	1	2				1	2	3	4

D51: 1= Less than 1 Year, 2= 1 -5 Year, 3= 5-10 Year, 4= More than 10 Year

D52: 1= your family, 2= your department, 3= others

D54& D59: 1= 0%, 2= 5%, 3= 10%, 4= 15%

D55: 1= yes, 2= No

Table E1: Public perception regarding economic cost.

E11	It is important to have walking distance access to amenities and services from home.	1	2	3	4	5
E12	It is convenient for you to reach the children's school.	1	2	3	4	5
E13	Due to the high prices of petrol, fuel cost is unbearable, wish for shopping malls and parks are within walking distance.	1	2	3	4	5
E14	Car dependency promotes crowding on roads.	1	2	3	4	5
E15	Urbanization leads to an increase in the prices of houses in a compact city	1	2	3	4	5
E16	I prefer to reside in an area where I am not reliant on any public/private mode.	1	2	3	4	5
E17	Urbanization leads to an increase in the rent of houses in compact cities.	1	2	3	4	5
E18	Access to city facilities is crucial when choosing a location.	1	2	3	4	5

Codes: strongly disagree=1, disagree=2, neutral=3, agree=4, strongly agree=5

Table E2: How significant would each of these traits be when you're deciding where to live?

E21	Accessibility of transport	1	2	3	4	5
E22	Urban amenities	1	2	3	4	5
E23	Cost of mobility	1	2	3	4	5
E24	Availability of multiple modes of public transport	1	2	3	4	5
E25	Distance from business centers	1	2	3	4	5
E26	Distance from school	1	2	3	4	5
E27	Distance from the workplace	1	2	3	4	5
E28	Distance from relative	1	2	3	4	5

Codes: Very Important=5, Important=4, Moderately Important=3, Slightly Important=2, Not Important=1

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