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Integrating transport and land use policies for sustainable development;

Theory and Practice
A study of suburbs of Addis Ababa, Ethiopia

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Abstract

It has been long since mobility became a major issue in Addis Ababa following the enormous horizontal expansion of the city boundaries as a result of the rapid population and income growth. Although there are studies conducted to understand and solve the problems related to motorized transport in the city, most of them focus on the orthodox approach of improving the physical infrastructure of the transport sector to enhance the service provision by constructing highways, extending road networks and increasing the number of fleet. However, the problem proliferated and reached a critical level, already. This study approaches the problem from a different perspective; designing the city in a transit friendly manner by integrating land use and transport policies. Therefore, the aim of this research was exploring the need and possibilities of integrating land use and transport policies to assure sustainable development of the city. The main research instrument used was the interview conducted with authorities involved in formulation and implementation of land use and transport policies in the city. Thus, interviews were held with seven authorities in the Addis Ababa City Administration and the Federal transport Authority together with a senior researcher in similar areas. In this qualitative research, observations in the research areas and desk studies supported the results of the interview. The initial hypothesis of the research is proved to be fully acceptable since the land use and transport authorities do not recognize the impact of one on the other as validated by the increasing pressure on the public transport system which resulted from the enormous horizontal expansion of the city. However, it was the main finding of the research that most of the activities in the city are governed by informality. Moreover, other factors including market force and politics are highly involved in determining the urban structure of Addis Ababa. Therefore, despite the need for integration of land use planning, transport policies and environmental concerns for sustainable development, the focus on policy alone would be narrow and nugatory.

***Key Words**: Sustainable development, policy integration, land use, transport, Addis Ababa*

List of key-word definition

Accessibility	the capability of an area to be reached by transport means
Indicator	a measure of a necessary requirement of an assessment procedure
Integrated planning	planning that includes many different stakeholders and/or issues
Land-use	the socio-economic technical description of an area
Mobility	the ability of an individual or groups of individuals to physically move from one place to another
Planning	the systematic and comprehensive study of all features of a project, problem, or policy issue and the devising of one or more alternative conceptual approaches to addressing the project, problem, or issue
Stakeholder	an institution, organisation, group, or individual that has some interest in a particular project
Transport	a system for carrying passengers or goods from one place to another
Woreda	an administrative ward equivalent to a district (Amharic)
Kebele	the smallest administrative unit similar to ward (Amharic)

Abbreviations

AA	Addis Ababa
AACA	Addis Ababa City Administration
AACATA	Addis Ababa City Administration Transport Authority
AACG	Addis Ababa City Government
AAU	Addis Ababa University
AU	African Union
CBO	Community Based Organizations
COST	European Cooperation in the field of Scientific and Technical Research
ECDPM	European Centre for Development Policy Management
ECSC	Ethiopian Civil Service College
GDP	Gross Domestic Product
ICLEI	International Council of Local Environmental Initiatives
NCTCOG	North Central Texas Council of Governments
NIMBY	Not In My Back Yard
OECD	Organization for Economic Co-operation and Development
ORAAMP	Office for the Revision of Addis Ababa Master Plan
SWOT	Strength, Weakness, Opportunity and Threat
TCRP	Transit Cooperative Research Program
NGO	Non-Governmental Organizations
UNDP	United Nations Development Program
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environmental Program

Executive Summary

Addis Ababa, the capital and the largest city of Ethiopia, is expanding spatially to accommodate the increasing population resulting from natural growth and in-migration. As a result, residents living in the sprawled residential settlements at the fringes call for an affordable and efficient public transport to accommodate travel to jobs, markets, health centers and other socio-economic activities. This development trend stretched the public transport to its limits; hence, it became an earnest matter that solicits resolute action to sustain the development in the city where work requires substantial journey.

Affordable and efficient transport is central to development as it facilitates access to different amenities, in the absence of which quality of life suffers. Moreover, without physical access to resources and markets the process of growth stagnates and sustainability of poverty reduction programs becomes gloomy. Whereas, inappropriately designed transport policies and programs can aggravate the conditions of the poor and harm the ecosystem.

An orthodox solution focuses on improving the physical infrastructure of the transport sector to enhance the service provision by constructing highways, extending road-networks and increasing the fleet number. However, despite the effort, the problem proliferated and reached a critical level as demonstrated by congestion, deterioration of air quality, etc... Therefore, this research takes a different approach than the traditional to sustain the development by integrating land-use and transport policies of the city, thus, decisions are complementary rather than contradictory. After all, they are crosscutting issues since transportation decisions affect land-use patterns and land-use decisions affect travel demand and mode choice. Therefore, Horizontal, vertical and inter-territorial integration of policies and co-operation among authorities help sustain the development process.

The main research instrument, besides literature study, was the interview conducted with authorities involved in formulation and implementation of land use and transport policies in Addis Ababa. These interviews were held with seven authorities in the City Administration and the Federal Transport Authority together with a senior researcher in similar areas. Moreover, in this qualitative research, observations in the research areas and desk studies supported the results of the interview.

This research revealed spatial segregation of different activities within the city's boundary with most of the fringe areas being earmarked for expansion mostly of residential settlements. The observation accounts for the planning, organizational structure and implementation of land use policies in the city. Besides, the trends of policy-making in the city shows a very poor level of integration and coordination that doesn't go beyond simple dialogues and information sharing among authorities resulting from poor institutional arrangement and capacity. To make matters worth, the land-use/transport interaction in the city is made even complex as the result of the involvement of the neighboring Region in administering large part of the metropolitan area.

Another finding of the research shows that informal settlement and market forces predominantly govern the spatial structure of the city. This was demonstrated by the large informal residential cluster being observed at the periphery in search of cheap and spacious housing which resulted in

an increasing travel demand that is beyond the capacity of the urban transport providers who are characterized by lawlessness, confusion and selfishness. In addition, informal business activities including land-use changes by alteration and extension of roadside units and growing street-vending and peddling together with poor pedestrian and drivers' attitude aggravated the transport problems of the city by encroaching the motorway and sidewalks.

Thus, it can be concluded that the integration of land-use and transport policies in Addis Ababa is very weak and the effect of the land-use plan on urban transport is not recognized by the authorities. Therefore, there is a need for *horizontal integration* between the different departments of the city-administration, *vertical integration* between the administration and the federal transport authority and *inter-territorial integration* between the city-administration and the Oromiya region. The integration helps the poverty reduction process in all aspects by promoting synergy, reducing duplication and inconsistency, and maximizing the effectiveness of policies and service delivery processes while stimulating economic development and social inclusion by creating different opportunities for the people, empowering the poor and enhancing safety/security. This can be considered as a major impetus to realize a sustainable development.

However, considering that informality takes the upper-hand in urban activities in Addis Ababa, despite the fact that there is a need for integrating policies for sustainable development, the focus on policy alone would be narrow and nugatory. Therefore, it is recommended to form inter-sectoral steering team, facilitate a more compact, infill and mixed development, form a comprehensive public transport policy, give emphasis for Non-Motorized transport infrastructure, make regulations to control transgression by private transport providers, encourage sequential land-development following incremental extension of transport services, and use articulated buses with segregated bus-lanes.

Chapter 1 Introduction

"A sustainable condition for this planet is one in which there is stability for both social and physical systems, achieved through meeting the needs of the present without compromising the ability of future generations to meet their own needs."
-United Nations World Commission on Environment and Development
(Brundtland Commission, 1987)

1.1 Background

The world is concerned with Economic vitality, Social equity and Environmental quality which are brought to one in the opaque concept of sustainable development. Sustainable development at its simplest form can be defined as simultaneous achievement of quality environment, sound economy and equity between societies (Deakin, 2001). Nowadays, sustainable development is widely perceived as a development pattern that improves the quality of life while protecting and enhancing the natural environment. The transport system is one of the basic components of sustainable development which integrates the economical, social and environmental needs of a city. Geerlings et al. (2005) showed this by saying "The issue of transport is partly a derived effect of the fulfilling of all sorts of needs, varying from economic needs to social needs". Sustainable development can also be defined as land use and transport practices that promote economic development, social equity and environmental effectiveness while using limited resources in an efficient manner (NCTCOG, 2007)[1]. As a result, special attention is being given to transport and land use interaction as an instrument for sustainable development.

Ethiopia is a developing country with low level of income accompanied by a high rate of population growth. Being part of the developing world, the country's economy is highly dependant on Agriculture with low level of urbanization. It can also be said that the economic performance of different sectors of the national economy is very poor. Different reasons can be mentioned as constraints in the economic performance of the country, among which the existing transport system takes part. This is because Transport is an important sector for facilitating different economic activities in the national economy (AACATA)[2].

Located at the heart of the country with 54,000 hectares of land, Addis Ababa has a population of 3 million. Though the 1986 Addis Ababa Master plan had proposed compact urban expansion in the three major directions, over the past few years Addis Ababa has witnessed an amazing expansion of the city size and is still going through a dynamic spatial de-concentration and over-urbanizing period that keeps segregating the residential areas from the business and economic activities (Alebachew, 2003). But, due to different reasons, the city administration could not provide adequate urban transport system to cope up with the rapid increase in population with annual growth rate of 3.8% (AACATA).

Urban public transport in Addis Ababa is carried by both public and private operators. The modes of urban transport system in the city are generally categorized as motorized and non-motorized transport. These include public bus, minibus (shared taxis), individual taxis, private cars, and the non-motorized transport, while walking and animal carts dominate the periphery. Though the term public transport refers to all types of transport systems; Road, Rail, and water transport, as in most of the Sub-Saharan cities the modalities of public transport mobility in Addis Ababa are limited to the road transport that basically comprises of shared taxis (mini

[1] North Central Texas Council Of Governments, http://www.nctcog.org/trans/sustdev/
2 Addis Ababa City Administration Transport Authority: http://www.telecom.net.et/~aata/

buses) and buses. Currently, taxis, city bus and private cars altogether cover 30 percent of the urban mobility while 70% of urban mobility is covered on foot (AACATA).

The demand for efficient and affordable public transport is increasing with the sprawl of urban areas and increasing economic activities. The residential areas being developed at the edges of the city scream for a very acute demand of public transport to accommodate travel to the city center where all activities; markets, offices, entertainment areas, etc, are concentrated. These and other unforeseen problems seemingly made private car ownership the best means of transport available. As a result of this alarming increase in car ownership together with the poor road conditions in the city, Addis Ababa is now far from road safety taking 60% of the share in traffic accidents in the country. Moreover this rapid increase of private cars, mostly very old, has resulted in a very high air and noise pollution in the city (AACATA). However, a large proportion of the city's population is still crucially dependent on public transport services.

It is the physical location of different activities that influence the needs for travel and the choice of modality. And to date, it is witnessed that promoting using public transport alone has limited influence on the use of private cars (TCRP, 2003, ITE[3], 2004, Wright and Montezuma, 2004). It is also made clear that the existing public transport infrastructure is not enough to satisfactorily meet the transport demand generated by the rapid growth of residential areas at the peripheries of our major cities. One part of the solution includes looking at ways of improving the public transport to make it more flexible and responsive to user needs which includes expanding the road networks and/or increasing the public transport services. But the major part of the solution takes the land use policies in tackling the mobility problems and reducing the mobility needs of residents that refers to focusing more on developing residential areas in the city center and/or encouraging a more mixed land use development in the outskirts of the city.

This trend demonstrates the significant impacts of transport on sustainable development and the complexity of the interaction between transport and land use patterns. This complex interaction in patterns of sustainable development shows that it is not a single disciplinary issue but rather demands integration between transport and land use policies. According to Stead et al. (2004) as a variety of factors have increased the number of actors involved in the policy process, such as the emergence of the information society, greater emphasis on public participation and the increasing role of non-governmental organizations, pressure groups and agencies in the decision making process, policy integration becomes more difficult but more compelling to achieve. This is neither a simply conceived nor an easily implemented solution to these complex and cross cutting issues of sustainable development.

To sum up, the transport system is an important part of a city and success in insuring mobility can even be an indication of how well the city really is organized. Transport is a common element used by all city mayors in the world while talking about being a 'world class city'. But as Addis Ababa keeps expanding horizontal as a result of increase in wealth and population, mobility in the city becomes a big issue. And the failure to provide well functioning public transport causes growing social, economical as well as environmental problems in the city. These points emphasize the needs to recognize the effects of transport in any land use planning in urban areas and integrate the policies. The research assesses the need for integration of land use and transport policies in Addis Ababa the focus being on the newly developed areas at the periphery of the city.

[3] Institute of Transport Engineers

1.2 Statement of the problem

Addis Ababa is the capital and the largest city of Ethiopia. It is where most of the economic activities of the country are centered. As a result of the limping public transport system and other reasons the number of cars in the city is increasing, though import taxes are extremely high. This together with the poor infrastructure has resulted in an increase in traffic accidents, congestion, poor mobility hence poor economic activity, and environmental degradation jeopardizing the economic advantages of the city from being the seat of embassies and international organizations including the Head Quarters of AU and UNECA.

Both of the public transport components of the city, shared taxis and city buses, are proved to be incapable of meeting the increasing demand of the citizens due to the dynamic spatial de-concentration and increase in population in the past years. The mobility needs generated from the land use policies that encourage development of non-mixed land use patterns in the peripheries of the city create enormous pressure on the public transport. This problem could not yet be solved by expanding the road networks which end up encouraging more car ownership, hence increasing congestion, pollution and commuting time.

To state the problem clearly; While Addis Ababa is expanding horizontally to accommodate the increase in population as a result of natural population growth and in-migration from all corners of the country, the public transport system failed to reach the increasing demand generated from sprawled settlement at the peripheries. Spatial sprawl and increasing transport demand are concurrent trends that need coordination among actors and policies for sustainable development.

1.3 Justification of the study

This study, as stated above, focuses on the impact of land use plan on public transport system of Addis Ababa. The public transport system is an essential part of a sustainable city with a direct relation to social equity, environmental effectiveness and economic efficiency. Though there are studies conducted in the land use patterns and transport system of the city, most focused on the traditional solution of improving the physical transport infrastructure but none looked at on the need for integrating policies of these concurrent trends of development. Therefore, this research explores the need for integration of land use and transport policies in rapid growing cities like Addis Ababa.

The findings of this study are expected to strengthen the needs for integration of land use plan and public transport policies in Addis Ababa. And because of the similarity of most Sub-Saharan Africa cities, the findings could also contribute to the solution of the same problem in the region. Moreover it is hoped that the study will contribute to the pile of knowledge in building sustainable cities, specifically focusing on integration of policies on urban transport and land use plans, and it is also a partial fulfillment required for MSc in Urban Management and Development.

1.4 Research objectives

The objectives of this study are:

1. *To study, from a theoretical perspective, the concept of policy integration related to land use and transport.*
2. *To analyze the need for integrating the land use and transport policies to ensure sustainable development in Addis Ababa.*
3. *To identify and evaluate the opportunities and barriers for integrating the land use and transport policies in Addis Ababa.*

1.5 Description of the research area

Ethiopia

Ethiopia, situated in the horn of Africa, has been a landlocked country since the independence of neighboring Eritrea which shares border in the north. Apart from that, Ethiopia is bordered to the south by Kenya, to the west by Sudan, to the north east by Djibouti and to the east by Somalia. This country of long history, mosaic of people and diverse cultures, is also the second most populated nation in Africa with a population of 77.1 million out of which 16% live in urban areas (Central statistics agency of Ethiopia, 2006). Ethiopia currently has a tiered government with nine regions and two special administrations; the federal government, regional governments, the classification of which is ethnic based, and local governments. (Selamta, 2007)[4]

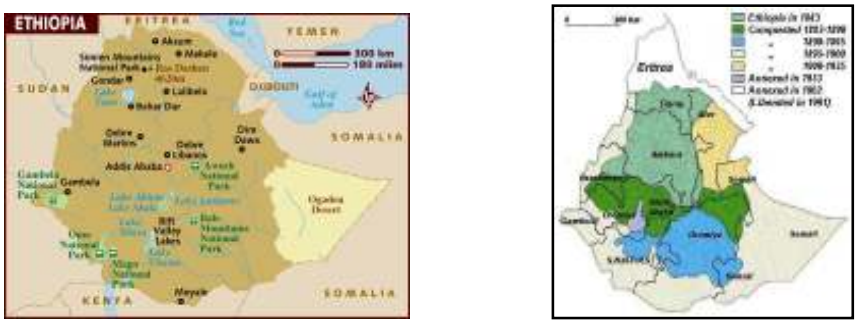


Figure 1-1: Location of Ethiopia in the Horn of Africa and decentralized map of Ethiopia

Since agriculture and tourism are the main drivers of the economy, land is the primary asset for survival and development in Eastern Africa. More over, land and property assets are usually the most important physical assets for the worlds' poor. Ethiopia is a country with high biodiversity and distinctive ecosystems and the natural resource base is crucial to the economy and the livelihood of incredibly high percentage of the population (Berry, 2003). Studies show that, in Ethiopia, agriculture accounts for almost half of the GDP and 85% of the population are directly supported by the agricultural economy.

Attempts have been made to formulate and implement integrated land-use plans at village, district, regional and national levels. The national land-use plan was based on a nationwide socioeconomic and physical land resources database.

Transport is another decisive issue to be discussed while talking about sustainable development and poverty alleviation. Studies show that seventy five percent of Ethiopia's population still does not have access to all-weather transport. Commuting time (whether walking or on public transport) accounts for a large part of the time budget of the urban poor and commuting by public transport is also very costly to the poor (The World Bank, 1996).

Addis Ababa

The capital and the largest city Addis Ababa, is a high land city situated in West shewa, Oromiya, with geographical coordinates of 9°03´ North latitude and 38°42´ East longitude, approximately at the geographical center of the country. Extensive physical growth is shown over the years growing from only 33km^2 in 1920 to 224km^2 in 1984 and since 1990 the area is estimated to be 530.14 square kilometers with a density of over 5600 people per square

[4] http://www.selamta.net/economy.htm

kilometer. The city's growth has accelerated dramatically since a major urban migration into the city began in the mid 70s driven mainly by unemployment, poverty and declining agricultural productivity in rural areas, and relatively improved income and employment opportunities in the urban areas (United Nations Environment Program)[5]. The city is not only the political center but the economic and social nerve-center of the country (Ethiopian Triple Helix Association, 2006)[6].

Addis Ababa is sub-divided in to 10 sub-cities which in turn are divided to 99 kebeles where power is devolved to this smallest tier of administration. The Central Statistics Agency figures (2005) show that, the current population of Addis Ababa has reached 3 million with 52% women and 48% men which makes it 14 times larger than Dire Dawa, the second largest city in Ethiopia. The figure also shows that all the inhabitants of the city are considered to be urban dwellers that cover 24% of the countries urban population. According to UNEP, the population doubled in the last twenty years and is expected to reach 5.1 million in 2015.

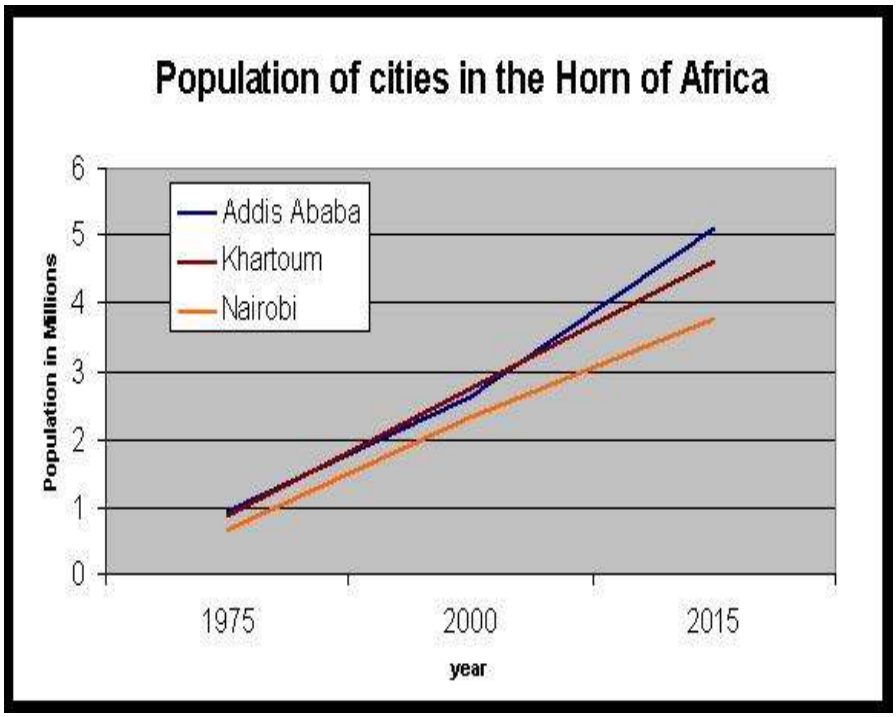


Figure 1-2: Population growth of A.A. in and other two East African cities
(Source: UNEP)

In rapidly growing urban areas, like Addis Ababa, access to land is being increasingly difficult by the conflicting demands of industry, housing, commerce, agriculture, land tenure structures and the need for open spaces.

In the past few years, while Addis Ababa has witnessed an amazing horizontal expansion and rapid growth in urban population, it has not been provided with an equal growth in urban transport provision which has resulted in increasing private car ownership, high congestion, increasing pollution and large number of accidents and fatality rates; the pedestrian, the elderly, the disabled and the children being primary victims.

[5] http://na.unep.net/digital_atlas2/webatlas.php?id=268
[6] http://www.iked.org/ethiopia/web/index.html

Summary:

Land management and Transport are taken as the critical elements of poverty alleviation program in Ethiopia. This has resulted in the formulation of a number of policies at national and local level to address this cross cutting issues. But, because of the trend of development which segregated the residential areas from the economic activities, the travel demand and commuting distance in the city has increased which the city administration is yet unable to meet with provision of efficient and affordable public transport. This has also created an enormous amount of pressure on the transport infrastructure of the city that led to a large number of accidents and fatality rates; the pedestrian, the elderly, the disabled and the children being primary victims. This is a proof that the problem needs an integrated, multi-sectoral, and participatory approach; hence, the integration of land use and transport policies is very essential.

1.6 Research structure

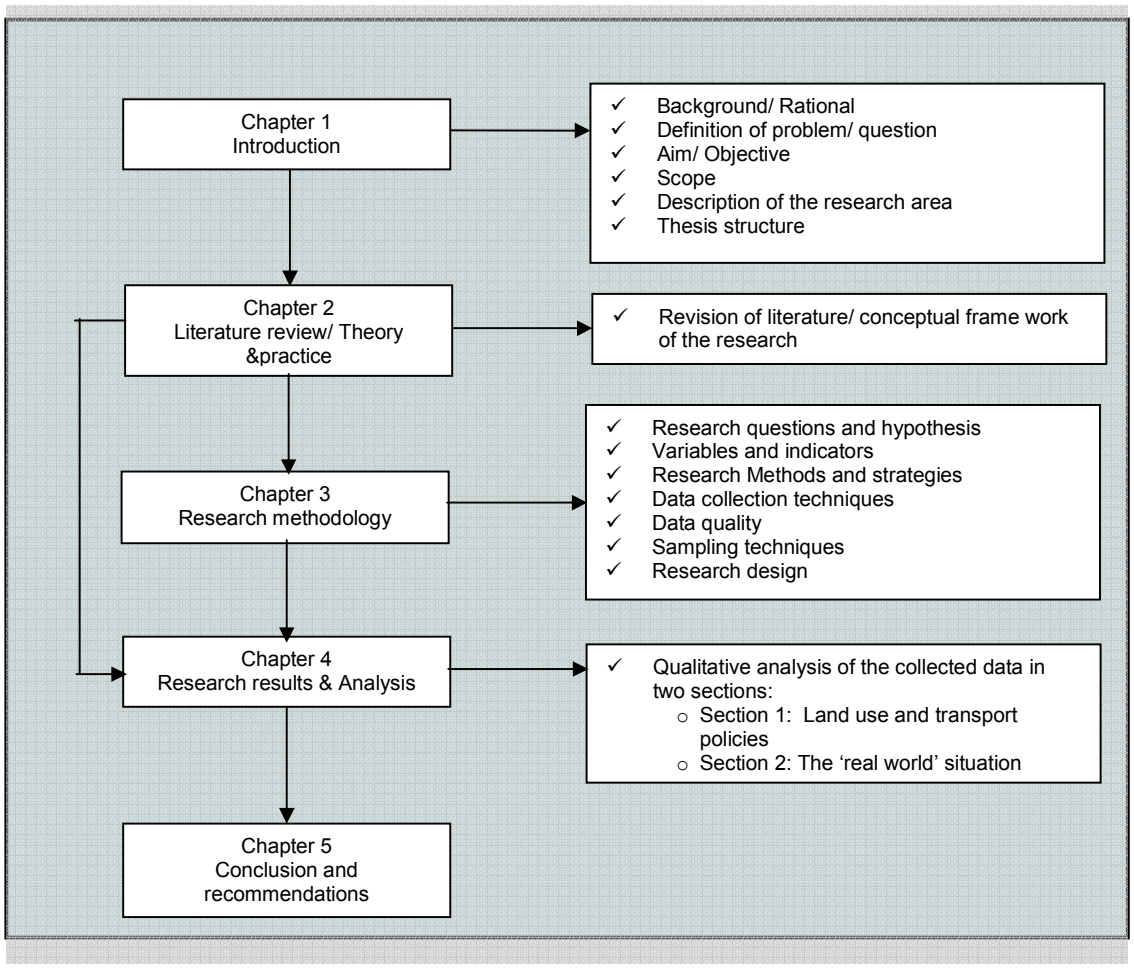


Figure 1-3: Research structure

Chapter 2 Literature review

There are increasing calls for greater policy integration from a number of areas. This is coming at a time when decision-making is facing increasing complexity as a result of various concurrent trends. Some of these trends are towards globalization and greater centralization of decision-making, whilst other trends are towards fragmentation and decentralization of decision-making.
(Stead et al., 2004)

2.1 Introduction

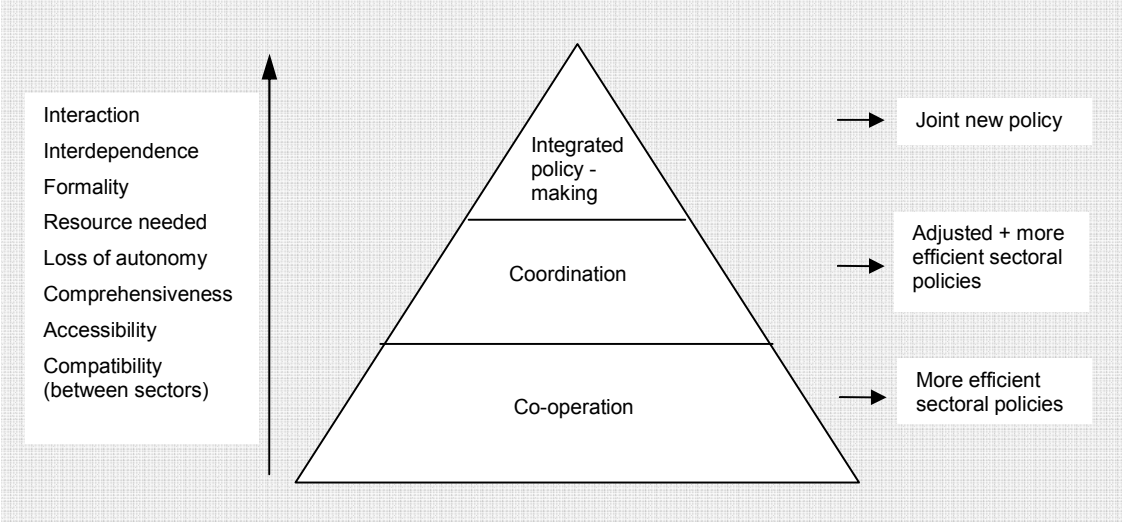
Integrated policy making is growing in importance as policy makers become aware of the limitations of single goal policy making. However, integrating policies to simultaneously address cross cutting issues can be neither a simply conceived nor easily implemented solution to the complicated urban problems. This is because, despite the consensus about the need for policy integration, information about the importance of policy integration in practice, the experiences of policy-makers with policy integration, and the mechanisms or tools for policy integration that could help to lead to more integrated policy are difficult to find (Stead, 2003). But there are increasing calls for greater policy integration from a number of areas at times when decision making is facing increasing complexity as a result of various concurrent trends (Stead et al., 2004). More over, policy formation and implementation are coming to involve a more variable mix of communities and actors, both within and outside the formal structures of government (Armstrong, 1995). This increasing diversity of voices speaking on the ever growing social and environmental problems in urban centers is also another reason for policy integration.

2.2 Part one: Policy integration; Theory and concept

Though most of them did not use the term 'policy integration', there are a number of researches and articles in this area. According to Peters (2005), policy integration is a level of coordination[7] within the government that involves moving from coordinating not only the delivery of services but also the goals being pursued by public organizations, which makes it more politically difficult. This stage of coordination not only requires the lower echelons of organizations to cooperate on the implementation stage but also other levels of the organizations to ensure that their goals are compatible (Peters, 1998). But Stead et al. (2004) argue that policy integration is more far-reaching and more sophisticated than policy coordination which in turn is more sophisticated than co-operation. Policy integration concerns the management of cross-cutting issues in policy-making that transcend the boundaries of established policy fields, and which do not correspond to the institutional responsibilities of individual departments (Stead et al., 2004). Often, policy goals of different organizations might not be compatible and sometimes even contradict, so that substantial negotiations and perhaps imposition of authority from higher levels of governments may be required to make the organizations perform their tasks in a more integrated manner (Peters, 2005).
Stead et al. (2004) has identified policy integration, policy coordination and cooperation at different hierarchy, as summarized in ***figure 2-1***, based on their level of interaction and complexity.

[7] The four levels of coordination are mentioned as: Negative coordination, Positive coordination, Policy integration and Strategy development.

- *policy co-operation*, at the lowest level, which simply implies dialogue and information
- *policy coordination*, policy coherence and policy consistency, all quite similar, which imply cooperation plus transparency and some attempt to avoid policy conflicts (but do not necessarily imply the use of similar goals)
- *policy integration (joined-up policy),* which includes dialogue and information (as in policy cooperation), transparency and avoidance of policy conflicts (as in policy co-ordination, policy coherence and policy consistency) but also includes joint working, attempts to create synergies between policies (win-win situations) and the use of the same goals to formulate policy. (Stead, 2003)



(Source: Stead et al., 2004)
Figure 2-1: Integrated policy-making, policy coordination and cooperation

Policy integration for the purpose of this paper is contemplated as defined by Stead and Meijers (2004) as the management of cross cutting issues in policy making that transcend the boundaries of established policy fields, and which often do not correspond to the institutional responsibilities of individual departments. The notion of policy integration can be defined and analyzed in terms of three criteria that refer to different aspects of policy making process:

- Consistency to the policy out put: determines if the various policy activities are coherent from the point of view of a specific objective.
- Interdependence to the causal linkages between the policy components: determines if the various policy activities are inter-linked and causally linked with this specific objective.
- Structural connectedness to the inter-institutional relations: determines how the various actors and institutions that are involved in the formulation and enforcement of these policies are coordinated in terms of authority, responsibility and information structures. (Ugland and Veggeland, 2006)

A synonym to policy integration usually used by the OECD[8] is policy coherence which encompasses policy interactions at several levels (Fukasaku et al., 2005). According to the working definition given by OECD, policy coherence is the effort to ensure that the objectives and results of a government's development policies are not undermined by other policies which will have impact on the development of the country. Hence, the process of forging greater policy coherence for development means matching different policy frameworks within an administration and/or between administrations (ECDPM and ICEI, 2006)[9]. Forster and Stokke (1999), as cited in ECDPM and ICEI scoping study (2006), defined a coherent policy as one whose objectives, within a given policy framework, are internally consistent and attuned to objectives pursued in other policy frameworks of the system.

Improved integration of policies plays crucial role when it comes to poverty reduction and sustainable use of natural resources by promoting synergy, reducing duplication and inconsistency, and maximizing the effectiveness of policies and service delivery processes. Its importance is even more decisive when it comes to issues that transcend organizational boundaries such as sustainable development that embrace economic development, social equity and environmental concerns. Therefore, for sustainable development of a nation, at least, the policies' objectives should not conflict with intentions, motives, goals or values on which other policies are founded. A good coherence of policies implies improving the quality of the processes of collective action that characterise public and intergovernmental institutions.

An orthodox response to facilitate integration of policies among issues of growing importance as sustainable development has been creating new institutions. However, the process requires not only institutional restructuring but also government initiatives and political commitment to integrate economic, social and environmental goals with in the authorities of existing organizations. Therefore, achieving greater policy coherence requires maintaining efforts to improve the integration of sectoral policies, ensure integration of policies across different tiers of government, and affirm consistency in the choices of stakeholders. In fact, success in integration of development policies requires precise understanding of economic, social and environmental implications of sustainable development among all stakeholders. Moreover, it demands commitment and leadership that comes from the top and develops throughout the organization, encouraging and facilitating stakeholders' participation at all levels of policy formulation, and adequate scientific input and knowledge management. However, since countries represent a diversity of different interests, standards and norms, achieving greater policy coherence in practice has proven to be unfeasible target to achieve but rather requires accepting a certain level of inconsistency.

In addition to what is said above, Stead et al. (2004) gave some tools for policy coherence based on OECD (1996) shown in ***Box 2-1***. Though they are derived from guidelines, procedure, indicators and best practice documents, these tools do not necessarily ensure success in integration of policies due to its opaque nature. However, since good governance and sound public management are important requirements for sustainable development policies, these tools may be used to facilitate the process of integration of policies and cooperation among authorities. Moreover, long-term budgeting and sound regulatory instruments together with the right incentives are critical elements for policy coherence and integration.

[8] Organization for Economic Co-operation and Development
[9] ECDPM: European Centre for Development Policy Management, ICEI: Instituto Complutense de Estudios Internacionales

- Political commitment is a necessary precondition for policy coherence, and a tool to enhance it.
- Establishing a strategic policy framework helps to ensure that individual policies are consistent with national goals and priorities.
- Decision makers need advice based on a clear definition and good analysis of the issues with explicit indications of possible inconsistencies.
- The existence of a central overview and coordination capacity is essential to insure horizontal consistency among policies.
- Mechanisms to anticipate, detect and resolve policy conflicts early in the process help identify inconsistencies and reduce incoherence.
- The decision-making process must be organized to achieve reconciliation between policy priorities and budgetary imperatives.
- Implementation procedures and monitoring mechanisms must be designed to insure that policies can be adjusted in the light of progress, new information and changing circumstances.
- An administrative culture that promotes cross-sectoral cooperation and a systematic dialogue between different policy-communities contribute to the strengthening of policy coherence.

Box 2-1: Tools for policy coherence
(Source: Stead et al, 2004)

Summery:

Integration of policies is becoming a main global concern for sustainable development as decision making is becoming increasingly complex due to various concurrent trends of development. A number of synonyms like coherence, consistency, collaboration, co-operation, co-ordination and integration have been used through out the years to express a more or less similar idea. However, policy integration is seen as quite distinct and more sophisticated than policy co-operation or policy co-ordination. This is because unlike to co-ordination or co-operation, policy integration includes working together, attempts to create synergies between policies and requires the use of same goals to formulate policy.

2.2 Part two: Land Use and transport interaction

> *Transportation and land use are inexorably connected. Everything that happens to land use has transportation implications and every transportation action affects land use.*
> *(Centre for Urban Transportation Studies, 1999)*

Since cities grow with or without planning, meeting the resource requirements of a growing population requires land-use change in one way or another in order to satisfy the need for food, space, infrastructure development and service provision. There fore, spatial mobility is a distinguishing feature of a modern society as it offers many new windows of opportunities for humankind and business life. This shows that transport and activity patterns are closely related issues as spatial distribution of different human activities leads to the need for travel and transport of goods. As a matter of fact, with every change in land use of an area, which could be in terms of intensity and/or type of use, there is a corresponding change in the flow of people and goods to and from the site. Similarly, with every change in flows of people, vehicles and goods along routes adjacent to a site, there is a corresponding change in accessibility to the site and its attractiveness to the present use, or for some other potential use. Furthermore, a considerable share of urban land is occupied for transportation use which shows that transportation not only relates to land uses but also it is itself a land use (COST, 1996)[10].

The key factor for understanding this impact of land use patterns on transport is the concept of accessibility. Transport infrastructures promote the spatial interaction between different activities which is measured by accessibility that reflects the attractiveness and ease of reaching these different activities. Studies show that the potential of interaction between any two places increase as the cost of movement between them decreases, either in terms of money or time (Parsons Brinckerhoff Quade & Douglas Inc., 1998). Similarly, land use pattern and urban form is influenced by the level of accessibility provided by transport system between different activity areas.

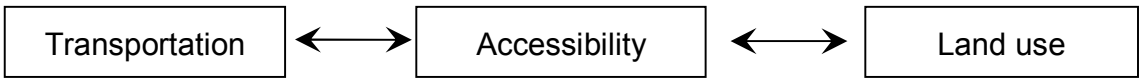


Figure 2-2: Accessibility links Transportation and Land Use
(Parsons Brinckerhoff Quade & Douglas Inc., 1998)

Figure 2-2 illustrates the relationship between land use and transport in terms of accessibility assuming a very simple relation with out the influence of other factors. However, that is not the case in the real situation. The land use and transport interaction is affected by a number of factors including public policies such as land use planning and transport policies. This relationship can be conceptualized as an interaction of the supply of accessibility that considers the physical aspects of land use and transportation, and demand for accessibility that considers the preferences of individuals and firms which is further affected by public policies, as shown in ***figure 2-3***.

[10] European cooperation in the field of Scientific and Technical Research

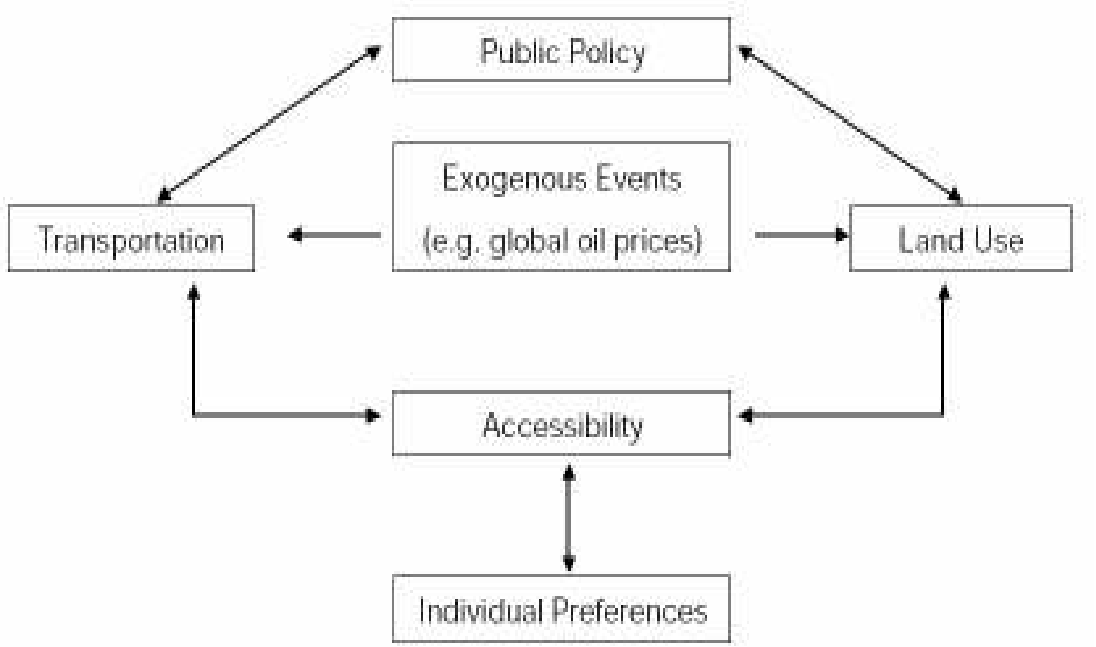


Figure 2-3: Supply and demand for accessibility
(Parsons Brinckerhoff Quade & Douglas Inc., 1998)

Mayer and Miller (1984) explained this interrelation between land use and transport using 'land use and transport interaction, shown in ***Figure 2-4*** below. Transport system, in the figure, refers to modes of transport, different technologies of transport, the infrastructure, institutional set-up, and policies concerned with transport system, while the activity system comprises of the socioeconomic and demographic characteristics of the area including land-use policies and characteristics. The figure summarises the idea that the development of land for a particular use in an area either generates new trips originating from that area, or attracts new trips to that area, or even both. In any of the cases, the development of land creates new travel demands which increase the need for transport facilities whether in the form of new infrastructure or more efficient operation of existing transport facilities. Such improvements to the transport facilities of an area will make land more accessible to existing activity centres, hence more attractive. What makes this land use and transport interaction more complex is that this increased accessibility and the resulting improvement of land values, in turn, influences the location decisions of individuals and firms, once again motivating new land development in the area and starting this cycle again until equilibrium is reached or until some other external factor intervene the process (Pujinda, 2006). In short, the activity system determines the demand for travel in an area, and transport system determines the supply to meet the current demand in that area.

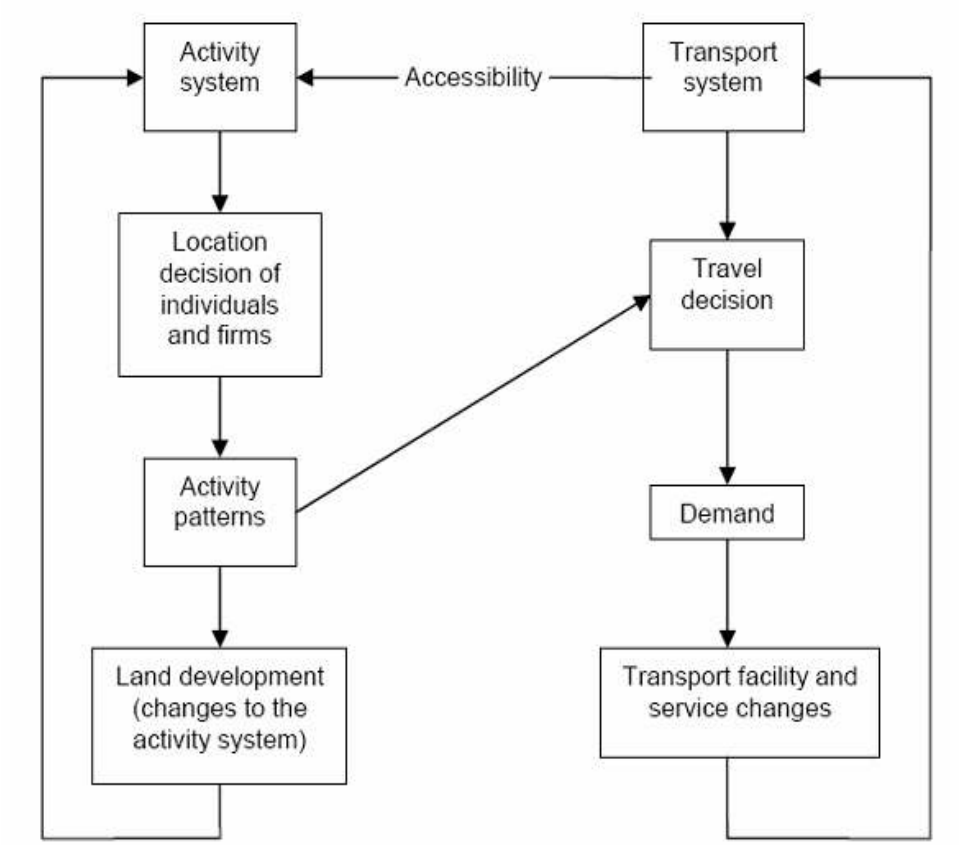


Figure 2-4: Land use and Transport interaction
(Mayer and Miller, 1984)

Wee (1997), as cited by Wee (2000), illustrates even a more complex and comprehensive relationship between land use and transport as shown ***Figure 2-5*** below. The volume of passenger trips of an area and its mode split depends on the location of the different socio-economic activities, personal needs and desires of people that are related to socio-economic and cultural factors, and the transport resistance that area dominantly guided by the time and cost of travel. More precisely, transport resistances are decided by cost of travel, travel times, comfort, and reliability of transport alternatives; all the three categories having considerable impact in all directions. If change occurs in any of the three categories of determinants, it will significantly affect the whole system which simply means that changes in land-use patterns will affect the transport resistance between certain locations.

Wee (2000) also suggests other indicators to measure the impact of land use on transport as used in the empirical analysis of this research. These indicators include: the option value of an area, the consumer surplus, the cost of unsafety, peoples valuation of one thing over the other, financial aspects of land use-transport alternatives and robustness of the land use-transport system.

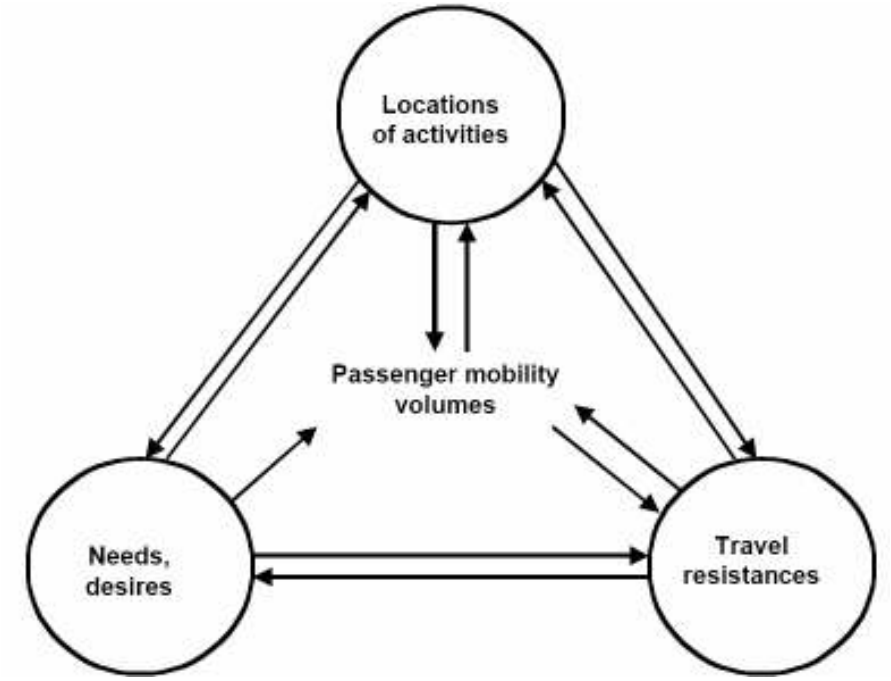


Figure 2-5: Relationships between activity locations, needs and desires, transport resistances and passenger transport.
(Wee, 1997)

Transport and land use are critical elements of sustainable development given high emphasis in most development programs and policies since they are pervasively integrated to improving the urban environment and the lives of those living in it. This was magnified when UN-HABITAT identified land-use planning, adequate housing, security of tenure, and reliable infrastructure and services together with good governance as decisive issues for making cities more sustainable for the poor. As a result land use and transport are made parts of Agenda 21 in chapter 7: promoting sustainable human settlement, chapter 9: protection of the atmosphere and chapter 10: integrated approach to the planning and management of land resources.

Moreover, in the world of increasing concern for the ecosystem, the impact of the transport system on the environment has been given a considerable attention. This is mainly because developing infrastructure for a motorised transportation system takes vast amounts of land, intrudes into natural habitats and permanently alters the landscape of an area. But the concept of sustainable transportation promotes a balance of the economic as well as social benefits of transportation with equal consideration to the environment. A well-organized transportation system can enhance the economic efficiency of urban centres and the result could be synergetic when integrated with land-use strategies that result in reduced transport demand.

A transport system is sustainable if it provides individuals and societies safe and affordable access to amenities and in a consistent way with human and ecosystem health, and also with equity within and between generations (Institute of Transportation Engineers, 2004). To make this simple, a transport system is said to be sustainable if it meets the mobility and accessibility needs of all residents by providing safe and environmentally friendly modes of transportation. However, this is a very complex and difficult duty to achieve considering that the needs and demands of people belonging to different income groups are not only different but also often conflicting.

However, some researchers argue that, though, land use sure affect urban mobility, the impact is not that important to play a crucial role in the policy debate of an urban centre. They say this is because there are other aspects that should be given more emphasis such as the desire of urban dwellers to live in low density settlements (Wee, 2000). As a result, the nature of existing infrastructure, current societal values and preferences and also the flexibility afforded by the personal vehicle tend to perpetuate the policy and decision-making processes focused on the automobile. This has dominated the land use policy for almost five decades to provide ease of access with automobile that has resulted in outward expansion of cities, which is referred as 'urban sprawl'.

Most cities respond to this situation by introducing land use planning policies that encourage denser, more compact, sequential development patterns that support sustainable transportation. Studies (Knaap and Song, 2004, Newman and Keneworthy, 2007) show that one problem associated with low density cities is sprawl-based car dependence. When cities are built around automobiles, the land use pattern suggests that there is little alternative for transport, hence they use 10 times as much cars as other cities. On the other hand, cities with denser land use patterns support more transit and other non-motorized transport options (Newman and Keneworthy, 2007). Sustainable development emphasise the land use and transportation relationship to improve mobility, enhance air quality, support economic growth, and ensure the financial stability of the transportation system. Most of all, providing planning support for a variety of mobility options, such as automobiles, bicycling, walking, and mass transport, helps local governments present a range of development opportunities to the private sector (NCTCOG, 2007)[11].

So far, measures that promote the use of mass transport in cities had only limited success in reducing car use. It has also been said many times (TCRP, 2003, ITE, 2004, Wright and Montezuma, 2004) that the most effective way to reduce the pollution and congestion caused by car dependent society is to tackle the problem from the perspective of how communities are planned and redeveloped. It goes without saying that urban sprawl is closely related to transport issues. The spatial pattern of sprawling cities is characterised by low population density and spatially segregated land uses. This trend of development is unfavourable to the provision of efficient public transport and other sustainable transport modes but rather urban sprawl causes high level of private car use. The impacts of urban sprawl on transport can, therefore, be mentioned as an increase of trip lengths, congestion on the radial roads giving access to city centres, increase in fuel consumption and air pollution. The guiding principles usually mentioned while talking about reducing pollution and congestion can be summarised in to the following five categories:

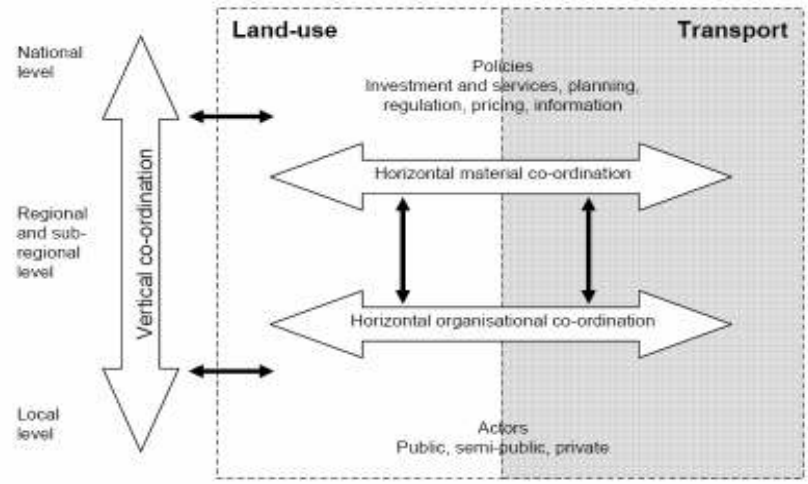
1. Reducing the travel demand and travel length by building residential areas at the right density close to mix of amenities and services.
2. Ensuring communities are well served with appropriate transport services including cycle networks and walk ways,
3. Facilitating and encouraging modal shift to non-motorized transport options through site design
4. Improvement in the automobile technology, and
5. Discouraging car ownership by reducing the amount of car parking spaces available.

[11] North Central Texas Council of Governments

As the result of these characteristics, compact and traditional development has drawn increasing attention from land use and environmental policy makers when compared to sprawl. The argument is that 'compact' or 'transit oriented' neighbourhoods can decrease automobile dependency, reduce air pollution, and also reduce the amount of land affected by impervious surfaces such as roads and parking lots (Carplus, 2004).

This is one of the reasons that policy integration, at least in transport and land use, is gaining more global attention as a crucial element of sustainable development. So far, studies show that a more sustainable policy making for urban transport demands a more holistic approach in which decisions for land use and transport are made jointly. This is because land use strategies can influence transport demand by shortening trip lengths (by providing near-by alternatives) and/or providing transport mode alternatives that are efficient and cost effective.

Countries adopt variety of planning systems to address the problems of mobility in urban centres, but lack of integration between the land use and transport planning can be considered as a general similarity between most countries. The only solution is to develop local strategies to integrate land use and transportation planning processes. Wegener and Fürst (1999) proposed the integration process of land-use and transport planning by "Vertical and Horizontal Coordination". Unlike the horizontal integration, vertical integration is already required by planning regulations in most countries and supported by a formal process (Pujinda, 2006).



(Wegener and Furst, 1999)

Figure 2-6: Co-ordination and integration of land-use and transport planning

Summery

Transport is central to development; without access to education, health, jobs, and other amenities, quality of life suffers; without physical access to resources and markets, growth stagnates hence poverty reduction cannot be sustained. However, inappropriately designed transport policies, strategies and programs can result in services that might aggravate the conditions of the poor and harm the ecosystem (The World Bank, 1996). Land use and transportation are cross cutting issues that are becoming crucial elements of sustainable development of a nation. Transportation affects land use patterns and land use also affects the form and modes of transportation. In this complex relationship decisions that affect one also affect the other. As a result, it has become important to integrate transportation and land use planning decisions so they are complementary rather than contradictory. This is to ensure that transport policy and planning decisions support land use policy and planning objectives and vice versa.

2.3 Part three: Inspiring Example; Curitiba

Studies show that there is very little correlation between car use and city wealth, with some exceptions[12]. Comparing cities like Tokyo, GDP per capita of US $64,722, and Hong Kong, GDP per capita of US $38,127 with Atlanta, a city with GDP per capita of US $ 37,555, a study shows that the residents of the first two cities use 10 times and 25 times less gasoline than Atlanta, respectively. This comparison was also done with the European cities which in general are among the wealthiest countries in the world and was found that people in European cities use six times less fuel than those in Atlanta. This same study shows that the wealthiest Asian cities use public transport as a very high proportion of their motorized transport, Hong Kong being at the top of the list with 73 percent, which again seems not following the per capita wealth levels (Newman and Keneworthy, 2007).

But it was also shown that cities with higher density have the most walking, biking and transit use, while on the other hand, low density cities have the most car use. This trend was illustrated with cities like Hong Kong, being dense city, is among the highest in transit use and non motorized trips, whiles US cities like Atlanta, with the lowest density, has a low proportions of transit and non-motorized transport use (Newman and Keneworthy, 2007). This has made the link between urban form and transport system rather quite clear.

A fascinating example of a developing city in integrating land use and transport policies to insure sustainable transport system is Curitiba, the capital city of the state of Parana in Southern Brazil. It is a city with a total metropolitan area population of 2.2 million and GDP per capita of 7,827 US Dollars which is among the highest in South American cities. This city has attained great success in achieving a high share of trips by public transport with a lower density than expected for its low car use.

As the result of population growth as high as 6% a year starting from the early 1960s due to the rural migration, the city's plan designed in the 1940s failed to provide the rapidly increasing demand for urban services. Thus, a Preliminary Urban Development Plan was prepared in 1964 that has led the city's development for more than 3 decades and became the Curitiba Master Plan in a later period. The Instituto de Pesquisa e Planejamento Urbano de Curitiba (IPPUC), a planning institute in Curitiba, was created parallel to the evolution of the plan with a responsibility to develop, supervise, monitor and continuously update the Master Plan.

Following the decisive decision to rely on buses as more flexible and affordable transit system than the rail transport for a medium-size developing city, Curitiba's bus system was developed integrated with the overall master plan whose basic objectives included radial expansion of the city along five major corridors (structural axes), integrating land use and transport, and protecting the traditional city centre.

Curitiba's transit system is founded on an integrated land use and transport policy and is famous throughout the world for its realistic, integrated, cost-effective, and efficient transport system. The success starts from the fact that IPPUC, Curitiba's planning institute, is an independent institute, hence less prone to political pressure and changes by any government office other than the municipality department or division.

[12] Detailed data is shown in Appendix 4

The vital features related to land use and transport in the plan are summarised and presented as follows:

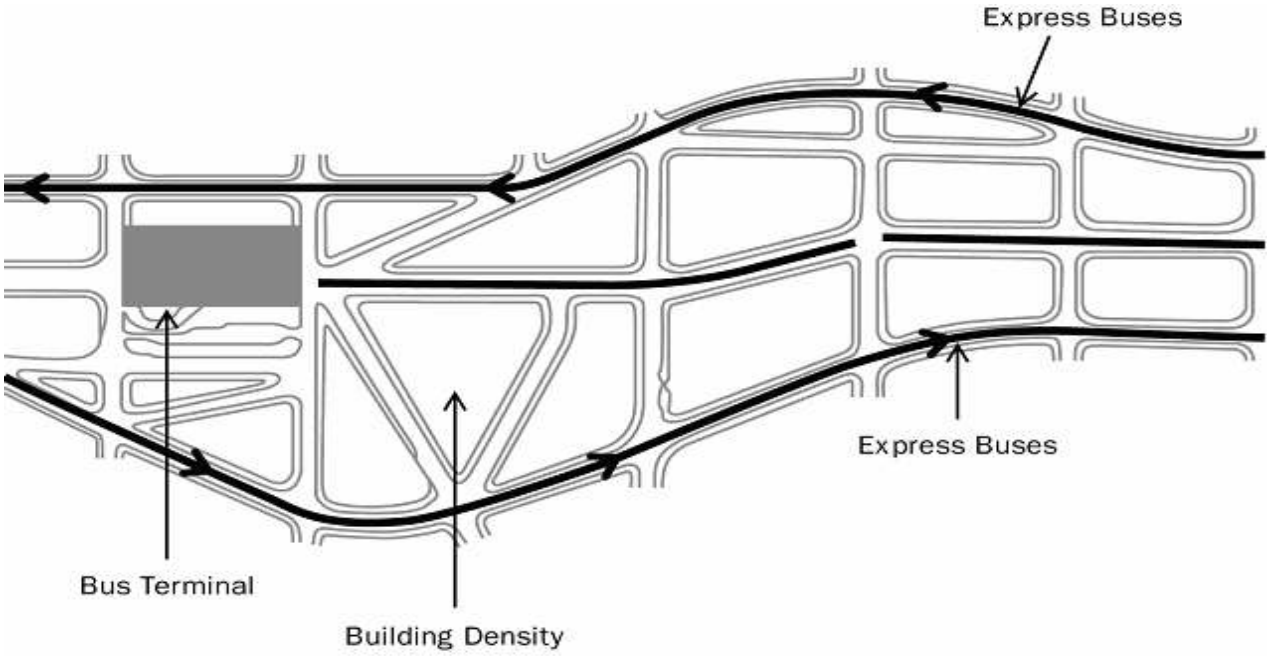
1. Land use and transport are well integrated: the "structural axes" concept of high-intensity development has created corridors with a travel demand that is well suited to be met by mass transport services (high demand, short walk distances to the transit facility, etc.).
2. Land within two blocks of the bus way has been zoned for mixed commercial-residential uses. As shown in the ***table 2-1*** below, beyond these two blocks, zoned residential densities become gradually lesser with distance from the bus ways.
3. Most importantly, the zoning stipulated by the structural axes has been brought to effect by a combination of sticks and carrots. This combination includes various bonuses to develop according to the plan; incentives to sign over development rights; strong control over large-scale development (such as large shopping centres that are strictly limited to the structural axes); provision of incentives to real estate developers to augment residential density near the transit corridors; and development of transit terminals with a wide range of facilities – both public and private sector.
4. The bus way system has been of a great value in influencing land use development and it has also been used to encourage development along the structural axes.

Zone	***Population***	***Residential population [per hectare]***	***Dwelling units [per hectare]***
Mixed High-Rise Residential	130,700	294	93
Medium-to-High-Density Residential (ZR 4)	217,300	164	40
Medium-Density Residential (ZR 3)	240,800	76	22
Low-Density Residential (ZR 2)	416,506	63	17

(Source: TCRP, 2003)

Table 2-1: Residential Densities in Curitiba's Structural Axes 1992

The plan also includes parking policy that has played a decisive role in controlling the travel demand especially to and from the central area. The policy clearly states that in the central area road side parking is restricted at some location and at times, and is well enforced. However, permission has not been granted to supply parking spaces to match the potential demand for more parking spaces as a result of growth in vehicle ownership, moreover, off-street parking is reported to be costly. Despite the relatively high automobile ownership, the design of the bus way that prevents any access or interference from parked cars together with the limited parking space available in the central area has played a great role in maintaining a high mode share to mass transport, which took about 70–75 percent of the journey to work for more than two decades but declined to 54% in 1990, in the city.



(Source: TCRP, 2003)
Figure 2-7: Land development and mass transit, Curitiba

This way, the city has managed to improve the quality of life of the citizens by providing easy access and efficient mobility by the bus transit system, while at the same time reducing the pollution and congestion in the city. Therefore, achieved the requirements of sustainable transport by:

1. Meeting the citizens' access needs safely and in a friendly manner with the ecosystem
2. Providing affordable and efficient transport system that offer mode choice and support a vibrant economy
3. Reduce emission and noise pollution while using land in a proper manner.

Summery:

Curitiba is among the very few cities worldwide that has successfully implemented an integrated policy of land use patterns and transportation systems. As said earlier, integration of the city's land use and transportation policies was done at a favourable time of development, just prior to experiencing a very large population growth. This is a great example that shows mass transport has become more than just a transportation system; it is also a very essential instrument to control and manage city growth. Unlike most developing cities, Curitiba has managed to sustain land use development by a mixture of sticks (controls) and carrots (incentives) and has even succeeded in using the transport system to sustain and to encourage development in the city, at the same time (TCRP, 2003)[13].

[13] Transit Cooperative Research Program

2.4 Conceptual Frame work

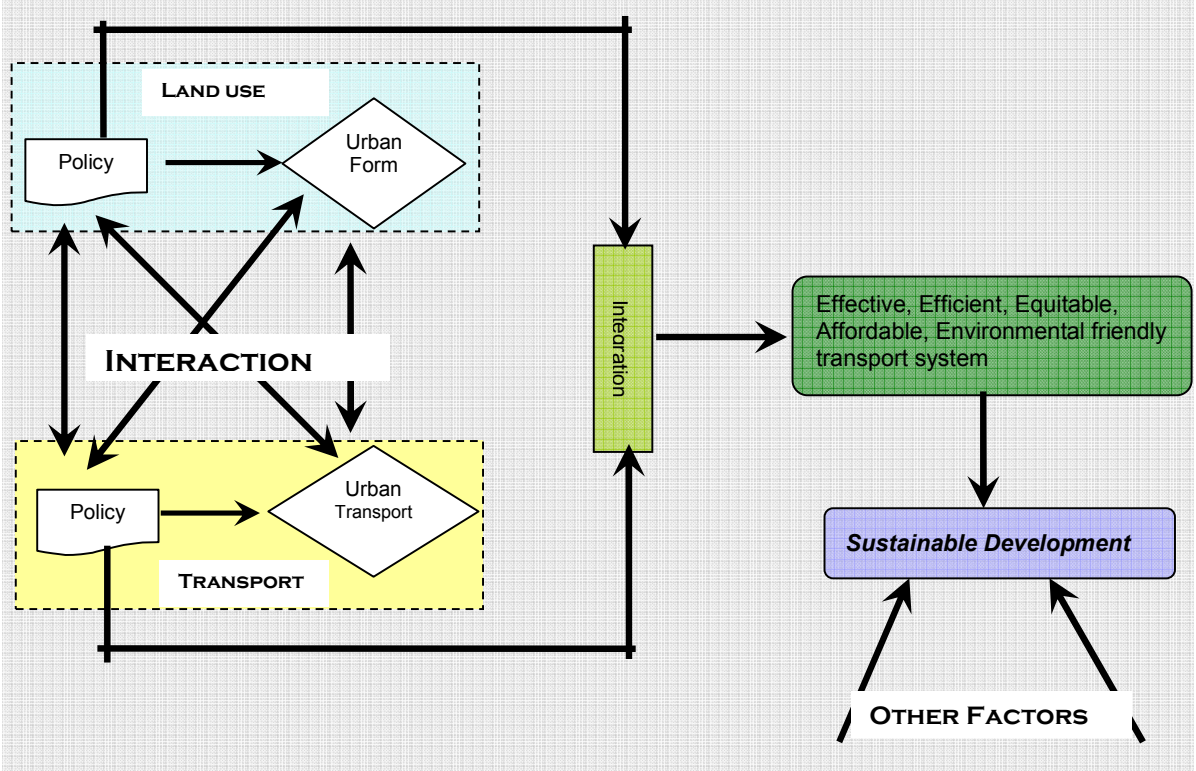


Figure 2-8: Conceptual Frame work of the research

The conceptual frame work illustrates that land use and transport influence each other at the stage of policy formulation and/or implementation as will be used in the research.

1. The land use policies affect the land use patterns of a city and at the same time will have impact on transport policy hence the transport system as a whole. And the transport system will further attract more development to the area that will affect further land use decisions.
2. Similarly the transport policies have impact on transport service provision resulting in change in demand of an area and land use decision. This in turn affects the land use policies of a city to harmonize the situation with future development and control and direct development trends.
3. Spatial structure of cities that could be guided formally and informally will get the attention of transport service providers hence will require some correction on land use and transport policies.

This way all the four elements will affect one another therefore calls for a resolute action to sustain the development of the city. The idea is to emphasize that the role that the public transport system plays in controlling the spatial structure of cities is as important as the role of the land use instruments to control the travel behaviors of people. Therefore, integrating land use and transport policies will bring the economic, social and environmental dimensions of land use and transport to a profile that ensures sustainable development of urban centers together with other development strategies of cities.

Chapter 3: Research methodology

This research explores two of the elements of sustainable development, Land use and transport, focusing on the need for integration of policies in these disciplines in Addis Ababa. These issues are identified as major priorities in most of the national and local strategies and policy documents in Ethiopia and a number of policies are formulated. But the practical picture of the city is getting even worth as each and every land development in the suburbs of the city creates an enormous pressure on the transport infrastructure as a result of not being provided with equal growth in public transport services. This required a study on the trends of policy formulation and stakeholder participation in the city. In addition to the practical situations of policy formulation and implementation in Addis Ababa, theories of policy integration are also explored from different literatures in the same topic in order to address the aims of this research.

3.1 Research questions and hypothesis

The main focus of this research is to explore the needs for integration of land use and transport policies in Addis Ababa. There fore, the main research question was formulated as:

How can integration of land use and transport policies lead to sustainable development in Addis Ababa?

Hypothesis: Since land use and transport are cross cutting issues, there is need for the integration of land use and transport policies for sustainable development, which is not yet recognized in Addis Ababa.

As discussed before the interaction between land use and transport is a complex issue to deal with. There for, to answer this main research question, the first thing to do was to study the policy environment in land use and transport in Addis Ababa which resulted in the following sub-question:

How is the land use planning and transport policy organized in Addis Ababa?

Well designed Land use plans always facilitate easy access to public transport and the accessibility of public transport has impact on mode choice of people. The researcher's aim was to study the newly developed areas in terms of efficient provision of public transport. Most of the newly developed areas are residential only and access to public transport will serve as a pull factor for business sectors to settle in those areas. But meanwhile, this trend of development will have impact on demand for public transport. This took us to the second sub-question:

What is the impact of the current land use trends in Addis Ababa on the public transport?

While understanding the policy environment, it was also important to look at the opportunities and barriers in improving the integration of land use and transport policies that are addressed by this last research sub-question:

How can the integration of land use and transport policies be improved in Addis Ababa?

3.2 Operationalization /Definition of variables

Table 3-1 below gives the definitions of dependent and independent variable that are used in the research in terms of the operations or techniques used to measure it. After defining the variables the researcher selected specific indicators to measure them. The individual variable in each research question and the methods of measurement used are further explained in ***table 3-2*** below.

Variables	Operational definition
Policy	A plan or course of action of a government intended to influence and determine decisions, actions, and other matters (Bitpipe Inc., 2007)
Land use	The spatial distribution of activities (H.P. Blijie and De Bok, 2002)
Mix/non-mixed land use	Degree that related land uses (housing, commercial, institutional) are located together. Sometimes measured as Jobs/Housing Balance, the ratio of jobs and residents in an area. (Litman, 2005)
Land use plan	Refers to the design of various land use factors, such as density, mix, connectivity and the quality of the pedestrian environment (Litman, 2005)
Urban public transport	A mass transport system that takes share of urban transport modes

Table 3-1: Operational definition of variables

3.3 Variables and Indicators

Question	Variable	Indicator	Data source
How are the land use planning and transport policy processes organized in Addis Ababa?	Form of land use and transport policy organization	▪ Elements given emphasis in the policies ▪ Stakeholders involved in policy formulation ▪ The level of clarity of the policy structure	▪ Land Administration office ▪ Office of the Revision of Addis Ababa Master Plan ▪ Addis Ababa Transport Authority ▪ Direct Observation
What is the impact of the current land use plan on the public transport system in the city?	Kind of impact on transport services	▪ The change in demand of public transport ▪ Mode choice	▪ Office of the Revision of Addis Ababa Master Plan ▪ Federal Transport Authority
How can the integration of land use and transport policies be improved in Addis Ababa	Alternatives of improvement	▪ Barriers for integration ▪ Opportunities for integration	▪ Federal transport Authority ▪ Addis Ababa City Administration Authorities ▪ Literatures

Table 3-2: Variables and Indicators

3.4 Research methods and strategy

As discussed several times in the previous chapters, the aim of this research is to analyze the current situation and assess the barriers and opportunities for integrating land use and transport policies in the context of sustainable development in Addis Ababa, Ethiopia. Ethiopia is a country in the horn of Africa, being one of the poorest nations of the world in the Sub-Saharan Africa with GDP per capita of $130. Addis Ababa is a high land city located approximately at the geographical centre of the country covering 540km^2 of land area and having a population of nearly 3million, 60% of which living below the poverty line; according to UNDP.

The study is a qualitative research that will explore the impact of the current trend of development on the transport system in Addis Ababa and explain how the land use and transport policies are organized to determine the need for integration. Hence, the study combines exploratory and explanatory methods of research.

In this study, which focuses on the study of the contemporary phenomenon of the practical situation of Addis Ababa in relation to land use and transport trends, case study is used as the main research strategy. This strategy includes interviews with the authorities involved in land use and transport policy, direct observation of the current trends, and desk studies of organizational records and policy documents.

3.5 Units of analysis

The units of analysis used in this research will spin around land use and transport systems of Addis Ababa. The basic aim of the research is to understand the culture of policy formulation and the overall impact of the city's spatial structure on public transport so that it will be possible to determine the opportunities and barriers to integrate land use and transport policies. Therefore the three main units of analysis used are ***Addis Ababa City, Land use policy in Addis Ababa***, and ***Public transport policy in Addis Ababa***.

3.6 Data Collection:

This qualitative research will be based on primary, secondary and tertiary data to understand the trends of policy formulation and the need for integration of policies in the city:

3.6.1 Primary Data

The primary data will be collected through a field work between 2nd of July and 5th of August in Addis Ababa, Ethiopia.
The primary data was collected by using the following two instruments:

In-depth interview

In-depth interviews with open-ended questions and semi-structured format was conducted to explore the views, feelings and perspectives of the Addis Ababa transport authorities, land use planners and policy makers of the city and understand the trends of policy making. The interview with planners, managers, politicians and bureaucrats resulted in the understanding of the trends of policy making in land use and transport, the stake holders involved, the criteria included and other factors given emphasis. The assumption here was that the land use policy process was driven by the acute demand of housing and investment enquiries in the city and gave less focus for the problems of mobility that will result from faulty land use plans.

The responses were recorded with written notes and audiotape. In addition to the responses, general observations and non-verbal responses of the respondent was also recorded.

Respondents
A.A.C.A. Land Administration and Development Authority
A.A.C.A. Infrastructure Development and Civil Works Authority
A.A.C.A. Master Plan Office
A.A.C.A. Housing Development Project Office
Federal Transport Authority Public Transport provision and Coordination department
Federal Transport Authority Policy research and planning department
Federal Transport Authority Legal Services department

Table 3-3: List of respondent organization for the in-depth interview

It was not easy to talk to the authorities in the A.A.C.A. and the Federal transport Authority at first. But having a support letter from IHS and the Ethiopian Civil Service College has made it relatively easier. However, the researcher had to go through old friends and classmates to get the appropriate person and extract the relevant information in the Federal transport Authority that was going through an administrative reform.

Direct observation

A covert observation was used to understand the ongoing behavior and process of the traffic system at pick hours and the trends of land use development in the city. This unstructured observation was done twice a day at purposively selected locations of the city, shown below, on seven weekdays and four weekends. This process focused on the sub-cities of Addis Ababa where there are large numbers of residential areas developed and being developed to understand the trends of development, find physical evidence of the impact of the city land use plan on accessibility of different amenities, and the type, amount and frequency of transport modes being used and other features like commuting time to the city center.

Sub-City	Specific location
Akaki Kality sub-city:	Saris, Worku sefer, Kality
Nifas-Silk Lafto sub-city	Hana Mariam Church, Mekanisa
Yeka sub-city	Ayat, CMC, Meri
Kolfe-Keranio sub-city	Betel Hospital, Tor Hailoch

Table 3-4: Observation sites

These areas are purposively selected because of the large number of residential building development and squatter settlement that has dramatically increased the number of households living in that area.

Field notes were used to record what ever important was observed in an unstructured manner, and a digital photo camera was also employed additionally to keep record of observation for later analysis and illustration of the results.

3.6.2 Secondary Data

Data about the traffic condition in Addis Ababa, the trends of development, land use and transport policies, regulations, proclamation and directives were explored and collected from literatures and the A.A.C.A and the Federal Transport Authority documentation sections.

Practices of other developed and developing countries in areas of transport and land use interaction and policy integration is also discussed in the theoretical part of this research.

No.	Data type	Data source
1	Number of vehicles operating in Addis Ababa by type & age	Federal Transport Authority
2	Transport Proclamation No. 468/2005	Federal transport Authority
3	Addis Ababa City Development Plan 2001-2010	A.A.C.A Documentation Section
4	A.A.C.G Executive and Municipal Service Organs Establishment Proclamation No. 2/2003	A.A.C.A Documentation Section
5	A.A.C.G. Revised Charter Proclamation (Amendment) No. 408/2004	A.A.C.A Documentation Section

6	Addis Ababa City Master Plan Preparation, Issuance and Implementation Proclamation No. 17/2004	A.A.C.A Master Plan Office
7	The A.A.C.G. Regulations Issued to Provide Land for Real Estate Regulations No. 20/2005	A.A.C.A. Land Administration and Development Authority
8	A.A.C.G. Structural Plan Approval and implementation Regulation No. 16/2004	A.A.C.A Master Plan Office
9	A.A.C.G. Regulation to Prevent Illegal expansion of Land Possession and Construction on Illegal Possession Regulation No 14/2004	A.A.C.A. Land Administration and Development Authority

Table 3-5: Type and sources of secondary data

3.6.3 Tertiary Data

Some useful data about the mass transport services of Addis Ababa, like the ratio of the different variables, are derived from other studies previously conducted on different topics. These data are analyzed by a researcher or a secondary data analyst and does not show the original sources and numbers but only the result of the analysis by the researcher.

3.7 Data quality

Validity: Validity of this qualitative research is controlled by the use of multiple triangulations that combine data triangulation and methodological triangulation techniques. This is done by employing different data collection methods like, observations, interviews and desk studies, and by varying other research factors like the location of observation and the respondents. Efforts have also been made to use the appropriate sampling technique and adequate sample size.

Reliability: The reliability of the data was also enhanced by collecting data at a variety of times and from a number of different locations and sources. Having another assistant recording his observation for cross checking has also helped increase the reliability of the judgment.

3.8 Research Population and sample:

The population of the research is Addis Ababa city with a population of 3 million inhabitants and is divided to 10 sub-cities with number of residents approximately ranging from 200,000 to 330,000 dwellers. But the study focuses on four sub-cities where large number of residential developments and squatter settlements are witnessed. Purposively selected sampling technique was implemented in the study to identify the people involved in land use planning, transport planning and policy making. The target of the research is to analyze the trends of policy making and the extent of consideration of transport policies in land use planning and determine the role of integrated policy making to insure sustainable development in Addis Ababa.

This is a non-probability sampling and the interviewee are selected from government and private organizations that are involved in policy making, land use planning, transport provision, infrastructure development and real estate development.

3.9 Instrument design

Semi-structured in depth interview questionnaires, attached here with, were employed in this research. The researcher tried to design the interview questionnaires in a logical sequence and organized manner to be able to answer the research questions. Greater care is taken to determine which questions are needed to measure the research variables and objectives, as well as to avoid

leading questions. Moreover, a test-run was conducted to check whether the questionnaire gives the required information and whether the respondents and the interviewer feel at ease with it before the application.

3.10 Data analysis

This qualitative study follows the deductive reasoning process where it begins with a predetermined hypothesis saying 'there is a need for integration of the land use and transport policies in Addis Ababa' and uses in-depth interviews, direct observations and desk studies to confirm or negate this hypothesis.

The impact of land use patterns on the transport system of the city is analyzed qualitatively from the data obtained by using the three instruments mentioned above. It is also supported with the theoretical part of the research that discusses and demonstrates the theories and case studies of land use impacts on transport, respectively.

Another element explored was the level of stake holder involvement and elements given emphasis in the formulation of land use and transport policies in Addis Ababa. This data, obtained from interviews and desk studies, reveal how the policy environment in the city is organized. This analysis considers the number and type of stakeholders involved, the roles and responsibilities of the stakeholders, how much influence they have on the policy, and the different interests of the stakeholders.

This way, the data analysis (empirical) part of the study will have two stages;

1. At the first stage the research analyzed the impacts of land use policy of Addis Ababa on public transport to determine the need for integration of land use and transport policies from the perspective of written policies, proclamations, regulations and directives for sustainable development. At this stage where primary, secondary and tertiary data are employed, the researcher analyzed the failure and success of policies, proclamations, regulations and directives of land use and transport authorities in insuring affordable and efficient transport provision in the research areas that encourage sustainable development of the city.
2. The second stage of the analysis has also used the primary, secondary and tertiary data to analyze the existing situation of the research areas and determine the impact of the current, formal and informal, land use trends of the city on the performance and demand of the public transport in Addis Ababa. Even though, the researcher tried to enhance the reliability of the empirical study by triangulation techniques, the finding still relies on the subjective observation and judgment of the interviewee.

3.11 Scope and limitations of the study

The scope of the research is the integration of transport and land use policies in Addis Ababa city including the metropolitan areas with a focus on the newly developed and being developed suburbs of the city.

There are limitations in this research, in addition to time and financial resource scarcity, as mentioned here below.

One major limitation was that, though it allows the interviewer to clarify points for the respondent, the interview technique relies on the willingness of the respondent to give accurate

and complete answers. However, the biggest limitation the researcher faced while the field work was that the Federal transport Authority and the Addis Ababa Transport Office were going through a basic administrative reform program that it was difficult to talk to the right person, at the right time and with right mood. Unfortunately, people who were not happy with the reform were not willing and/or open to respond to the questionnaires.

More over, even if an assistant were employed in the process, researcher's bias could still be a potential limitation to some extent in the observation technique of data collection. Further more, though purposively selected sampling technique was used, authorities usually push the interview to the lower level employees.

3.12 Research design

To have the general overview of what the research process is going to be, the research design is summarized in the figure below;

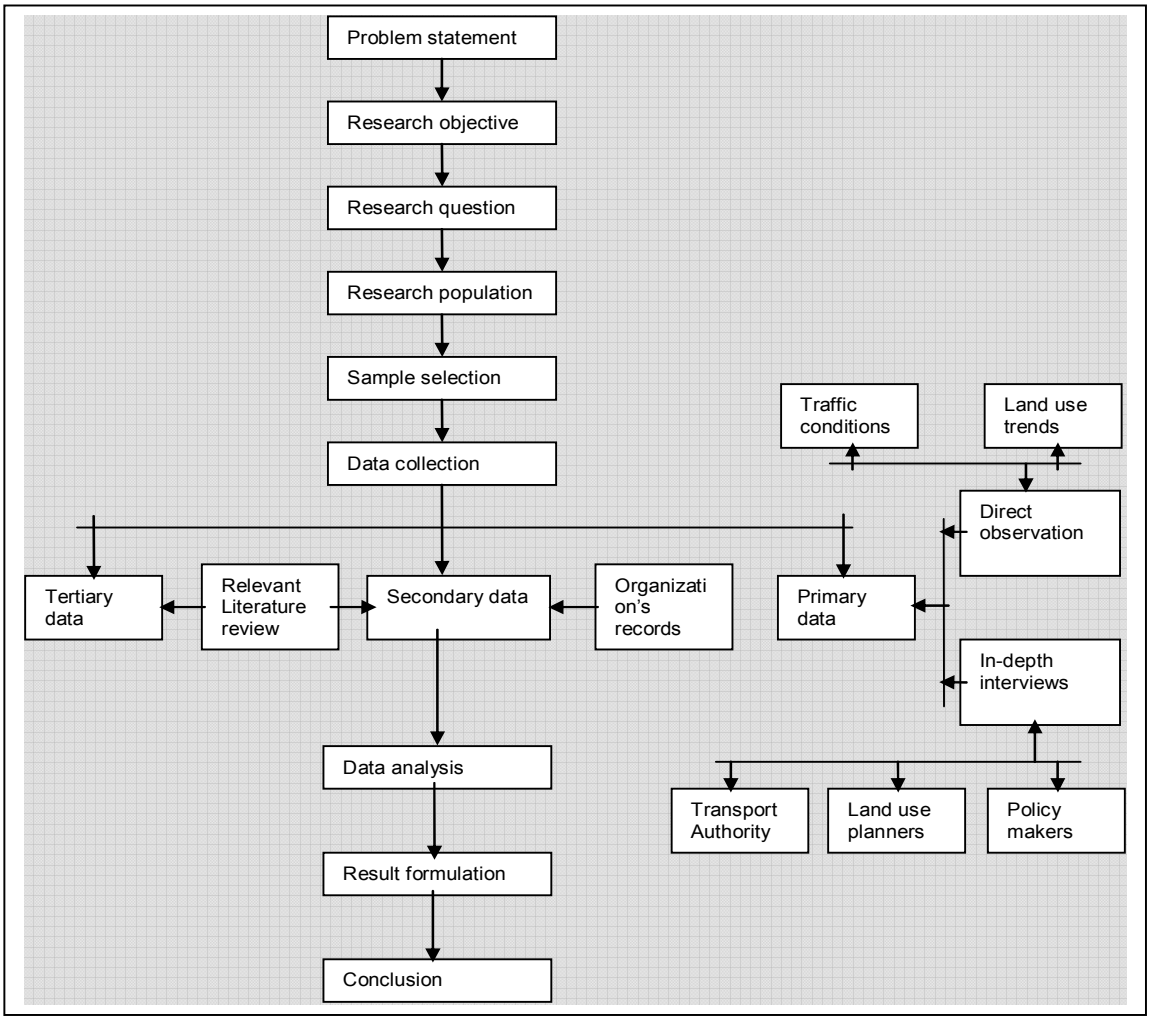


Figure 3-1: Research design

Chapter 4: Empirical study

4.1 Introduction

Ethiopia is a country of diverse nations and nationalities, which is among the poorest nations in the world with a low level income of GDP per capita of 130 USD (PPP 1000 USD) accompanied by a high level of population growth of 2.27% and low level of urbanization (Central Intelligence Agency, 2007). The population of Ethiopia as of July 2007 is estimated to have reached 77, 127,000 out of which only 16 percent live in urban area (Central statistics agency of Ethiopia, 2006). The capital, the economic centre and the largest city is Addis Ababa that takes 26% of the country's urban population.

Following the establishment of the Federal Democratic Republic of Ethiopia in 1995, multi-party based parliamentary system, and democratically elected governments at Federal and regional levels were formed by the new constitution. The country is divided into 9 regions and 2 special administrations and these regions and special administrations are further divided into lower administrative units of 66 Zones and the Zones in turn are sub divided into 556 Woredas[14]; there fore the constitution assumes a 4-tier structure: federal, regional, zonal and woreda. While The Federal Government of Ethiopia is responsible for national defence, foreign relations, and general policies of common interests and benefits, the Regional States are vested with legislative, executive and judicial powers for self-administration.

Region/Administration	*Population*		
	Rural	*Urban*	*Total*
Tigray	3,593,000	854,000	4,449,000
Affar	1,286,000	132,000	1,418,000
Amhara	17,325,000	2,299,000	19,624,000
Oromiya	23,613,000	3,691,000	27,304,000
Somali	3,676,000	768,000	4,444,000
Benishangul-Gumuz	576,000	64,000	640,000
Southern Nations /Nationalities and peoples	13,983,000	1,338,000	15,321,000
Gambela	204,000	49,000	253,000
Harari	76,000	127,000	203,000
Addis Ababa City Administration	-	3,059,000	3,059,000
Dire Dawa Administrative Council	104,000	308,000	412,000
Total	64,438,000	12,689,000	77,127,000

Table 4-1: Population of Ethiopia by Region
(Source: CSA, 2006)

The empirical analysis is conducted for four purposively selected sub-cities in Addis Ababa. Addis Ababa, the capital and the largest City of Ethiopia, is further sub-divided to 10 sub-cities which in turn are divided to 99 kebeles for administrative purposes, where power is devolved to this smallest tier of administration. It is witnessed that while the residential areas are being dynamically expanding at the sub-cities located at the fringes of the city, the market and business activities are still concentrated at some specific locations of sub-cities in the inner city. This primary city of Ethiopia is suffering from varied social, economic and environmental problems as most of the major African cities. Some of the problems can be mentioned as widening income

[14] The zonal and woreda figures may change from time to time as the result of continuous administrative reforms

disparity, rising unemployment, severe housing shortage, poorly developed physical and social infrastructure and the proliferation of slum and squatter settlements (UN-HABITAT, 2007).

4.2 History of Addis Ababa and its expansion

Addis Ababa was found in 1886 by Emperor Menelik II and his wife empress Taitu situated in the foot hills of Entoto Mountains and standing at 2,400 meters above sea level which makes it the third highest capital in the world. Wide spread building programmes were taken in the late 1980s and the city became the political, administrative, and religious hub of the country (Garretson, 2000). There has been a rapid growth of population in the city in the last four decades mainly because of natural urban population increase and in-migration from the rural areas (Melese, 2005).

Year	*Population*	*Annual growth rate (%)*
1910	65,000	-
1935	100,000	1.72
1952	317,925	6.80
1961	443,728	3.70
1970	750,530	5.84
1976	1,099,851	6.37
1984	1,423,111	3.22
1994	2,112,737	3.95
2000	2,495,000	2.77
2004	2,805,000	2.93

Table 4-2: Population growth of Addis Ababa
(Source: UN-HABITAT, 2007)

This rapid growth of population has put tremendous pressure on the urban spaces in the city. Studies show that large proportion of this growth appears to be in slums and squatter settlements in the city (UN-HABITAT, 2007). In response to this acute demand, efforts are being made by the city government to incorporate the peripheral areas of the city, which is resulting in hastening the sprawl of the built-up area of the city and a rapid physical expansion.

Period	*Area covered (hectares)*	*Total built up area (hectares)*	*Annual growth rate (%)*
1886-1936	1863.13	1863.13	-
1937-1975	4186.87	6050.0	3.1
1976-1985	4788.0	10,838.0	6.0
1986-1995	2925.3	13,763.3	2.4
1996-2000	909.4	14,672.7	1.6

Table 4-3: Physical growth of Addis Ababa City built-up area 1986-2000
(Source: Melese, 2005)

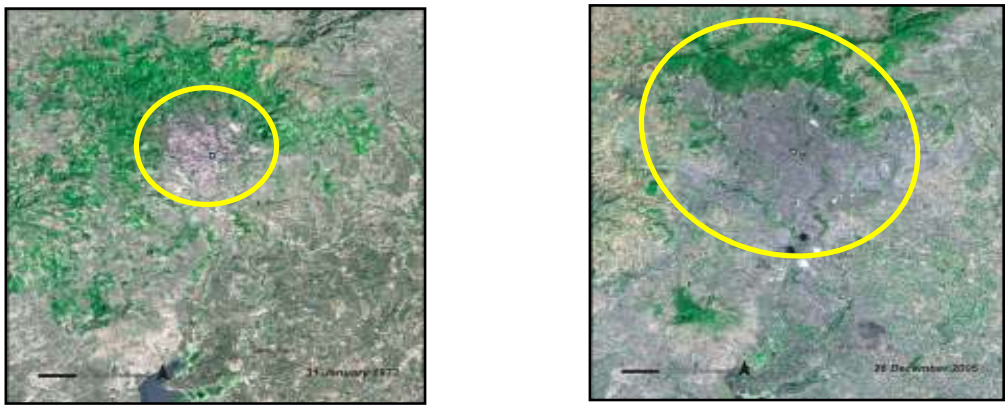


Figure 4-1: Expansion of the city in the last thirty years

From 1886 to 1936 the development trend of the city was characterized by fragmented settlements. According to Melese (2005), following Italian occupation in 1937, the process of physical development of Addis Ababa in the period from 1937 to 1975 was focused more on expanding the built-up area of the city by compact development and consolidation of the former fragmented settlements. From 1976 to 1985 was the period when the city's built-up area showed a tremendous increase of 4788 hectares that shoot up the cumulative total to 10,838 hectares. Simultaneously, horizontal expansion took place in all peripheral areas of the city, where both legal and illegal settlements were established. Out of the total 94,135 housing units built in the city between 1984 and 1994, 15.7% (14,794 housing units) were built by squatters (Melese, 2005). This way the physical expansion of the city went increasing and the cumulative reached 14,672.7 hectares in the period from 1996 to 2000. This expansion of the city was characterized by the development of scattered and fragmented settlements in the peripheral areas of the city, with both legal residents and informal settlements. In 2000, Addis Ababa had an estimated total of 60,000 housing units with informal settlements. This figure accounted for 20% of the total housing stock of the city and the total area occupied by squatter settlements was estimated at 13.6% of the total built-up area.

This trend of development also demonstrates a very compact and dense development along major corridors at the inner city, while scattered developments, excessive use and empty spaces dominate the peripheries as shown in ***table 4-4*** and ***figure 4-8***.

No.	Sub-city	No. of kebeles	Population	% of the total population	Area in hectares	% of total area	Density (persons per ha)
1	Arada	10	323,777	10.21	994.71	1.84	325.50
2	Addis ketema	9	348,063	10.97	764.35	1.42	455.37
3	Lideta	9	321,697	10.14	1,225.54	2.27	262.49
4	Kirkos	11	364,294	11.48	1,518.03	2.81	239.98
5	Bole	11	309,800	9.77	12,314.01	22.80	25.16
6	Yeka	11	337,575	10.64	8,546.43	15.83	39.50
7	Akaki-kality	8	188,808	5.95	12,797.36	23.70	14.75
8	Nifas Silk-Lafto	10	348,673	10.99	6,044.04	11.19	57.69
9	Kolfe Keranio	10	283,795	8.95	6,543.38	12.12	43.37
10	Gullele	10	346,023	10.91	3,252.14	6.02	106.40
	Total	99	3,172,505	100.00	53,999.99	100.00	58.75 (average)

Table 4-4: Population and density in Addis Ababa by Sub-city
(Source: UN-HABITAT, 2007)

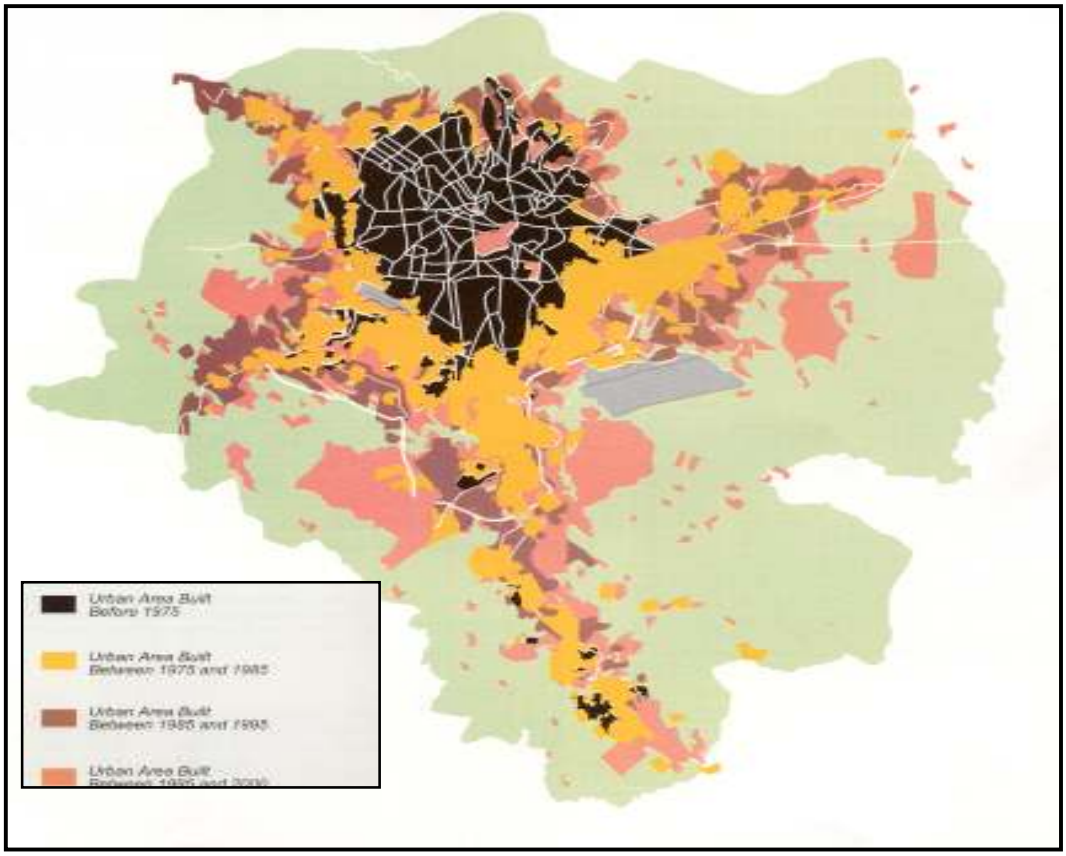


Figure 4-2: Expansion Trends of Addis Ababa
(Source: ORAAMP, 2002)

A study report shows that the expansion trend of the city has, more or less, followed the proposed shape by the 1986 master plan that led the development of the city for two decades. Considering the locations of residential development in the city, however the report also indicates that, this trend of development has destroyed the proposed green areas near rivers, hillsides and woodlands consuming them for residential and other urban functions (ORRAMP, 1999).

The study rated Yeka sub-city as one of the most endangered areas in the city referring that intensive cutting down and uprooting of trees has been going since 1986. This deforestation and encroachment has been going on the clearly delineated forest zone of the city. In addition to this, all the green strips along streams proposed by the 1986 master plan of the city are all consumed by built-up areas except the ones in deep gorges. More over, the green buffer zones proposed by the same master plan are now widely affected by formal as well as informal built up areas. This encroachment of urban green spaces in the city has also affected important agricultural land, parks and zoological gardens (ORRAMP, 1999).

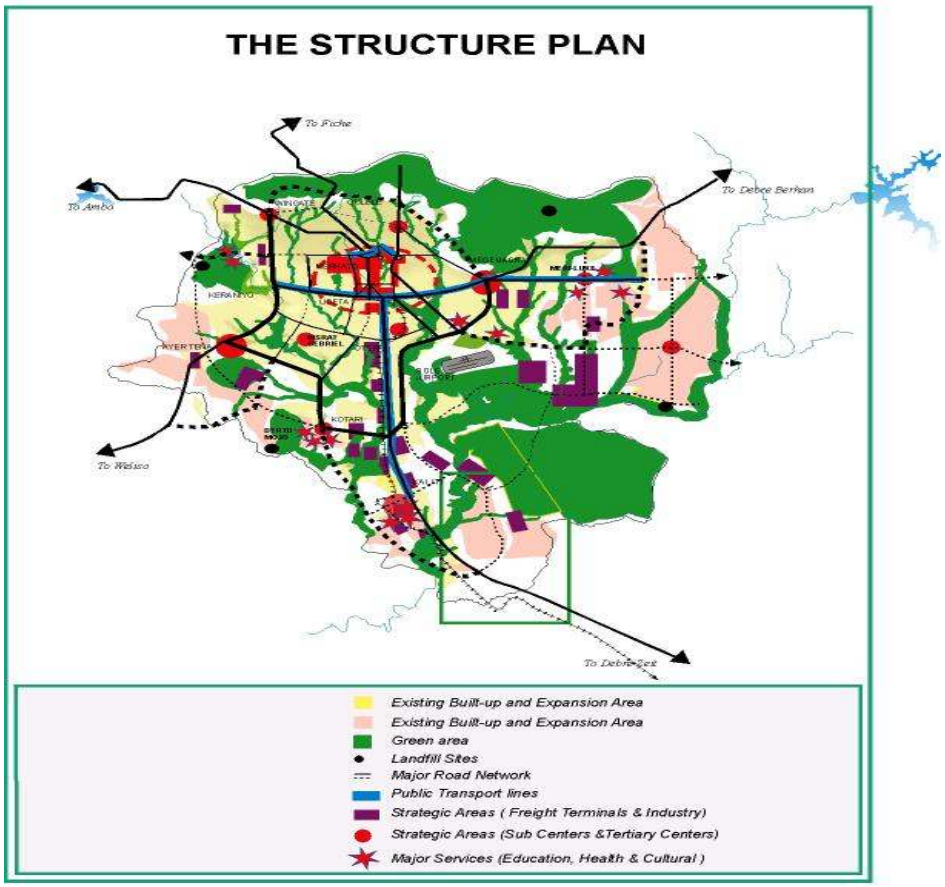


Figure 4-3: The structural plan of Addis Ababa
(Source: ORAAMP, 2002)

4.3 Addis Ababa: The metropolitan area

Even if the master plan focuses on development of high density residential settlements with in the inner city, the Addis Ababa City Administration has put effort to incorporate the peripheral areas and woredas from the Oromiya region in to the city's planning in response to the increasing demand for urban spaces as a result of the rapid growth in population. Thus, the metropolitan area that was defined based on physical as well as socio-economic criteria includes seven weredas of the Oromiya region. Since the metropolitan area is dominated by agricultural population, the land use pattern is dominated by cultivation and grazing, however, a high magnitude of urbanization is being observed along Ambo and Jimma roads. Nevertheless, major changes in land use has been observed since 1984 that demonstrate the decline in vegetation cover and cultivated land following the high magnitude of human settlement at the peripheries with in the Oromiya regional state since then.

The Addis Ababa metropolitan area is characterised by high number of residential as well as industrial developments. Investment share of the metropolitan area is as high as 53.4%, 13.17% and 6.8% of the total investment capital of the Oromiya regional state, Addis Ababa City and the country, respectively. Among the total registered investment capital of 1.93 billion Birr, the manufacturing industry takes 75% while the Agriculture takes a share of 18%, leaving the rest for the service sector.

However, this relation between the City Administration and the Oromiya Regional State that controls most of the metropolitan areas is characterised by policy difference and administrative conflicts. This has made the promotion of integrated regional planning between Addis Ababa and the hinterland difficult that resulted in haphazard urban development, inappropriate land use, inadequate infrastructure and social services, weak urban structure, weak rural urban linkage, high population and grazing pressure, and environmental degradation.

4.4 Currency used in the research

All monetary figures used in this empirical part of the research are in Ethiopian monetary system which is decimal based, the primary unit being the Ethiopian Birr. The birr is subdivided into 100 cents with five different coins of value 1, 5, 10, 25, and 50 cents. As of August 18th 2007, the rate of exchange of Euro to Ethiopian Birr was 1 to 12.23. This rate reflected the highest devaluation of the Birr in exchange to Euro.

4.5 Public transport systems in Addis Ababa

The city is served by two types of public transport services; Shared taxis that are known as mini buses and Public Buses.

Shared taxis [Minibuses]:

(Source: picture by the author)
Figure 4-4: The formal shared taxis on the move

Figure 4-5: Taxis allowed giving services in the city by the new regulation

One of the public transport services in the city is shared taxi service with a pleasant appearance of two colors, bottom up blue and white[15], Andrew heavens refers them as 'Blue Donkey Cabs' in his article 'My favorite place in Ethiopia, august 2005'. The minibus has 11 passenger seats[16] and two operators; the driver and the conductor. The Addis Ababa Transport Authority web site shows that there are 7500 minibuses all owned by private individuals that are not organized through any kind of enterprise but are self regulated. These start and finish at taxi-parks but have no fixed route and can stop any where on the route to pick and drop passengers giving priority to the former. The fares for taxi services range from 0.5 Ethiopian Birr to 2.2 Ethiopian Birr depending on the length of the trip, but 60% of the population can not afford this fare. (ORAAMP)

[15] Others colours are also allowed after the new regulation in 2007.
[16] Shared-taxis are allowed to take 12 passengers following the new regulation in 2007.

Public Buses:

(Source: Picture by Author)

Figure 4-6: Over crowded City Bus on the move;

Figure 4-7: Anbessa City bus in comparison with Minibus taxi

Anbessa city bus enterprise is a publicly owned federal enterprise subsidized by A.A.C.A. to meet the transport needs of the poor residing in Addis Ababa. The city has 550 buses fully functional at the moment deployed to 93 routes. The buses have nearly 30 seats each but carry about 100 passengers at once to meet the transport demands of the low income city dweller and provide services from 6:15 in the morning to 21:00 in the evening. Though they have scheduled running time which is not made public at all they are characterized by delay, crowding and overloading and low frequency hence unreliability and susceptibility for fare evasion. The fares for the buses range from 0.25 to 2.20 Ethiopian Birr depending on the route you are using which is 3 to 5 times cheaper than the taxis. Therefore, since most of the city resident is poor, the buses are the most exhaustively used mobility option next to walking which in Addis Ababa (Asfaw, 2000). However, 20% of the population is still too poor to afford this fare (ORAAMP).

4.6 Addis Ababa urban transport demand characteristics

Estimated daily trips (million)	4.9
Estimated modal split: % trips by public transport % trips by private car % trips by NMT (including walking)	 26 4 70
Share of public transport market: % trips by big bus % trips by minibus/shared taxi % trips by taxi (individual)	 27 72 1
Average journey distance (km) Walk big bus Minibus/shared taxi	 5 17 7

Table 4-5: Urban Transport demand characteristics
(Transport Research Laboratory, 2002)

4.7 Land use and transport policy documents in Addis Ababa

The main transport and land use related documents that are being implemented in the A.A.C.A and used in this study are presented in ***table 4-6*** below. The table gives description of the contents of the documents and their weak points in terms of the land use-transport interaction of a vibrant city.

Document	Description	Remark
A.A.C.G. Revised Charter Proclamation No. 361/2003	Objectives, Government Structure, Power and Responsibilities of the A.A.C.A.	
A.A.C.G. Executive and Municipal Organs Establishment Proclamation No. 2/2003 re-amendment Proclamation No. 20/2004	Establishment, Organization, Power and Duties of the Executive Organs within the A.A.C.A.	No clear demarcation of duties and responsibilities
A.A.C.G. Master Plan Preparation, Issuance and Implementation Proclamation No. 17/2004	Content, Preparation and Determination of Plans at all levels	Information is limited to Public Participation
A.A.C.G. Structural Plan Approval and Implementation Regulation No. 16/2004	Approval and Implementation of the Structural Plan	Information on land use, road network, major social services, strategic investment location, environmental protection
Transport Proclamation No. 468/2005	Establishment, Objective, Power and Duties of the Federal Transport Authority	No land use elements
The A.A.C.G. Regulations issued to provide Land for Real Estate regulation No. 20/2005	Land Prices, Issuance of land, Objectives, Requirements for Real Estate developers	No Transport element
A.A.C.G. Building Permit Regulations No. 17/2004	Procedures for the issuance of construction permit and general requirement of design and plan	No transport element
A.A.C.G. Regulation to prevent illegal expansion of land possession and construction on illegal possession Regulation No. 14/2004	Preventive and Corrective measure on illegal settlement	Opaque in terms of identification and implementation Regulation

Table 4-6: Land use and Transport documents in Addis Ababa

4.6 Data Analysis

The empirical part of this study answers the first two research sub-questions.

1. Organization of the land use and transport policies
    a. Who leads the process of policy formulation
    b. Who is involved in the process of policy formulation
    c. What elements are given emphasis in the policies
2. The impact of the current land use trend on transport in Addis Ababa
    a. Who allocates land for development
    b. Who decide the land use of a plot
    c. What is happening to the urban transport system as a result

These questions will be answered in two different sections. The first section looks at these questions from the perspective of policies, plans, proclamations and regulations. Therefore, the focus of this first stage will be limited to the consequences of the development process as proposed by the policy. On the other hand, the second stage of the data analysis will look at the practical development of Addis Ababa and its impact on public transport which will not be limited to the formal development process of the city. And the third sub question will be part of the conclusion and recommendation of the study.

4.6.1 Section one: Land use and Transport policies

The Addis Ababa City Charter Proclamation No. 361/2003 declares that the City Administration have the power to issue and implement policies concerning the development of the city. This same charter also gives the City Council the power on issuance of the city master plan and to constitute executive organs of the city. Following this declaration, the land Management Authority, the Infrastructure and construction Works Authority, the Addis Ababa Road Authority and the Addis Ababa Transport Authority were re-established with revised duties and responsibilities by Proclamation No 2/2003. These organs are given powers and responsibilities to develop standards and directives, implement and follow up the same, conduct studies for policy inputs, and facilitate land development and transport provision according to the Addis Ababa City Charter. However, part of this Proclamation that deals with the Addis Ababa Transport Authority is repealed by Proclamation No. 468/2005. This new regulation made the Addis Ababa Transport Authority a branch office of the Federal Transport Authority that is accountable to a Federal Ministry, hence; it is not anymore accountable to the A.A.C.A. Council that emphasize the necessity of facilitating vertical integration of policies.

By the power given by the Addis Ababa City Charter, the A.A.C.A. has approved the City Plan that has four levels: The City development frame work, Structural plans, the Long and medium term City development plan, and Local development plan. The City Development Framework that has the vision, objective and general implementation strategies of the city development plans, is prepared by the decision of the City Government, by coordination of the City manager, and in collaboration with other offices as authority is given by Proclamation No. 361/2003. On the other hand, the structural plan puts and/or indicates general directions, laying out of infrastructure, and land use and organization to enable direct the future development of the city. This way, the structural plan is expected to have clear indications on the mixed housing services, centers and sub-centers, local plan, essential social and municipal services, strategic investment lands, and road and transport services.

While the empirical study, it was understood that at the preparation stage of the master plan two teams were formulated to lead the process. These teams were the technical advisory committee that was composed of sector agency representatives who were department heads of relevant sectors including the A.A. transport Authority, and a steering committee that includes the President of the Oromiya regional State, the A.A. City Mayor and other high position managers such as, Works and Urban Development Authority, and the Addis Ababa Economic and Development Authority.

But, according to the respondents, the involvement of the then A.A. Transport Authority was limited to giving suggestions on some issues in the way of the development of other elements of the master plan. This shows that the A.A. Transport Authority didn't have the power to influence the decisions on the land use allocation and the overall master plan preparation by forecasting the travel demand that will be generated as a result. In fact, one of the interviewee from the A.A. Master Plan Office revealed that they never had any scheduled meetings with the Transport Authority but only few ad-hoc meetings as the need arise from either side. This was confirmed from the side of the Federal transport Authority interviewee who said that the contact should be with the A.A. Roads Authority but not with the Transport Authority. The idea for defence was that, if every new development is provided with road infrastructure, the transport services will follow the development. But this doesn't work well for a city, which is a national economic motor, crawling with incapacitated transport services and road infrastructure covering only 6.1 percent of the built-up areas out of which asphalt accounts for only 36.25 percent of the total road length. This is a clear indication of authorities whose duties and responsibilities are not clearly stated and/or understood.

This could be quite amazing since the objectives of the Transport Authority, as stated in Transport Proclamation No. 468/2005, include promoting an efficient, adequate, economical and equitable transport system, ensuring that public transport services are safe and comfortable, and promoting the development of all aspects of transport. In fact, the city doesn't have any white paper entitled 'transport policy' so far but is run by proclamations, regulation and reaction to immediate concerns as curative measures. The interview with the authorities show that most of the regulations on public transport are set in a way to extinguish the fire with out deep understanding of the causes of problems and finding a reasonable solution which usually fire-back. A very recent proof for that is the regulation that changed the number of passengers allowed to board on shared taxis to relief the pressure and the other that allowed mini buses without blue and white colors to provide taxi services in the city. These rules are not put in black and white but are working 'well' by what the authorities call 'understanding'. These decisions did not involve other stake holders with in the A.A.C.A. or other transport experts, but are speculative and desperate decisions by the authorities. This fails the notion of good governance which is an inclusive process that encourages involvement of all relevant stakeholders in decision making from the outset hence not sustainable.

On the contrary, the Addis Ababa Master plan preparation was better in encouraging participation from all related stakeholders within the country and abroad. Proclamation No.17/2004 states the City Resident's participation in the preparation of the structural plan; however, the real picture shows it was, in a way, even more participative. A number of workshops, public meetings, and discussion and consultations forums were held with all responsible stakeholders throughout the process. The interviewee stated, that among these

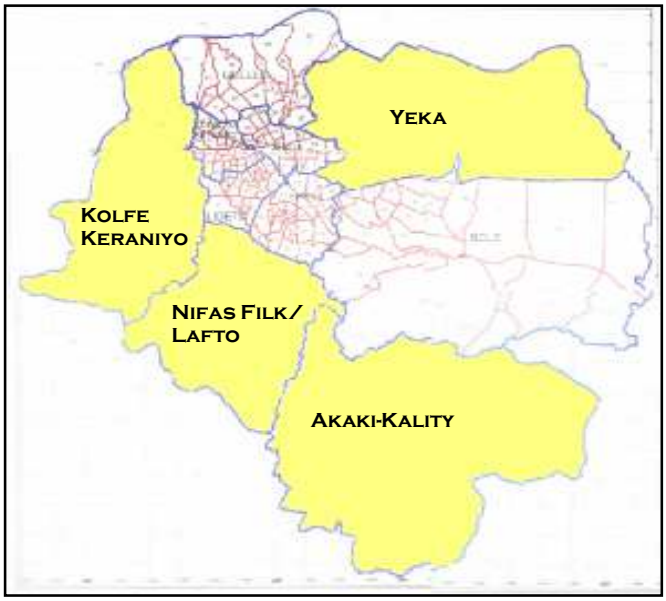
workshops and meetings; Vision of Addis Ababa workshop, Public discussion forum and exhibition, Design Addis workshop, and Addis 21 international conference could be mentioned as the most successful. This, according to the respondents, was the most important part of land development as land is very sensitive issue to all parts of the society including the A.A.C.A. Authorities, Federal authorities, Oromiya Regional Government, the civil society, NGOs, Embassies, CBOs, Professional associations, and Religious organizations, that have their own interests (See ***Appendix 2*** for the list of all stakeholders involved in the master plan preparation process). This was mentioned as the strongest point of the A.A. Master Plan by most of the respondents since it will create belongingness and sense of ownership in the society. However, this has resulted in some complications as well. One of the problems mentioned by the respondents is the very long process of design and approval as efforts were being made to involve as many stake holders as possible through forums, meetings and mass media that required time. Thus, the sub-city administrations were giving land to investors before the completion of the structural and local development plans that causes worries among the authorities as this might hinder mobility in the near future.

The revision of the Addis Ababa master plan was initiated by the large population growth, rapid economic development of the city and income growth which couldn't be served by the 1986 plans. But, the interview with the authorities involved in master plan preparation discloses that the transport issues were addressed by the planning exercise of senior urban planners but not by transport experts. Most of the respondents admit that the absence of any transport expert to analyze and predict the impact of the proposed land use plans on urban public transport in the future as one of the main weaknesses of the new A.A. master plan. However, expansion of road networks for efficient streets and issues of providing affordable transport, enhanced access and mobility are among the ten elements given emphasis in the master plan, at least on paper. On the contrary, it was learnt that there is not even a single land use elements on the 2005 transport proclamation. This shows that the Transport Authority failed to consider that spatial distribution of different human activities does lead to need for travel and transport of goods as stated by COST (1996), hence, will have impact on the mobility if not planned ahead.

The interview also showed that the Land Development and Administration Authority doesn't consider the impacts of the city land use allocation on transport demand and mode choice in the city, and definitely not the Infrastructure Development and Civil Works Authority. The primary objective of the Infrastructure Development and Civil Works Authority, as stated in proclamation No, 2/2003, include issuing construction and consultation licenses for all kinds of construction projects, supervising the construction process, and assuring coordination and cooperation among other amenity and infrastructure providers. However, while issuing the license the authority assumes that all the required amenities and infrastructure availabilities including future transport requirements are already checked by the Land Development and Administration Authority prior to allocating the land for the assigned purpose. Whereas the truth is that, while administrations require developers to provide hospitals, shops, infrastructure for public services, etc, nothing is said at all about transport provision or creating employment opportunities which obviously demonstrate the gap in horizontal coordination of authorities. This could apparently be the result of lack of clear institutional settings and interdepartmental coordination with in the A.A.C.A. Sustainable development of a city requires authorities to be concerned about how people and goods can efficiently get to the new premises while allowing development of an area.

Apart from this, the interaction between the A.A.C.A. and the Oromiya Regional State was mentioned as one of the major constraints of sustainable development in Addis Ababa. Regarding the relation of the A.A.C.A. with the Oromiya Regional State, Proclamation No. 361/2003 states that the City Government shall have such relationship with the Oromiya Region as rests on fruitful cooperation and, of course, the special interests of the Oromiya region shall be respected as provided by the Constitution. This has given the city administration a very difficult task in controlling the expansion of the city as large part of the city metropolitan area is administered by the Government of the Oromiya Regional State (G.O.R.S). As pointed out in the introduction, the A.A. metropolitan area is the economic motor of the whole of the Oromiya Region taking a share of more than half of the region's investment capital. As a result, land use conflicts and undesirable developments have been witnessed at the expansion areas of the city because of lack of appropriate regional policies, inter-organizational and planning coordination, and proper institutional settings. In fact, the interviewee attributed that one of the reasons that are responsible for hastening the squatter settlements and sprawl development at the peripheries of the city is the huge difference in land prices between the two regions as the land prices of the A.A.C.A. reaches about 100 times higher than the price given by the Oromiya Regional State in adjacent neighborhoods.

This failure to integrate development policies between the two regions is demonstrated by the high magnitude of investment and urban growth by the Oromiya Regional State in the metropolitan areas of A.A. which, according to the respondents, is done with out prior investigation of its concordance with the city system. This aggravates the transport problems of Addis Ababa that was already limping because of the internal affaires of the city since the G.O.R.S play a role in provoking the demand for transport while the supply side is left for the A.A.C.A as a result of dearth of inter-territorial integration among regions. A study on 150 cities in developing countries shows that for every additional 1000 people there is an increase of 350 to 400 public transport trips, similarly, every square km growth of city generates 500 public transport trips per day (Transport Research Laboratory, 2002). The impact is obvious while both phenomena are taking place simultaneously in a city characterized by poor infrastructure and incapacitated transport system.



(Source: A.A.C.A)
Figure 4-8: The Four sub-cities under the study

As supported by the findings of the interview, even if large scale of the development process in Addis Ababa is affected by factors not controlled by the land use policy of the city like informality, market forces, political issues and lack of comprehensive integrated regional policies, the formal settlements and development directives of the Addis Ababa Master plan also show segregation in land allocation that hinders mobility in the city since land-use planning done without sustainability in sight leads to sprawl .

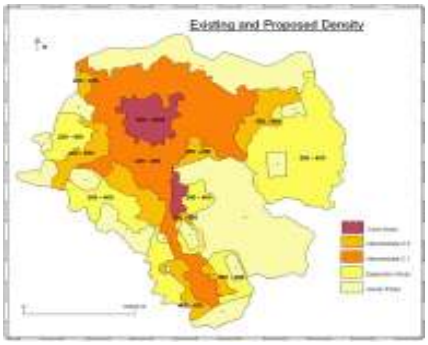


Figure 4-9: Existing and Proposed density in A.A. (Source: ORAAMP, 1999)

Figure 4-10: Current spatial structure of Addis Ababa (Source: Google Earth)

The south of Addis Ababa, specifically Saris and Kality areas, are meant to be dominated by industrial and commercial activities. However, there is still huge cluster of residential housing developed and being developed in the vicinity, most of which is classified as informal settlement. It has been observed that, there is an increasing demand for public transport in these areas. Moreover, the area is usually characterized by high level of congestion and pollution as it is the main gate for all port activities and most economic activities of the country. Observation done by the researcher in these areas show that less than 20% of the cars in the main road going from or coming to this areas are transit while 70 % of other cars carry only one passenger at pick hours. This has increased the pressure on public transport as shown in ***figure 4-11*** and ***figure 4-12*** while at the same time worsening the congestion and the pollution level of the area.

Another finding of the observation is that, the level of congestion at morning pick hours from 6:30 to 9:00 a.m. is sever on the road going to the city center while the opposite is observed at evening pick hours between 3:00 and 7:00 p.m. This was supported by the respondents who said most people residing in the south exit of the city work around the inner city or even on the other end of the city including the metropolitan areas, which is demonstrated by the high passenger crowed boarding on the long distance Buses shown in ***figure 4-11***.

A survey conducted at different bus stops shows that 60% of the bus riders travel more than 5 km to work out of which 11% travel more than 15km (Transport Research Laboratory, 2002). Besides, Anbessa city bus enterprises report shows that the number of passengers has increased from 10.5 million in 1988/89 to 18.9 million[17] in 2000/01 and currently one bus is available for 6193 people, which is even worth than Africa's population to bus ratio of 1:3333 as pointed out by Jacobs et al. (1986). Currently the average daily trip by bus reaches 119 persons and passenger loads of 150 persons per bus have also been counted at peak hours, which is in excess

[17] See figure 24 for detail

of the maximum registered capacity of 100 passengers per bus(IBIS Transport Consultants Limited, 2005). This increase shows the share of trips by public buses that take only 27% of the motorized trips in the city where walking takes 70% of the total mobility. The poor are facing enigmatic pressure since they rely on the bus to get to the market, job, health centers and other socio-economic activities.

Figure 4-11: Over crowded Anbessa City Bus, Saris
(Source: Picture by Author)

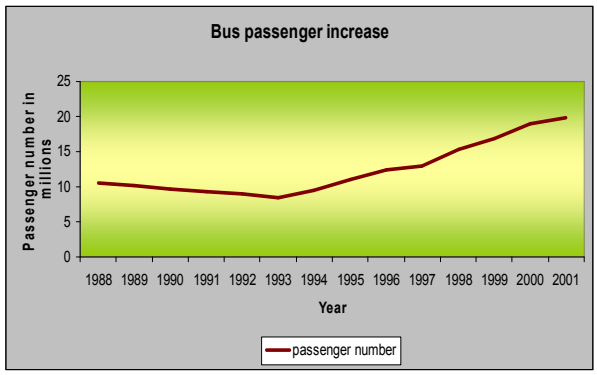


Figure 4-12: Bus passenger number increase
(Source: computed from Transport Research Laboratory, 2002)

Moreover, the respondents held the commercial activities at the edge of the main road accountable for aggravating the congestion and pollution problems of Saris and the surrounding by encroaching the path way and blocking mobility of goods, people and vehicles; especially at morning and evening pick hours. The problems in these areas, as illustrated in ***figure 4-13*** and ***figure 4-14***, can be mentioned as lack of off-street parking and/or pedestrian walk way, inability to enforce land use policies, and inappropriate location of bus and taxi terminals. Studies (Melese, 2005, Transport Research Laboratory, 2002) support this observation by giving an exact length of side-walk ways to be only 252 km which means that out of the nearly 800 km of asphalted road, two-third does not have Pedestrian Street, at all. Therefore, this shows that the transport planning and road infrastructure provision gave more attention to the comfort of the motorized transport and hardly looked to the pedestrian and their safety which is a blunder in a city where walking surpasses the urban trips.

Moreover, shared-taxis are demand-responsive and prefer only few destinations in that area because people are willing to pay higher transport fares unfairly set by the service providers as they value the trip to the inner city for different activities most. It is this 'consumer surplus' that serves as pull factor for these poorly regulated shared taxi service providers to prefer these specific areas over the others. It is difficult to control this transgression since the public transport providers operate individually as allowed by part three of Transport Proclamation No. 468/2005 to provide service with or without becoming a member of any taxi association. Moreover, the flat fare for the city buses depend on the length of the route and not the individual's trip hence the enterprise's interest is to provide service on the longer routes than the shorter since the fare collection is higher on the former, according to the respondents.

Figure 4-13: Mobility chaos, Saris
(Source: picture by Author)

Figure 4-14: informal business activities on the streets

Even if this has become a common phenomena in all parts of the city, the condition of Yeka sub-city, with special focus on CMC and Ayat areas, is getting worse every time because of the increasing low-density residential development in the area as proposed by the structural plan. This east exit of Addis Ababa is characterized by a high number of residential developments as shown in ***Figure 4-15*** and still large area has been earmarked by the structural plan as expansion area of residential settlement. The problem in these areas is different from that of the south exit since most of the residents in these areas can afford more than one car per family. However, the Transport Authority interviewee pointed out that the large population that own private cars, the small population depending on shared taxis, and even the smaller population that can only afford buses, suffer from transport problems, though in different ways. The researcher's observation also shows that the small road width together with the poor road quality and inadequate road network has made traffic congestion at pick hours a common character of the area.

But the problem for the transit dependent society is even worth as both taxis and buses do not come frequently because of the low density development and high car ownership of the area. In general, only 6% of the Anbessa bus routes have a frequency of 6 or more per hour which is the standard frequency for urban bus services, 29% have 3 or 4, 35% of the routes have 2 buses an hour and 20% of the routes have frequency of only 1 bus every hour (IBIS Transport Consultants Limited, 2005).

As mentioned by Newman and Keneworthy (2007) cities with denser land use patterns support more transit and other non-motorized transport options while in low density cities there is little alternative for transport. As demonstrated in ***table 4-4*** and ***figure 4-8,*** the four sub-cities under study cover 63% of the total land area of the city while accommodating only 37% of the city's population. Therefore, the average density of these areas is only 38.83 persons per hectare that is even less than the city's average density of 58.75 people per hectare hence will make conventional infrastructure and services provision inefficient. Whereas, this density is similar to Curitiba's density of 38.5 people per hectare, a city that has successfully implemented an integrated land use and transport policies and achieved a large share of public transport trips despite its significantly high GDP per capita relative to most developing countries.

Figure 4-15: Residential developments in Yeka sub-city
(Source: Picture by Author, UN-HABITAT 2007)

However, the respondents attributed the easy access to large plots, clean and green environment, the extensive infrastructure construction, the relatively smaller distance to the inner city and the growing investment attract more residential development in this area. This can be explained by the economic concept of 'option value'. It is that most people value having possibility to access different services and amenities, even if in the real life they don't usually use them. A simple example is that people like to live in areas where they have access to a park whereas in reality they don't use it (Wee, 2000).

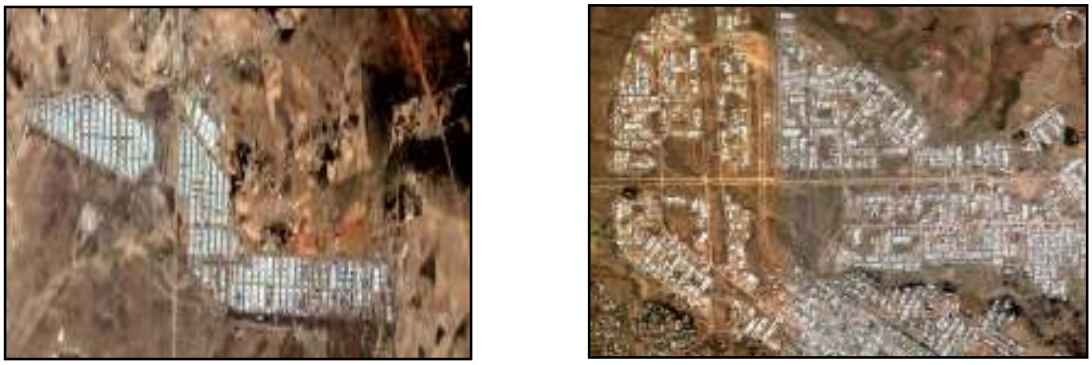


Figure 4-16: Residential cluster; Yeka sub-city (left) and Nifassilk-Lafto sub-city (right)
(Source: Google Earth)

Failure to consider the land use impact on transport has also been demonstrated by the transport problems aggravated by the construction of the ring road in Kolfe-Keraniyo sub-city. As stated by two of the respondents, as the result of inappropriate planning and faulty design, people living in a huge cluster of residential settlements in Betel area, west of A.A., are hold back from easy access to public transport. Besides it was observed that as a result of the problem, people are either asked to pay a significantly higher fare than they used to pay or forced to switch three taxis to get to the inner city. The low-income households, that take the larger number of the city resident, are in greater difficulty since the transport costs consume relatively large proportion of their household income that reaches up to 37 percent, according to a senior researcher.

This is the consequence of the high way built within the city and goes between neighborhoods that closed their only access road to public transport adding to the utter miseries caused by poor transport network of the city and made them vulnerable to traffic accidents while informally crossing the highway, as shown in ***figure 4-17***. Besides, people have to live with the increasing level of air and noise pollution from vehicles. One of the authorities added that if the land use trends of the area were taken into consideration while constructing the high way, it would have been possible to build an efficient transit system that creates vibrant, livable community while at the same time saving time and energy, and improving the environment.

Figure 4-17: Accessibility problem occurred as a result of the Ring road construction

This is not the only land use-transport related problem of this area. According to the respondents, it is common to come across people that fence part of the backstreet and claim as their property. The explanation could be that most people settle in this area trading accessibility to different opportunities and public transport system for large plots as they value living in spacious houses most. 61.7% of the houses in kolfe-keranyo sub-city have a total area of more than 175 square meters which is the maximum allowable plot under normal circumstance (Meles, 2005). Besides, the failure of the land use and the transport authorities to enforce laws and regulation at such conditions gave the chance for these people to abuse the law. This is what Wee (2000) mentioned as 'peoples valuation'; i.e. people living in this area value spacious plots more than access to amenities.

The complications of Mekanisa area, NifasSilk-lafto Sub-city, are a bit different from what have been said so far. The main problem is that only few buses are assigned to provide service for a large area over a long service route. As a result, most taxis and buses arrive at major stops midway on the route over crowded that they can't board any more passengers. It was observed that taxis in this area usually board 14 to 18 passengers, while by law they are allowed to provide service for only 12 passengers at once. Looking at the huge residential development as proposed by the master plan, the respondents anonymously agree that it is very necessary to assign buses that will begin at few major stops on the route at least at peak hours. Moreover, mobility could be improved by providing infrastructure for non-motorized transport to relief the public transport that is already stretched to its limits.

Figure 4-18: Long cue of taxis waiting at route start
(Source: picture by Author)

Figure 4-19: Condominium housing development

Table 4-7 below shows the distribution of the condominium houses in Addis Ababa that are hoped to relief the housing problem of the city as part of the 2004/2005 A.A.C.A. urban renewal program. The distribution of the larger proportion of the housing units, i.e. over 58%, in the four sub-cities under the study can be seen as an opportunity or a threat. The increase in density is an opportunity as it will reduce the cost of infrastructure provision by economies of scale, however, will be a threat if not provided with an equivalent transport provision. The table shows only part of the 45,000 housing units under the program for 2004/2005 out of the 200,000 housing units to be constructed in the five year plan.

Sub-city	No. of sites	No. of Housing Units	% of the total units
Arada	19	2,253	7.18
Addis ketema	9	1,550	4.94
Lideta	9	1,676	5.34
Kirkos	14	1,965	6.26
Gullele	7	1,464	4.66
Bole	9	4,234	13.48
Yeka	12	3,050	***9.71***
Kolfe Keranio	10	8,619	***27.45***
Nifas Silk-Lafto	10	5,286	***16.83***
Akaki-kality	5	1,302	***4.15***
Total	103	31,399	100.00

Table 4-7: Distribution of condominium houses by sub-city
(Source: UN-HABITAT, 2007)

The structural plan of the city also shows that, large proportion of the amenities including the main central market, main business, commercial areas and centers, public transport lines, general hospitals, and fire brigade stations are concentrated in the inner city. Besides, because of the poor transport network in Addis Ababa, anybody who wants to cross from the south to the east end of the city by public transport has to get to the inner city first. This is shown by the large proportion of the routes operated in to the three main terminals in the inner city (Addis Ketema, Legehar and Menelik Square) that take 70% of the operating routes, i.e. 62 of 89 (IBIS Transport Consultants Limited, 2005). As a result, trips are generated to the city center from the fringes of the city where most residential developments are sprawled. This trend of development is unfavourable to the provision of efficient public transport and other sustainable transport modes but rather urban sprawl causes high level of private car use (Carplus, 2004). In comparison, a more compact and mixed land use patterns bring together activities that are complementary to each other and encourage walking (that accounts for the larger share of urban mobility in the city) and cycling, while allowing affordable and efficient transit provision.

Summery

The Addis Ababa Master Plan shows spatial segregation of different activities with in the city boundary. It is indicated that most of the fringe areas of the city are earmarked as expansion areas mostly for residential development. Besides, even if there are few transport elements given emphasis in the new master plan of the city, the general view shows a very poor level of integration and coordination among authorities as evidenced by the consequences of the land use as well as transport decisions made by the authorities with out consulting each other, from time to time, that resulted in mobility chaos. This could be the result of lack of clear institutional arrangement, specially related to fiscal matters and responsibilities, with in the administration. Furthermore, the Federal Transport Authority doesn't recognize land use effects on transport as proved by the policy that gives almost no attention to land use elements that have impact on transport services now and in the future. Thus, the crucial role of cheap and efficient public transport in poverty alleviation purging the disadvantages of the urban poor living at the fringes couldn't be realized. To make matters worth, the land use-transport interaction in the city is made even complex as the result of the involvement of the Oromiya Region and the Federal Authorities in land use allocation and infrastructure provision, respectively.

4.6.2 Section Two: The 'real world' situation

The actual situation in the city is even worth than what is expected from poor planning and faulty designs of plans and policies. In general, it can be said that the land use allocation in the city is beyond the control of policies. Inability to control illegal and/or informal activities made traffic congestion, pollution, and accidents beyond one can ever expect looking only at the porous policies. The Federal Transport Authority statistics validates this sentence by putting Ethiopia at the top of all countries with highest traffic accidents, Addis Ababa taking 60% of the share (Asfaw, 2000). UN-HABITAT (2007) study asserted that traffic accidents involving death and major injuries rose from 3.6 percent per annum in 1998 to 6.3 percent in 2003 being among the highest in relation to the number of vehicle. As a result, the economic advantage of the city from being the seat of international organizations including AU and ECA is under jeopardy following the debates and complains of the organizations' members.

Moreover, informality in housing construction, business activities and service provision is being a common phenomenon of Addis Ababa, as many of the developing countries. These increasing informalities in all aspects of development have come to be the major constraint in providing safe, efficient and equitable transport services in the city. If informal construction would have been 'unplanned', as used in most literatures, nearly 80% of the total housing units built between 1984 and 1994 would be informal (ORAAMP, 1999). UN-HABITAT (2007) study shows that the A.A.C.A. issues not more than 500 residential building permits, while the actual building in the city exceeds 4000 residential housing units annually. But in this research, 'informal settlement' is referred as a construction taken place on a publicly owned land with out the authorization of the A.A.C.A. However, even with this definition, the housing units provided by the formal sector do not exceed 30% of the total housing unit in that period the rest being either semi-formal or informal, according to ORAAMP (1999). Currently, among the 540000 households living in the city, it is estimated that 41% of them do not have housing units at all but live in shacks or on the streets (ORAAMP, 1999).

As pointed out by the interviewee, the root causes of informality in Addis Ababa include housing shortage, low affordability of formal housing, inefficiency of public services, absence of clearly demarcated urban boundary, discouraging bureaucracy, custom of land transaction by speculator as a way of profit making, and weakness of authorities to enforce laws. A study on kolfe-keraniyo sub-city shows that, while 60.4% of the squatter settlers had accessed land directly from neighboring peasants, 33 % have bought it from land speculators (Melese, 2005). Meles (2005) argues that, though informality in a way responds to the acute housing demand, it also has negative impacts like hazardous settlements, inefficient utilization of land and public infrastructure, difficulty of infrastructure provision, and environmental problems in addition to poor economic performance. While the interview, it was also said that the informal settlement of houses in different places of the city and claim for infrastructure services has made vertical and horizontal coordination of land use and transport planning between sector agencies arduous given the poor institutional arrangement and capacity.

This alarmingly growing informality in all activities in the city is also mentioned by one of the interviewee as a major treat to the future development of the city. He said, the situation is getting sever in spaces deliberately left open for public purposes, green areas and environmental value by the master plan between the newly developed areas at the periphery and the inner city. The informal activities in the city have gone far to a level of encroaching waste disposal sites, river

gorges, green strips, important agricultural lands, and backstreets. The respondent reassures that this trend of development is not only wasteful but also has adverse effects on the economic, social and ecological pillars of development. Currently, a study by ORAAMP (1999) shows that larger number of residential housing units in Addis Ababa is produced by the informal sector. The authorities admit that the appropriate explanation of the driving force behind this could be a swift market response to the ever growing demand for cheap housing and rental accommodations. However, this has resulted in a mismatch between the city plan and the actual situation, hence made service delivery a morass. Nevertheless, this is not an easy matter to halt overnight in a city where 79% of the population is categorized as the poorest of the poor and 90% in general is considered as very poor (ORAAMP, 1999). Moreover, unemployment has shown a sharp increase in the city, the number rose from 10.5 in 1984 to 34.7 in 1994 and currently reached 42% (UNCHS, 2000).

Another form of informality observed in Addis Ababa at large numbers is changing the land use of an area by alteration or extension of the formal housing without the knowledge of the planning authority. The respondents agreed that dynamic land use changes are observed in different parts of Addis Ababa depending on the degree of accessibility of an area, access to utilities and municipality services, and its compatibility to the present use. Moreover, the replies made clear that, although this is a healthy process that shows the dynamicity of a city, it is not possible at all to tolerate unplanned changes this far since it results in a quagmire in mobility, and an immense pressure on public infrastructure and the environment. This process changes the travel behavior of people in that area as explained by the land use and transport interaction model of Meyer and Miller (1984). In these cases, measures on land use and transport policy organization will not have considerable impact since most of the urban form in being developed out of the control of the master plan.

What makes this worth is that, most of the land use changes in the city occur along major streets and on residential plots. These changes, though some times show positive results, usually are inefficient as they are not planned. According to the responses, the problems that are associated with unplanned land use changes can be mentioned as misuse of public spaces reserved for health, education and civic centers for individual purposes, inhabitable, unsafe and inconvenient built environment (examples are sound, water, soil and air pollution), and land use imbalance.

Among all, land use imbalance is observed at large numbers in all of the four areas under this research. While changing the function of a unit without considering alternatives creates inconvenience, increased cost of transportation, longer trip and, hence, increased travel demands (Mayer and Miller, 1984).

Figure 4-20 and ***figure 4-21*** show a road side carpentry shop blocking the Pedestrian Street and a number of street vendors blocking mobility of people, respectively, which is a common epidemic in nearly all locations of the city that plays a major role in aggravating the congestion, pollution and traffic accidents, and result in long commuting time and journey delays.

Figure 4-20: Road side shop blocking the walk way

Figure 4-21: informal business blocking mobility

(Source: Picture by Author)

The interviewee unanimously agreed that mobility lies on top of the major problems of the areas under study that will get even worth in the future. This is so because most of the developments are located very far from the inner city where most of the activities are located (see ***table 4-8*** below for distance of built up areas from the inner city), and widely dispersed that the Government is short handed to provide infrastructure to meet the travel demands. This is shown by the high level of congestion and pollution that has resulted from the insufficient road size and road networks of all the areas under study. Another fact to bear in mind is that 35 percent of the residential settlements in Addis Ababa are not accessible by car. In addition, it is indicated that the older residential settlements in the city are better served with road infrastructure than the newly developed areas in the outskirts (UN-HABITAT, 2007). This, according to the respondents, is an earnest matter that solicits resolute action to sustain the development of a city where work requires a substantial journey.

According to a study conducted by ORAAMP, the ends of the built up areas along the city exit have reached at the boundary of the city or even gone beyond it. The distance between these points and Legehar (the inner city) is shown in ***table 4-8***, below:

No.	*Area Name*	*Distance from Legehar*
1	Akaki	19km
2	Lege Tafo	15km
3	Keranyo	10.5km
4	Intoto	9km
5	Lafto	10km
6	Bole Kotebe	15km
7	Asko	9.5km
8	Wolete Suq [Jimma road]	10km
	Average distance	***12.25km***

Table 4-8: The distance between the built-up areas and Legehar

(Source: ORRAMP, 1999)

Table 4-9 shows the current share of residential housing construction in the overall land use structure of the city. This built up areas mentioned in the table include the metropolitan areas of the city.

No.	*Land Use*	*Area Covered*
1	Total Area	540.1 km2
2	Built up Area	291 km2
3	Agriculture	170 Km2
4	Eucalyptus Plantation	60 Km2
5	Industrial	7.9%
6	Residential	63.6%
7	Commercial	10.3%
8	Open/Green	0.3%
9	Public/Other	17.9%
10	Others	19 km2

Table 4-9: Land Use in Addis Ababa
(Source: UNCHS, 2000)

Moreover, most of the informal settlement areas are low density area which makes the provision of infrastructure very expensive. The observation also revealed in the newly developed areas that all areas have few elementary and secondary schools, few have health centers and most of the areas share the characteristic of low drinking water supply. However, while 61.2% of the households do not use the nearest primary school, 90% do not use the nearest secondary school which is a crucial element regarding spatial mobility of a city (CSA, 1998). On the other hand, the chance of going to school for the children of the poor depends on the availability of a near by education centre or an affordable transport service.

Figure 4-22: Informal waste collectors on the street

Figure 4-23: Beggars and street vendors on the motor way

(Source: Picture by the Author)

Another constraint of mobility in these areas is that, people prefer to drive cars as long as they afford one, no matter how old it is, rather than taking public transport. This was explained while the interview as most of them replied that car ownership is an indicator of quality of life in addition to the freedom and independence it provides. As a result of this, the car ownership in the city has increased from 44 to 55 per 1000 inhabitants between 1997 and 2003 out of which 90% are older than 10 years[18] (UN-HABITAT, 2007, FTA, 2007). According to the respondents, the increase in old cars in the city together with the poor road infrastructure worsens the congestion and pollution level. However, this low car ownership also shows that the majority of the residents are crucially dependent on public transport. What is more, land ownership with own housing and spacious backyard is mentioned by the interviewee as an indicator of quality of life that is also accountable for the multiplication of informal settlement at the fringes of the city.

[18] The number only refers to cars registered in the A.A. Transport branch office under code 2.

Observations at different locations also show that street vendors and informal service providers also create problems in most parts of the city occupying streets, sidewalks, pedestrian paths and public spaces including parking areas as illustrated in ***figure 4-22*** and ***figure 4-23,*** above. But so far, the interviewee mentioned that it has been impossible to move the street vendors to other locations as that environment is the ideal location for them to sell their goods, which, by the way, are the favorites by the society as they are cheaper. The observation also asserted that the presence of street vendors and hawkers at some locations reduce the road capacity and slow traffic movement, hence increase congestion and pollution and reduce efficiency of urban transport.

Figure 4-24: poor junction plus poor drivers' attitude

(Source: Picture by Author)

Figure 4-25: Plan of the grandiose Millennium interchange, Gotera
(Source: Google Earth)

So far we have seen the complications in coordinating land use and transport issues at the planning and policy level. Apart from that, even at the implementation stage, the Addis Ababa public transport system is suffering from management chaos. A respondent indicated poor management of the transport sector as one of the major transport problems of the city together with high degree of congestion and pollution in central cities, inadequacy of public transport and of paved urban road space, and limited public resources. He also mentioned that the buses and taxis in Addis Ababa are already incapacitated and the measures being taken by the Federal transport Authority can only solve the problem temporarily but are helping neither the user nor the supplier. Moreover, the limited road network and poor road junctions made driving in the city awkward and dangerous, as illustrated in ***figure 4-24***. Therefore, the over pass under construction at Gotera shown in ***figure 4-25*** is believed to relief the congestion that Saris is suffering from. Moreover, there is already a plan to provide a rail transport on the longer corridor of the city which is still in doubt by most planners if it really will solve the problem.

It was also understood that, though neither of the authorities provides training in collaborated or integrated approach to planning and policy formulation, all the respondents agreed that integrating land use and transport policy could be the cure to most of the problems the city is facing. But they also added that, it sure is going to be difficult considering lack of clear institutional responsibility and jurisdiction within the A.A.C.A., the chaotic relation with the Oromiya Regional State, and growing informality in the city.

Figure 4-26: Informality gone nuts

Figure 4-27: Flash flood from faulty design Hindering Mobility

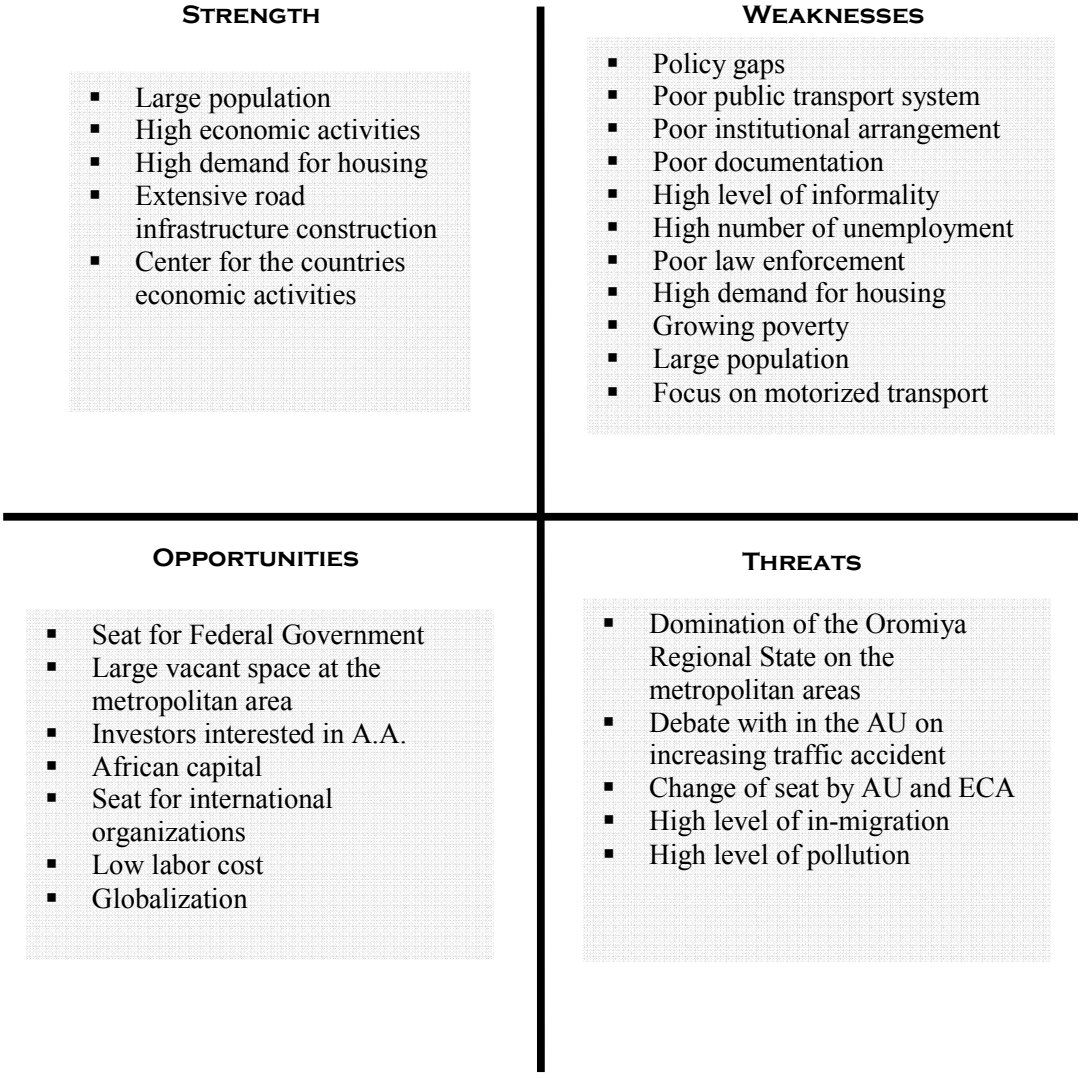
(Source: Picture by Author)

Summery:

Addis Ababa is characterised by informality in all aspects of the development process. As discussed above, the change in spatial structure of Addis Ababa and land use allocations of the city are predominantly governed by informal settlement and market forces. This was demonstrated by the large informal residential cluster being observed at the periphery in search of cheap and spacious housing. This has resulted in an increasing travel demand that is beyond the capacity of the urban transport providers that are characterized by lawlessness, confusion and selfishness. This increasing demand for transport services has given the room to the private transport providers to abuse the law and the public interest and maximize their profit. In addition, informal business activities including land use changes by alteration and extension of road side units and growing street vending and peddling together with poor pedestrian and drivers' attitude have aggravated the transport problems of the city resulting from insufficient road size, inefficient road network and poor road junctions.

4.6.3 SWOT Analysis of Addis Ababa city [land use and transport]

Following is a box that shows a SWOT analysis of situation of Addis Ababa city in the context of integrating land use and transport policies as derived from the empirical part of the study. The strengths and weaknesses in the city and the opportunities and treats of the external environment should be considered to successfully integrate the policies for sustainable development.



Box 4-1: SWOT analysis of the current situation in A.A.

Chapter 5: Conclusion and Recommendation

5.1 Conclusion

The aim of the empirical part of this research is to analyze the need for integrating land use and transport policies in Addis Ababa for sustainable development and evaluate the opportunities and barriers to do so. An integrated land use and transport approach yields considerable opportunities and benefits to communities attracting investment and development to an area. The information on land development also benefits transport planners to better predict the future transport demands of an area and prepare for the land use allocation impacts on transport. There fore, in theory, integrating land use and transport policies leads to an efficient and environment friendly urban transport system that provides safe, affordable and efficient transportation, increase energy efficiency, support vibrant economy, reduce pollution and congestion and adverse health effects. The process promotes sustainable development that affirms equity among societies, dynamic economic activities, and development in harmony with the ecosystem.

The integration helps the poverty reduction process in all aspects while stimulating economic development and social inclusion by creating different opportunities for the people, empowering the poor and enhancing safety/security. Integrating policies in general promotes synergy, reduce duplication, reduce inconsistency, and maximize the effectiveness of policies and service delivery. ***Figure 5-1*** shows the relation of transport with the three pillar of sustainable development.

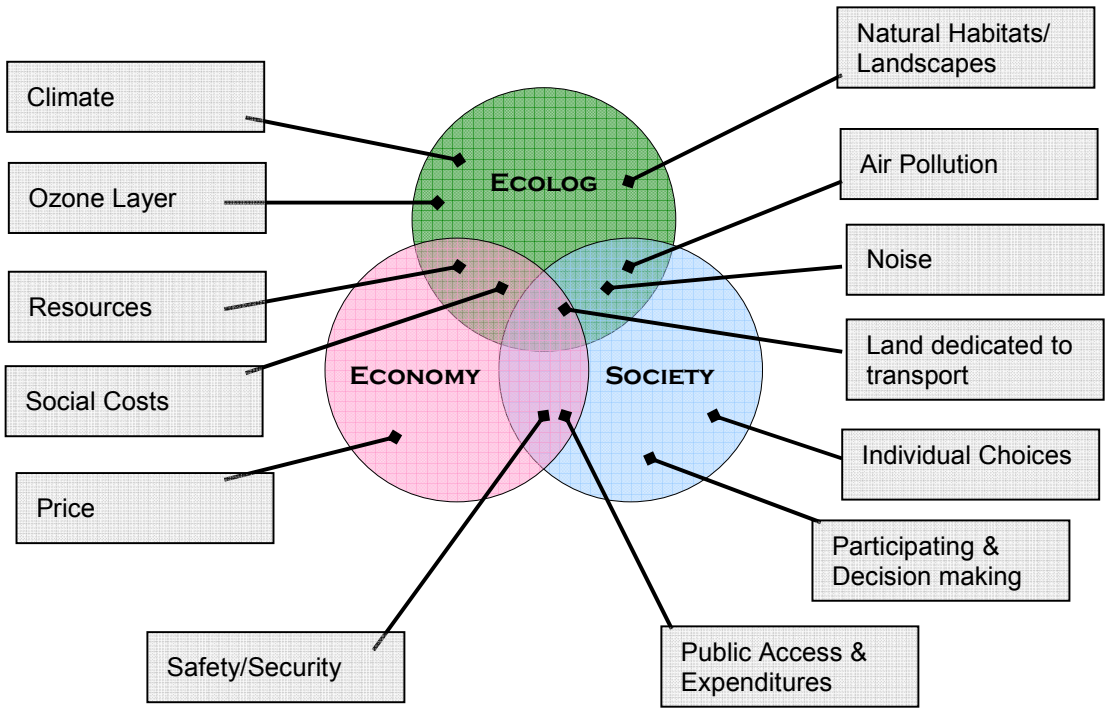


Figure 5-1: The Relationship of Transportation to Ecology, Economy, and Society
(Basler, 1998)

And based on the empirical findings, the study is concluded as follows in a way that summarizes the answers to the research questions:

Organization of land use and transport policies:

1. Looking at the way the land use and transport policies are organized in the city it can, in general, be concluded that the City Administration lacks coordination among responsible stakeholders that hampered the development process. Even if the land use policy and planning, some how, recognizes the land use-transport interaction, lack of collaboration with transport experts, weak institutional capacity and chaotic institutional arrangement has made the land use plans of the city inefficient in ensuring mobility.

2. The Addis Ababa urban transport is run with proclamations and ad hoc response to transport problems as they happen. This shows that there is no deep studied transport policy that projects the future travel demands that might arise from population growth and land use changes of the city. Moreover, there is not even a single land use element in Transport proclamation No. 468/2005, which is the most recent plan of action being implemented by the Federal Transport Authority. Besides, the Transport Authority is beyond the jurisdictions of the A.A.C.A. as it is accountable to a Federal Ministry which makes coordination very difficult given the poor institutional arrangement of the authorities.

3. The relation of the A.A.C.A. with the Government of Oromiya Regional State is confronted by potential conflicts on land use allocation. This is a common problem in management of issues that transcend the limits of established policy boundary as a result of poor integration between different tiers of Government.

4. Although it is characterised by poor documentation, there is an information communication and publications department in the A.A.C.A. which is barely known by the public. Therefore, the public doesn't use the centre to find out what is being done in the city, what projects are being implemented, which alternatives are chosen, what changes are expected in land use and transport in the future, etc…after a banal participation at the policy formulation and planning stage.

The impact of the current trend of development on the transport system:

5. Having given emphasis for environmental improvement in the city, pushing out industries as far away to the fringes has increased travel demands in the city since urban based workers have to travel to and from their homes to far-flung industries every week days at peak hours.

6. Inconsistency of planning and policy with the metropolitan area together with demand for own housing with spacious plots has also contributed to rapid development of residential houses at the fringes and increasing travel demand to the inner city. As the result of the current trend of development, the journey to work and other activities has substantially exceeded the average walking distance in the city of 5km hence stretched the public transport system to its limits.

Barriers and opportunities for integration of land use and transport policies:

7. What is probably the worst barrier for the integration of land use and transport policies in Addis Ababa is that most of the urban activities are dominantly informal. It is becoming common to see informality in housing construction, land use allocation, business activities, transport provision, and informality in parking in the city. In fact, informality in residential settlements will continue to be the main issue of the city and will even expand as it is taken by the citizens as the only solution to combat the housing problems of the city. Beside, the very poor data and record handling system of the authorities will also instigate the process.

8. There are also other factors beyond policy and informality that play major roles in land use decisions and changes in spatial structure of Addis Ababa that could be mentioned as barriers. One is market demand; demand for spacious plots, own housing, cheaper plots, quite and healthy environment, and demand for easy way to make money, played crucial role so far. Public opinion, like the NIMBY syndrome, against small industries and major streets can also be mentioned as a barrier that played a role in shaping the structure.

9. Though in one way, large population and increasing demand for housing could be seen as a barrier that hasten informality in housing construction, it could also be an opportunity to guide the development of the city in a transit friendly manner by encouraging dense settlements and taking advantage of economies of scale.

Finally, to summarise the conclusion in few words, it can be said that the integration of land use and transport policies in Addis Ababa is very weak and the effect of the land use plan on urban transport in the city is not recognised by the authorities involved in planning and policy formulation. However, since most of the activities in all aspects are dominantly led informally, integrating policies between land use and transport alone seems less effective in sustaining the development process of Addis Ababa. This way, the ***initial hypothesis*** is proved to be fully acceptable. There certainly is a need for

- *Horizontal integration* between the different departments of the A.A.C.A. that are involved in land administration and supervision, and
- *Vertical integration* of the authorities involved in land use allocation and road construction with the Federal Transport Authority,
- *Inter-territorial integration* between the A.A.C.A. and the Government of the Oromiya Regional State that has the upper power in the case of the metropolitan areas.

However, the study revealed that, considering that informality takes the upper hand in urban activities in Addis Ababa, despite the fact that there is a need for integrating policies for sustainable development, the focus on policy alone would be narrow and nugatory.

5.2 Recommendations

This study shows that most of the land use development in Addis Ababa is being done without the consent of the A.A.C.A. Hence, the transport chaos in the city can not be solved by concentrating the effort on policy issues alone as that seems a very narrow step; rather it needs a resolute action. However, the role and extent of informality in shaping the spatial structure of the city needs a further study. Having that in mind, the following actions are recommended at three different levels to improve the transport problems of the city:

Institutional arrangement

Institutional weakness is found to be the major obstacle since the solution to the problem involves the A.A.C.A, the Government of the Oromiya Region and the Federal Authorities.

1. All the sector agencies should reach to a consensus on understanding sustainable development issues in the city. That means effort should be made that economic, social and environmental pillars of sustainable development and how they interact each other are clearly understood. Although this doesn't ascertain policy integration, it at least should lead to commitment and decisive leader ship within the authorities that begins from the top but develop through out the public sector organizations. However, this might not be easy given the potential conflict of interest among sectors, thus requires a strong political leadership.
2. It won't be an easy task to integrate land use and transport policies since they are controlled by authorities at different levels of government. However, forming an interdepartmental and/or inter-sectoral steering team that facilitates the interaction among sector agencies together with human capacity building on collaborative and integrated policy making and implementation could result in smooth relations, hence synergy. Another inspiring organizational approach that is used in Germany while dealing with cross-cutting policy is establishing mirror units (spiegelreferate) in each government department, such as an office for environmental affairs in every ministry (Stead et al., 2004).
3. Documentation should be improved in A.A.C.A. and data base must be set up to show the amount of the current and future residential settlements to allow the Transport Authority predict the travel demand and provide the necessary infrastructure.

Policy and Planning

Policy gap is the major pitfall in the development process of Addis Ababa that has basically resulted from lack of national housing and transport policies:

1. For a rapidly growing urban population like Addis Ababa the length and number of daily trips are closely connected with the average population density in built-up areas, and the spatial distribution of trip destinations and origins. Though managing high density settlements requires large infrastructure investments, the investments are not necessarily higher (in many cases are even lower) than the investment that is required to accommodate an equivalent growth of a low density development at the fringes. So, the policy should not only encourage but also facilitate a more compact and infill development with mixed use centres that include multiple land uses, high density residential settlements and variety of housing types at some locations rather than allowing a sprawl, as is the case.
2. A comprehensive public transport policy that includes strategies of continual upgrading of the public transport network, improvement of public transport services, considering social

and environmental aspects of public transport, and incorporating land use policies of the city needs to be designed.

3. Plans and zoning codes should contain clear, conveying and readable land use maps that show the land use allocation, density and transport systems and options of an area. The time horizon of the land use plan implementation should also be indicated as it affects planned transportation projects. Minimum parking requirements, available parking capacity and parking cost should also be part of the Local Development plan. These are common elements of the land use and transport planning but are usually included in neither of them.
4. The transport policy should consider the land use consequences of different mobility option and, like wise; the land use policy should take the consequences of land allocation on the transport system in to consideration. Most importantly, while improvements on road construction and upgrading for motor vehicles are shown, nothing has been done on non-motorized transportation infrastructure. Therefore, emphasis should be given to NMT options as equally as the motorised transport.
5. Promote a transportation policy that supports a more compact urban form and doesn't cause sprawl through high way construction.
6. Clear regulations need to be set to correct and control informal activities in the city that have consequences on public transport and the environment. Moreover, regulations that facilitate control of the private transport providers should be put in place.

Implementation

1. It is also necessary that a plan achieve internal, horizontal and vertical consistency, not only at the planning stage but also at the implementation stage of policies. Therefore, integration should link the institutional, technical, spatial, and financial elements together.
2. Focus on sequential land development following an incremental extension of transportation and other infrastructure services from near-by built-up areas could facilitate transit provision. Moreover, there should be a balanced mix of transportation modes with a focus on bicycles use and walking.
3. Zoning alone will not guarantee that a particular type of development will occur, rather, policies should consider market forces. In addition, the A.A.C.A. should enforce laws better concerning informal settlements or find a way to formalize them by harmonising it with the city plan under implementation.
4. Following the extensive construction of road network in the city, it is the view of the author as learnt from the case of Curitiba that, using articulated buses with segregated bus lanes could be a better solution than rail transport cost wise and efficiency as well. Moreover, the involvement of the private sector should be developed and encouraged.

5.3 Direction for future Research

As activities in Addis Ababa are predominantly governed by informality and market forces, the role and extent of informality in shaping the spatial structure of the city needs a further study. There will be much to learn about in this aspect to guide the development of the city in a sustainable manner, and it could be an interesting topic to explore, as well.

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Appendix

Appendix 1: Interview questionnaire

Interview Questionnaire

This questionnaire is a research instrument of the study on "*integrating transport and land use policies for sustainable development: The study of suburbs of Addis Ababa; theory and practice*". This survey is strictly confidential and your answers will only appear as totals combined with those of other respondents for academic purposes only.

Purpose of the interview:

- To understand the trends of policy making in transport and land use planning authorities.
- To determine the problems of the newly developed areas of the city related to transport.

Date and time of interview: _

Background of the interviewee:

Name:	
Telephone:	
E-mail address:	
Name of organization you work for:	
Type of the organization:	
Your position in the organization:	
Location of the organization:	

Land use planning [for authorities involved in land use planning only]:

The policy environment

1. Is there a specific working group to study the environment for land use policy? Please explain the process of formulation and composition of the team, if any.
2. Have inter-agency project teams been formed while formulating land use policies? Please explain the process of formulation and composition of the team.

Stakeholder participation

3. Which organizations are involved in planning and policy development for land use policy in the city and how much control do they have?

Planning and policy area	***National Government***	***Regional Government***	***Private Org.***
Land use planning policy			
Master plan of the city			
Leasing arrangements			
Property/Tenure right			
Building regulations			
Property taxes			
Policy environment study			
Information			
Others			

4. Which stake holders or organizations are involved in land use planning and policy formulation?
5. How do you characterize the working relationship of your organization with the Addis Ababa transport authority?
6. Do you have scheduled meetings with the Addis Ababa transport authority?
7. How do you evaluate the level of involvement of the Addis Ababa transport authority in the policy decision process of your organization?
8. Does your organization give trainings on participation or collaborative approaches to policy making?

Elements of land use plan

9. What initiates the need for new land use policies?
10. What elements of development are given more emphasis while formulating land use policies?
11. What issues and conflicts do you face related to land use policy, planning and project development?
12. What are the most important objectives of your authority?
13. Does your organization's planning explicitly address the effect of land use patterns on transportation needs in the city?

Problems of the newly developed areas

14. What do you think are the problems of the four sub-cities under study concerning infrastructure and other amenities?
15. Which of these problems are related to land use patterns of the city? (Example: Traffic flow, accessibility/travel time to facilities and services, safety, public transportation, pedestrian and bicycle facilities, land use/growth and development patterns, economy and jobs, land use and its effects on transportation needs, etc)
16. What do you think is the best approach to solve this problem? How important is integrated policy making to solve the problems?

Personal opinions

17. What are some of your issues/concerns regarding the future of Addis Ababa? (Example: Land Use, transportation, housing, environment, resources, economic Development, social Issues, etc…)
18. Who do you think should be involved in solving/addressing these issues?
19. What do you think are the indicators of quality of life in the newly developed areas?
20. What is your overall opinion on transport policy of the city?

Transport policy: [for authorities involved in transport planning only]:

The policy environment

1. Is there a specific working group to study the environment for transport policy? Please explain the process of formulation and composition of the team, if any.
2. Have inter-agency project teams been formed while formulating transport policies? Please explain the process of formulation and composition of the team, if any.

Stakeholder participation

3. Which organizations are involved in planning and policy development for the modes of transport in the city and how much control do they have?

Planning and policy area	***National Government***	***Regional Government***	***Private Org.***
Transport policy			
Roads			
Pedestrian infrastructure			
Buses			
Taxis			
Fares policy			
Parking policy			
Information			
Others			

4. Which stake holders or organizations are involved in transport planning and policy formulation?
5. How do you characterize the working relationship of your organization with the Addis Ababa Land Development Agency (LDA) or Land Administration Authority (LAA)?
6. Do you have scheduled meetings with the Addis Ababa LDA or LAA?
7. How do you evaluate the level of involvement of authorities responsible for land use planning of the city in the policy decision process of your organization?
8. Does your organization give trainings on participation or collaborative approaches to policy making?

Elements of Transport policy

9. What initiates the need for new transport policies?
10. What elements of development are given more emphasis while formulating transport policies? How much impact does the land use development plans have on the transport policy?
11. What are the most important objectives of your authority?
12. Does your organization's planning explicitly address the effect of land use patterns on transportation needs in the city?

Problems of the newly developed areas

13. What do you think are the problems of the four sub-cities under study concerning infrastructure and other amenities?
14. Which of these issues are related to land use patterns of the city? (Example: Traffic flow, accessibility/travel time to facilities and services, safety, public transportation, pedestrian and bicycle facilities, land use/growth and development patterns, economy and jobs, land use and its effects on transportation needs, etc)
15. What do you think is the best approach to solve this problem? How important is integrated policy making to solve the problems?
16. Are major changes in transport regulations likely to occur in the near or distant future?
17. Did you conduct studies on the travel demand of the city in the future? If yes, what elements did you consider? And to what extent is the master plan office involved in these studies?

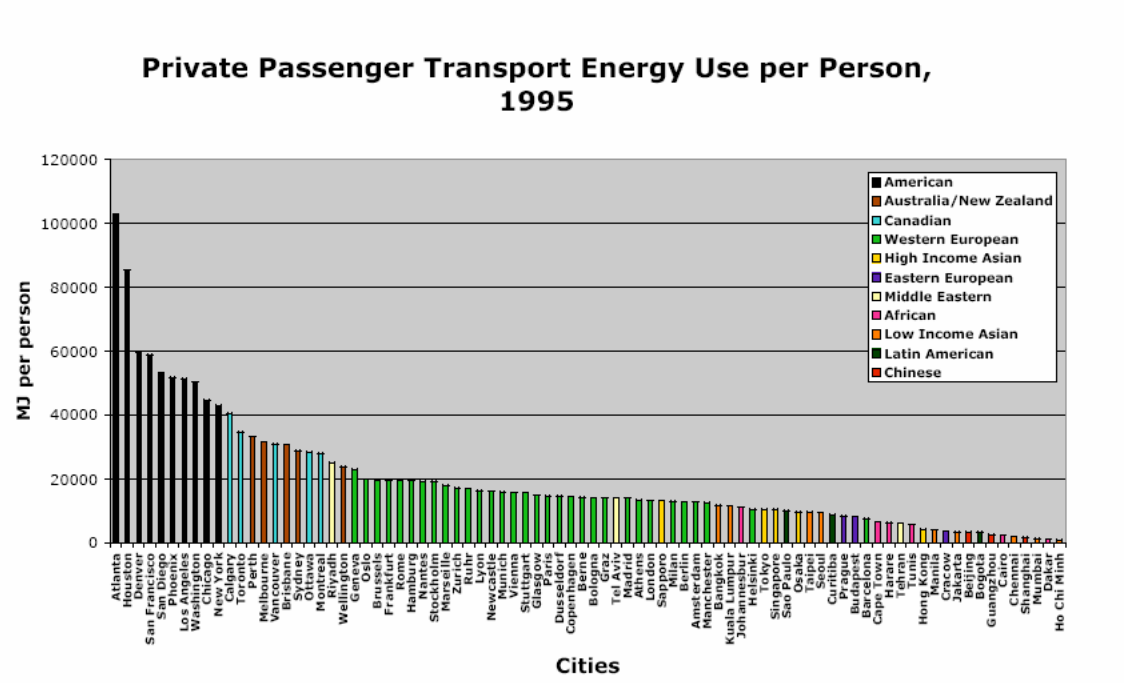
Personal opinions

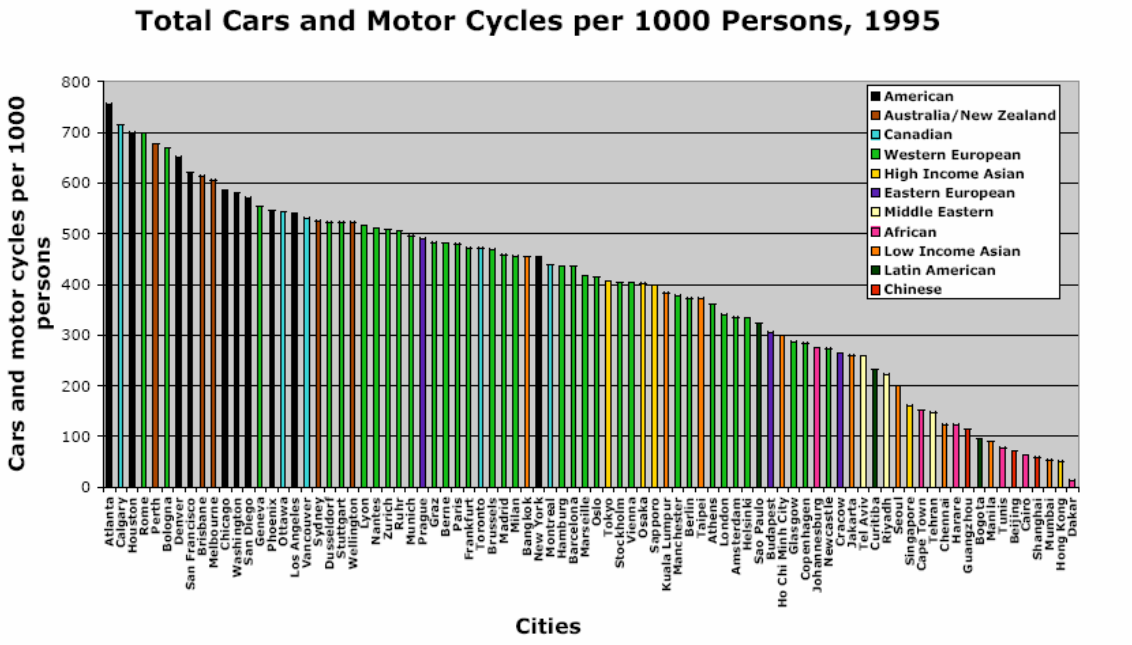
18. What are some of your issues/concerns regarding the future of Addis Ababa? (Example: Land Use, transportation, housing, environment, resources, economic Development, social Issues, etc…)
19. Do you think there is a need for improving the transport system of the city? Which specific areas of the city? Why?
20. What are the alternatives to improve the transport options? (Example: improvements to public transportation (bus/rail), improvements to pedestrian and bicycle facilities, roadway improvements)
21. How do you envision decisions being made regarding these issues?
22. What do you think are the indicators of quality of life in the newly developed areas?
23. What is your overall opinion on land policy of the city?

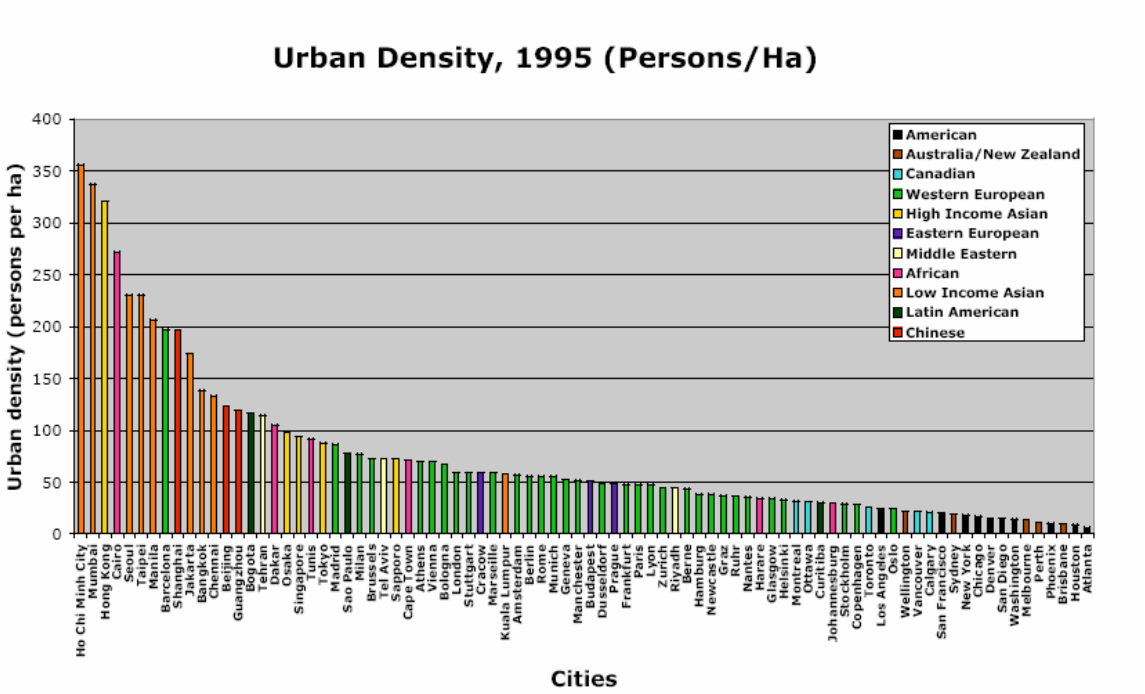
Appendix 2: List of stakeholders involved in the Addis Ababa master plan revision process

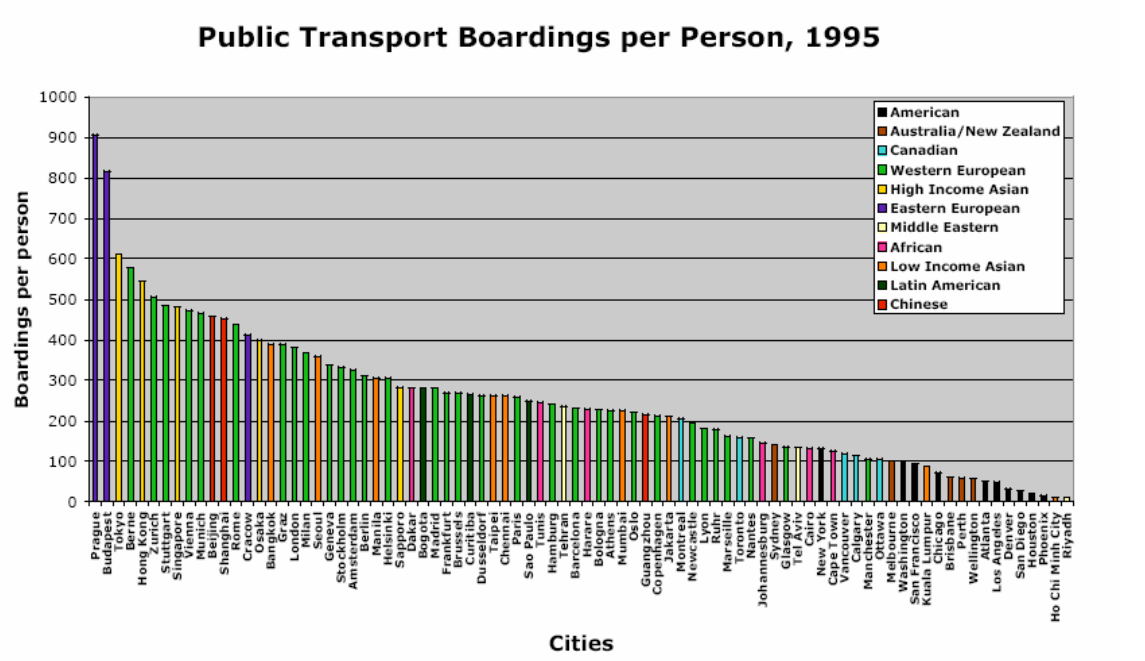
1. Addis Ababa City Administration
2. Ministry of Works and Urban Development
3. Addis Ababa City Roads Authority
4. Addis Ababa City Water and Sewerage Authority
5. Ministry of Federal Affaires
6. Oromiya Regional Government
7. Ethiopian Power and Electric Corporation
8. Ethiopian Telecommunication Authority
9. Private Organizations
10. Addis Ababa Trade Chamber
11. Mercato Committee
12. Higher Educations and Universities (AAU, ECSC)
13. Zonal, Woreda, and Kebele Administrations
14. National and International NGOs and CBOs
15. Professional Associations
16. Deutsche Gesellschaft fur Technische Zusammenarbeit (GTZ), German Federal Ministry for Economic Cooperation and Development (BMZ)
17. Lion Urban Planning Agency, France
18. Bauhaus Dessau Foundation, Germany
19. Institute for Housing and Urban development Studies (IHS), The Netherlands
20. The United Nations Human Settlements Programme (UNCHS), Habitat
21. European Union
22. DEVECON, Finland
23. The World Bank
24. British Council, Addis Ababa
25. Austria, Netherlands, Japan, American Embassies
26. Office of Revision of Addis Ababa Master Plan (ORAAMP)
27. National Urban Planning Institute (NUPI)
28. SHERATON ADDIS and MIDROC Ethiopia

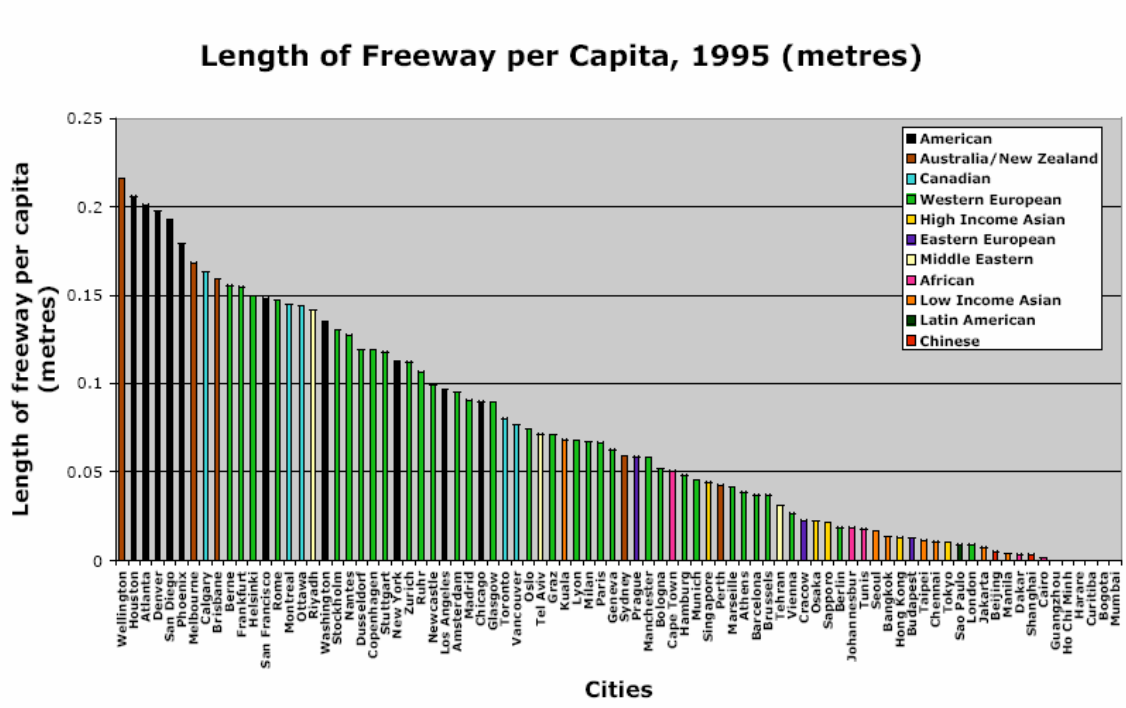
Appendix 3: Millennium data Base, 1995

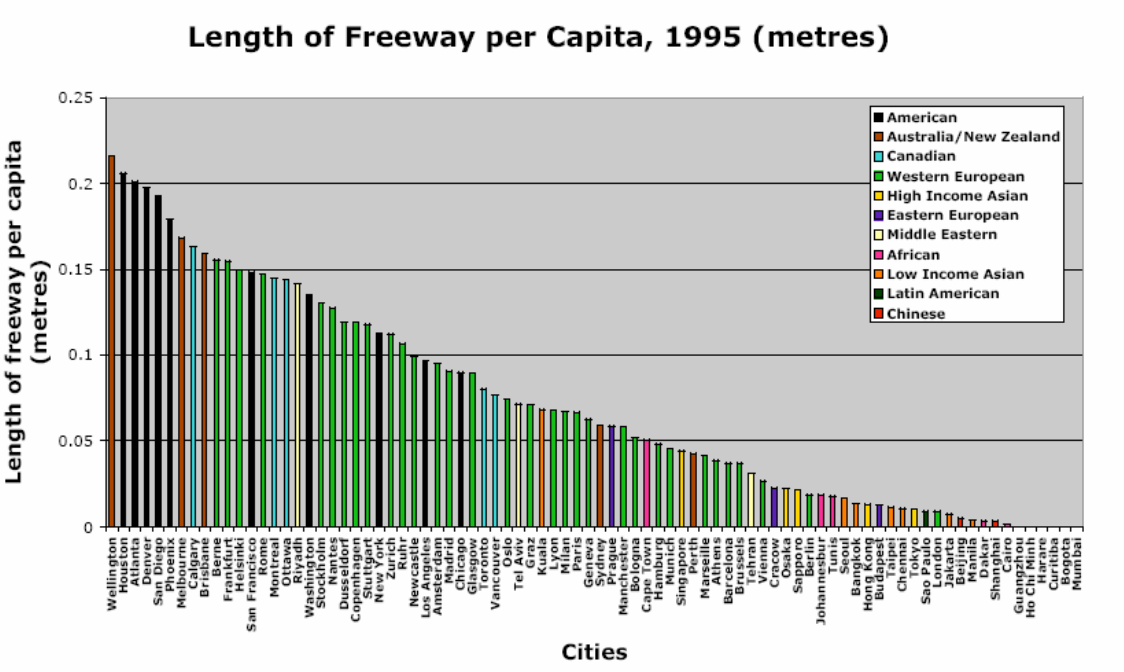





Urban Density, 1995 (Persons/Ha)
Urban density (persons per ha)
400
350
300
250
200
150
100
50
0
American
Australia/New Zealand
Canadian
Western European
High Income Asian
Eastern European
Middle Eastern
African
Low Income Asian
Latin American
Chinese
Ho Chi Minh City
Mumbai
Hong Kong
Cairo
Seoul
Taipei
Manila
Barcelona
Shanghai
Jakarta
Bangkok
Chennai
Beijing
Guangzhou
Bogota
Tehran
Dakar
Osaka
Singapore
Tunis
Tokyo
Madrid
Sao Paulo
Milan
Brussels
Tel Aviv
Sapporo
Cape Town
Athens
Vienna
Bologna
London
Stuttgart
Cracow
Marseille
Kuala Lumpur
Amsterdam
Berlin
Rome
Munich
Geneva
Manchester
Budapest
Dusseldorf
Prague
Frankfurt
Paris
Lyon
Zurich
Riyadh
Vienna
Hamburg
Newcastle
Graz
Ruhr
Nantes
Harare
Glasgow
Helsinki
Montreal
Ottawa
Curitiba
Johannesburg
Stockholm
Copenhagen
Toronto
Los Angeles
Oslo
Wellington
Vancouver
Calgary
San Francisco
Sydney
New York
Chicago
Denver
San Diego
Washington
Melbourne
Perth
Phoenix
Brisbane
Houston
Atlanta
Cities


Public Transport Boardings per Person, 1995
Boardings per person
1000
900
800
700
600
500
400
300
200
100
0
American
Australia/New Zealand
Canadian
Western European
High Income Asian
Eastern European
Middle Eastern
African
Low Income Asian
Latin American
Chinese
Prague
Budapest
Tokyo
Berne
Hong Kong
Zurich
Stuttgart
Singapore
Vienna
Munich
Beijing
Shanghai
Rome
Cracow
Osaka
Bangkok
Graz
London
Milan
Seoul
Geneva
Stockholm
Amsterdam
Berlin
Manila
Helsinki
Sapporo
Dakar
Bogota
Madrid
Frankfurt
Brussels
Curitiba
Dusseldorf
Taipei
Chicago
Paris
Sao Paulo
Tunis
Hamburg
Tehran
Barcelona
Harare
Bologna
Athens
Mumbai
Oslo
Guangzhou
Copenhagen
Jakarta
Montreal
Newcastle
Lyon
Ruhr
Marseille
Toronto
Nantes
Johannesburg
Sydney
Glasgow
Tel Aviv
Cairo
New York
Cape Town
Vancouver
Calgary
Manchester
Ottawa
Melbourne
Washington
San Francisco
Kuala Lumpur
Los Angeles
Brisbane
Perth
Wellington
Atlanta
Los Angeles
Denver
San Diego
Houston
Phoenix
Ho Chi Minh City
Riyadh
Cities


Length of Freeway per Capita, 1995 (metres)
Length of freeway per capita (metres)
0.25
0.2
0.15
0.1
0.05
0
American
Australia/New Zealand
Canadian
Western European
High Income Asian
Eastern European
Middle Eastern
African
Low Income Asian
Latin American
Chinese
Wellington Houston Atlanta Denver San Diego Phoenix Melbourne Calgary Brisbane Berne Frankfurt Helsinki San Francisco Rome Montreal Ottawa Riyadh Washington Stockholm Nantes Dusseldorf Copenhagen Stuttgart New York Zurich Ruhr Newcastle Los Angeles Amsterdam Madrid Chicago Glasgow Toronto Vancouver Oslo Tel Aviv Graz Kuala Lyon Milan Paris Geneva Sydney Prague Manchester Bologna Cape Town Hamburg Munich Singapore Perth Marseille Athens Barcelona Brussels Tehran Vienna Cracow Osaka Sapporo Berlin Johannesbur Tunis Seoul Bangkok Hong Kong Budapest Taipei Chennai Tokyo Sao Paulo London Jakarta Beijing Manila Dakar Shanghai Cairo Guangzhou Ho Chi Minh Harare Curitiba Bogota Mumbai
Cities


Length of Freeway per Capita, 1995 (metres)
Length of freeway per capita (metres)
0.25
0.2
0.15
0.1
0.05
0
American
Australia/New Zealand
Canadian
Western European
High Income Asian
Eastern European
Middle Eastern
African
Low Income Asian
Latin American
Chinese
Wellington Houston Atlanta Denver San Diego Phoenix Melbourne Calgary Brisbane Berne Frankfurt Helsinki San Francisco Rome Montreal Ottawa Riyadh Washington Stockholm Nantes Dusseldorf Copenhagen Stuttgart New York Zurich Ruhr Newcastle Los Angeles Amsterdam Madrid Chicago Glasgow Toronto Vancouver Oslo Tel Aviv Graz Kuala Lyon Milan Paris Geneva Sydney Prague Manchester Bologna Cape Town Hamburg Munich Singapore Perth Marseille Athens Barcelona Brussels Tehran Vienna Cracow Osaka Sapporo Berlin Johannesbur Tunis Seoul Bangkok Hong Kong Budapest Taipei Chennai Tokyo Sao Paulo London Jakarta Beijing Manila Dakar Shanghai Cairo Guangzhou Ho Chi Minh Harare Curitiba Bogota Mumbai
Cities