Attitudes and Policy Implications of Urban Growth Boundary and Traffic Congestion Reduction in Riyadh, Saudi Arabia

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Abstract---Rapid urban growth occurred in 2009 resulted in residing 3.4 billion people in the world in urban areas. This number is expected to increase to 6.5 billion by 2050 (United Nations, 2009). This phenomenon of urban growth has created challenges for several countries in both of developing and developed worlds. A complicated process involving in urban growth including the spatial temporal changes of all social, economic, and physical constituents at changed perspectives (Han et al 2009). The social, economic mechanisms of urban growth are related to urban population growth and economic growth, while physical constituents of urban growth and economic growth are associated with spatial growth, land cover change and land use change which are the focus of this paper. These complex interactions are caused by several forces such as transportation and communication, internal and international migrations, public policies, and high natural growth rates of urban populations (Hall 2000, Hart 2001). Positive and negative consequences are emerged from urban growth and expansion. The positive effects relates to well-planned and arranged urban growth, while negative effects associated with unplanned and scattered expansion, which is called sprawl. Traditional urban planning attitudes in fast growing cities like as Riyadh city in Saudi Arabia cannot accommodate the negative consequences of rapid urban growth.

Significant indicators will be set as a result of this study to link the knowledge gap between urban growth and transportation research, and to provide an effective understanding of the relation between transportation and urban growth in developing and promptly growing cities such as Riyadh.

Keywords----Urban growth, Transportation, Spatial analysis indicators, Riyadh

I. INTRODUCTION

Transportation plays a key role in urban development, it offers mobility for people, goods and chattels, and affects on patterns of expansions and different perspectives of economic activity through land accessibility. The infrastructure of transportation is considered one of the main reasons of urban growth as the relation between the development of high-speed roads, urban expansion, and the population growth has been revealed by various researches.

Urban transportation systems are complex networks figured by different geographical, social aspects (Peng 2008). And to understand this relation, it is important to study the relation and effects produced by each of these factors as they accommodate many patterns within the urban growth and expansion. The focus of previous researches was limited by the effects and causes of the relationship between transportation and urban growth. While as the research about the spatial and temporal process of urban growth were very poor. In this regard, the spatial indicators are effectively working tools and measures to investigate and assess this relationship between transportation and temporal spatial urban growth. These indicators could be employed to monitor and review the fast growing cities such as Riyadh, providing benchmarking and comparison for the development of urban attitudes and policies over space and time (UNCHS 1995). Specific Indicators will be improved and employed to quantify and analyse the urban growth over time and space, including population growth, urban land use, land cover change, and urban population density change. The proximity of urban growth to the infrastructure of transportation is an essential indicator to develop and use to analyse the relation of urban growth and transportation (Dendoncker, schmit 2008, Fan et al 2009). Riyadh city in Saudi Arabia which face speed urban expansion, spatial growth and transportation developing over the last four decades will be the focus of urban analysis in this paper. Its urban expansion has apparently differed by time. However, the systematic researches on the urban growth and transportation changes throughout time and space are not available yet in Riyadh city. Therefore, this study is urgently required and needed to highlight the various challenges which Riyadh city meets and faces at short and medium term progress and growth.

II. CURRENT PRACTICES AND IMPLICATIONS IN THE TRANSPORTATION SECTOR IN RIYADH

The city of Arriyadh, as the capital of the Kingdom of Saudi Arabia, has experienced tremendous economic and population growth especially in the final decades of the last century, so that today it is not just the economic centre of the Central Region and the Capital of the Kingdom, as it is also the
largest metropolitan area in Saudi Arabia and among the Gulf states. Arriyadh, like all metropolitan cities, has diverse social, economic and demographic features that contribute to its unique character. Allied to the growth in economic activity and population has been the growth in mobility. This has generated high levels of car ownership and car use and in turn this has led to the construction of a series of expressways and arterial roads across the city. In the past, these have enabled high expectations of easy mobility to be met. This pattern of growth is expected to prevail over the next two to three decades.

In Arriyadh, maintaining adequate mobility in a reliable, safe and sustainable manner has become a dominant challenge. It is evident that a continuation of the present trends will lead to serious negative implications in both economic and environmental terms. The available studies forecast that using current trends, by 2020 the resident population could increase to over 15 million persons.

Today, there is clear evidence that demand exceeds road space capacity and extensive and sometimes prolonged traffic congestion exists every weekday on parts of the Makkah Expressway and King Fahad Freeway, as well as arterial roads generally in central Arriyadh. The Arriyadh Development Authority [ADA] has undertaken various studies on the development needs of the city through the ongoing MEDSTAR [Metropolitan Development Strategy for Arriyadh] project. MEDSTAR addresses the strategic planning needs for Arriyadh and has recognised that the success of the expected planning outcomes will be contingent upon having a coherent strategy that supports urban mobility. In turn, high quality public transport is an important element of the mobility strategy that contributes to maintaining the economic prosperity of Arriyadh. It follows that there is a need to identify an appropriate and popular public transport system for this large metropolitan city. The Arriyadh Development Authority recognised that increased population, increased economic activity, increased personal expectations and increased population growth each contribute to increased mobility demands and thus to increases in travel demand. The existing road networks cannot successfully absorb the very significant increases in demand solely by building new roads and expanding capacity on existing roads. The main transport corridors into the City are already heavily used at peak periods today and it is incompatible with sustainable economic growth to meet higher mobility expectations for a future urban population of 10.5 million without a significant change in mode use (figure 2), which shows arterials with services roads; the overall decrease between 1996 and 2006 is due to transformation of arterial roads into freeways). A robust public transport option is a logical component of the transport planning strategies and this study addresses this issue.

As an early initiative, a Conference on Public Transport was held in October 2000. Local and national bodies and officials met with recognised experts to review the situation. It gave focus and attention on the need to establish policies that would help plan the way forward. Arising from the outcomes of the Conference, the ADA devised a Public Transport Pilot Study to provide guidance on how new public transport initiatives could be used to better meet future growth in travel demand. Most cities have developed their public transport systems parallel to general urban growth so that systems and services have evolved with the city. This is not so in Arriyadh and thus this initiative represents a unique opportunity to introduce a modern public transport system to a developed urban area that is, by any measure, without recognisable public transport. It is a major challenge to persuade car users to transfer to public transport, as car users will only transfer where the public transport offer is comparable in time and comfort to using their cars, and that it generally perceived as being attractive and convenient throughout the journey. This challenge to change the attitude of Saudis towards the use of public transport as an everyday experience will not be achieved in a short period. This is because changing people’s attitudes and then their travel behaviour is a gradual process as users becoming both comfortable about using the new services and confident that it will perform reliably at all times.

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This study recognises that the demand for public transport has to be justified and that the selected corridors present the best opportunities and value to develop a demonstration public transport system. The proposals will recommend that a variety of features are included, so that, for example, different types of station-stops are developed, different remedies for traversing junctions are developed and several strategies to incorporate different types of feeder services and Park and Ride facilities will be developed. The purpose of having an unusually wide variety of characteristics within the demonstration, is to gain experience of the introduction of modern transport systems, of associated transport technologies such as advanced ticketing and communication systems and of the management of support measures such as sophisticated priority techniques and parking management. In addition, it provides experience of the related institutional, regulator, financial, operational and monitoring processes needed to build and operate a modern public transport system. Finally, it provides local knowledge of demand for public transport and of techniques required to change demand through marketing, varying service delivery to fit user requirements and pricing.

It is most important that a ‘do nothing’ policy is reversed. This is because there is a poor prognosis of how metropolitan life in Arriyadh would develop in the coming years if such a policy remains. There are clear examples from many countries where a poor appreciation of the long term effects of the uncontrolled traffic demand have led to chronic and widespread congestion, severe conflicts between the different users and poor planning of relationships between land use and transportation. Arriyadh is in some ways fortunate in that it has the opportunity to plan its transport networks afresh and, especially outside of the current central areas, to reserve lands for major transport infrastructures so that high quality transport can be planned to sustain high levels of mobility for future generations. Good mobility is generally recognised as a key feature of prosperous world class cities, as easy access across the city is necessary for economic growth and for sustaining acceptable standards of living.

However, it must also be recognised that the window of opportunity to introduce modern public transport systems is finite. It may be that in short terms like as five years, the opportunities currently available [particularly relating to land take] may have passed and this could simultaneously limit choice, restrict effectiveness and add to the costs in implementing schemes. Therefore it is important that decision makers recognise that this study deserves not just careful and serious consideration but also a clear and timely response, so that subsequent actions can be authorised and implemented in a prompt and orderly manner.

### III. Riyadh and Urban Sprawl

The rapid growth of the capital city has created problems of sustainable and equal growth. In the last fifteen years in particular, the Kingdom of Saudi has to facilitate the oil-based growth of its cities. Governmental decrees by the Saudi royalty have helped in more than one way to create issues of sprawling, unequal development and a general lack of sustainable planning to accommodate the city’s growth. One of the facilitating factors to the city’s growth is the use of no-interest loans. The no-interest loan, have enabled countless businesses and global firms to expand and develop as far as needed to make Riyadh an important capital city (Gamboa 2008).

The Saudi government saw that low- to no-interest loans allowed for even small developing firms to expand as far as necessary to help the city’s growth from a 1 square kilometer Medina to a 3,000 square kilometer metropolitan zone in a little under a 100 years (Alahmadi 2008). The city’s focus on building upward, not outward, to alleviate pressures of an ever-expanding urban area was pushed in the late 1990s and attempted to change its building focus. While such a plan resulted in the construction of the Kingdom Center in the city center, there is no evidence as of yet that shows the current expansion of the city has yielded a decelerated growth period (Jehl). The Kingdom Center may be in the densely populated core of Riyadh, but anything beyond this small commercial zone is significantly less dense. (Alahmadi 2008).

Much of these problems that have been associated with the growth of Riyadh are related to the Saudi government. The oil boom that started in the 1970s also helped lead the city into its modern state. In order to begin the establishment of Riyadh as functioning capital city, the government of Saudi Arabia set forth different phases of development necessary to the growth of the city.

The troubling and tortuous establishment of the city over a thirty year period from small tribal reserved the nation’s capital and brought services issues that are still seen by many specialists today. In its development phase, the city sprawled into income-based inequities where services were unable to reach a large portion of the city’s residents. The growth of the
city beyond the city’s original walled-medina left an infinite amount of space for growth that in turn created several barriers for developing proper services for its residents (Gamboa 2008).

The oil boom period of the city made millions of dollars available to the government to allow for continued development. The expansion of much-needed services became part of the plan (Mubarak 2004). Part of the problem with the development of necessary public services was their lack of communication with other ministries. Public services for road construction were often uncoordinated with residential construction and created heavy traffic and transportation problems. The lack of coordination with services in the development of the sprawling city was so bad that in 1985, the government halted all further construction until development could be under control, to a certain extent (Murbarak 1992). The two year halt resulted in a reorganization of construction and also included the planning and definition of the city’s boundaries. During Riyadh’s expansion outwards, city agencies provided poor planning in the leasing and planning of land.

The city outskirts of the 1970s is about the half the radial distance from the city center compared to the boundaries of today. Agriculture and large land plots also proved somewhat troublesome to expansion. The Ministry of Agriculture contributed to the sprawl of the city by setting aside inadequate land-sizes for agricultural use. Had the lots been large enough, there would be no encroachment by surrounding development of urban protection zones. When the land sizes are not large enough, it is difficult to maintain the character of agriculture, especially when surrounded by expanding urban development.

Many of the city’s planners felt that the best way to create a cohesive and unifying identity of the city was to place limits on its physical area. With the expansive growth of the city, the reliance on automobiles created an unfriendly pedestrian environment. The irregular development of the city during the initial oil boom years of the 1970s and 1980s resulted in the scattershot development of residential and business regions that were either accessible only be car or its surrounding community (Murbarak 1995). Part of Riyadh’s second phase of development is the focus on limiting the barriers associated with its massive roadway system.

Increasing pedestrian space in regions like the Olayya-Batha Corridor will create walkable zones that are both functional and pleasing to the eye, and also give its residents a cohesive feel and sense of communities that were often solely connected to the placements of area mosques (RDA).

By limiting growth in the city boundaries, particularly in the 1985 freeze, it allowed for the services to keep up to the demand, and allowed for services to become established to reduce future costs. The city of Riyadh hopes that by connecting ill-developed services, roads and walking space, that the city can unify under a single city culture rather than the fragmented enclave style that has been rooted in Arab culture for hundreds of years.

Part of the problem that Riyadh, like many other cities in the Middle East and Northern Africa (MENA), is the struggle between the modern, globalized city and the traditional Muslim ideals of the community. Riyadh constantly struggles with the belief that in the Muslim world, “there is not even a city with defined powers, limits and function, but only an assemblage of neighborhoods, mostly defined by family, tribal, ethnic or religious criteria appointed by the independent” (Mubarak 2004).

Riyadh is delivered a particular dilemma as the services and culture associated with the unplanned urban area lacks basic needs of water and power. Because of the planned nature of Riyadh’s location as the nation’s capital, the construction of the city was not necessarily based around large amounts of natural resources such as water (Alahmadi 2008). While the construction of these communities were done in a haphazard manner, it created small pockets of communities in the city. The Western idea of an autonomous community was quite foreign to Arabs in the state-building of Saudi Arabia. But the seemingly-foreign concept of central government services to the people who lived Riyadh’s outskirts are faced with the need to associate their traditional lifestyle with necessity of government-supplied services for survival.

The traditionally-built leapfrog communities of Riyadh, known as hilal,shape were the first to expand greatly beyond the medina of the old city in the 20th Century. These communities became the transitional zones of moving from the tribal form to the modern city. The mud-style compounds of the Hilal were the bastion of the Arab middle class until the 1950s when importation of foreign goods became the norm that allowed for the use of brick house construction (Gamboa 2008).

![Fig. 3 Urban growth boundary phases](http://dx.doi.org/10.15242/IIE.E0215016)

Nonetheless, the growing problem of sprawl, and the blight associated with it is the prevalence of employer-owned housing projects within the city of Riyadh. With an unprecedented amount of foreign workers in the city of Riyadh (some estimates are upwards of 1.3 million in a city of...
4.5 million), the culture of the city becomes segregated and divided along lines of origin and income (Mubarak 2004). In the city of Riyadh, foreign workers are often paid significantly less than their Saudi counterparts. Due to the differences, most of the single family dwellings in Riyadh are relegated to the middle class Saudi, leaving the middle class foreign workers to lesser-quality housing. Less than 1 percent of the housing for foreign workers is resident owned, as opposed to the 56 percent for Saudi nationals, as of 2004. Also, 24 percent of the housing that the workers live in are owned by their employer. But part of the discontinuity of the urban form of Riyadh is the living preferences of the foreign workers (Al-Gabbani 380).

While many of residents of Riyadh enjoyed the living styles of detached single family dwellings, many of the foreign workers would rather live in densely-populated apartment complexes. The clustering of foreign workers is similar to the clustering of many other foreign-born groups of people in other cities. However, this contrast in living arrangements, at least during the 1980s, it seemed to strictly adhere to a contrast of Arabs to foreigners (Mubarak2004).

The population of people who had come to make Riyadh better is essentially subjugated to their working role in the local communities, as they rarely are able to take part in the social activities around the city. This contributes to the sprawling of the city as a place full of specific zones and communities that have trouble communicating with the outside environments. While more recently the balance has shifted, the foreign workers within the city still continue to be placed and isolated in other parts of the city.

A. City master plans

First Master Plan (Doxiadis), 1973

The departure from traditional design standards of the city culminated in the adoption of the first Master Plan for the city in 1973 by the Council of Ministers. The plan which was prepared by Doxiadis Associates International, provided for growth of the city in a north direction parallel to the dry basin of Wadi Hanifah to the west. Wadi Hanifah is a system of deep dry water basin located between flat plateaus and benches and has traditionally comprised a chain of agricultural oases. Doxiadis introduced a linear growth concept for the city along a central spine running in a north south direction, thus avoiding the encroachment of the city onto Wadi Hanifah system. The Dioxides Master plan introduce a physical plan that has been extended over time to accommodate an ever frenzied speculative sub-divisioning process. The main principles of the Dioxides master plan can be outlined as follows:

- A city wide grid plan comprising a system of highways that circumscribe super-blocks of 2*2 Km², on the slightly rising and falling topography of the city. It sorted the city area into functional land-use plan which has left the city with a profound urban form, essentially a lower income service oriented, industrial south-west, set against an upper income residential, commercial and administrative north-east.

Fig. 4 in 1976, subdivided land exceeded the 1971 Doxiadis Master Plan of 300 Km² (dotted line) the area of subdivided land added an additional 400 Km² to the master plan.

- City-scale zoning regulations which included type and density of residential development, and minimum lot sizes for new residential areas. However, zoning regulations were stopped in relation to special area plans such as historical and environmental areas provisions.
- The included design details of individual action area plans, covering 11.5 Km² in an effort to revitalize the city’s center.

By completing the master’s plans, the authorities sought to control Riyadh and other major cities as it was phenomenal growth. Simple physical planning of the past, mainly the laying- out of land subdivisions according to planning by law measures implemented by municipalities of the cities. City master plans were thought to create more economically and efficient urban systems in line with national economic growth plans. The Doxiadis planners pictured a functional city, set on a modular grid, a simple, straight-forward, easy to control and a clear urban framework for the estimation of city’s population to be growing at 100,000 per year. It was estimated that the 1970s plan would serve the city’s needs u to the year 2000. The modern outcome seemed inevitable: people abandoned the traditional built environment all together. However, the process of the laying land subdivisions using grid started with the Manfouhah subdivision in 1940s, headed the total arrangement of the city into super blocks of 2*2 Km² by Doxiadis. The plan was established based on the city segregation income, supposing economic plan depended on the population, which hitherto valued social ties and relations over economic privatizm (Mubarak 1992).

The kingdom’s approach to planning mirrored the planning followed by developing countries at that time. The approach of contracting western consultants to prepare master plans was popular in many countries of the Third World. They were
arch-typical solutions to rapidly expanding cities. They were long-range, multi-phase conceptualizations of a town’s future growth. Master plans constitute comprehensive land use and infrastructure development plans, projected in tune with vigorous national economic growth schemes, all sought to facilitate economic prosperity and social stability through manipulating the spatial system. However, these plans were more technical documents than realistic programs, reflective of communities’ individual needs. This was physical planning approaches which employed in Third World countries” (Mubarak 1992)

Oil wealth has enabled the government to embark upon vigorous national and urban planning schemes aimed at increasing living-standards of population by all feasible means such as better housing and hygiene) and by upgrading the built environment for projected future economic prosperity. Though progressive, these efforts were wrought without public input. By shifting to comprehensive master planning, the authorities sought to control Riyadh’s phenomenal growth.

Riyadh’s political centrality, its growth and concentration of government, industry, and services and with a population 4.5 million increasing at an 8% per year, the city has become a behemoth sprawl in a desert landscape that is increasingly becoming unsustainable (Mubarak 2004). Like other urban centers in the Arabian Peninsula, agricultural land is rare, and cities did not develop as same as marketing centres to support local hinterlands. Rather, urban economy and accessibility to water and power supplies which drew people to Riyadh and the city owes its impetus to the fortuitous discovery of oil, which has been the catalyst for the massive urban development in the city.

Fig. 5 Scattered sprawl characterizes the contemporary urban form of Riyadh and preempts its urban form for decades to come.

B. The second Master Plan (SCET International) 1982

In 1976, SECT international was retained by the Ministry of Municipal and Rural Affairs (MOMRA) to update the Doxiadis Master Plan. Following the oil boom of the early 1970, mega-land owners realized that money could be made laying out roads at the periphery of the city. The original Doxiadis Plan designated a city area of 204Km² and did not foresee the exponential growth of the city population and the associated channeling of massive financial savings in the real market. By 1977, the subdivision exceeded the original Doxiadis plan boundary of 300 Km² to cover a total area of 700 Km², resulting in an extraordinary urban sprawl. This sprawl resulted partly from the privatization of Saudi Arabia life and the increasing tendency to live in detached homes, but mostly from the real estate mania of the booming decade. The revised Master plan by SCET, which was completed in 1982, included 250Km²of vacant approved sub-divisions. Subsequently, more sub-divisions were approved beyond the boundary of SCET.

Riyadh suburban sprawl has been a result of causes not similar to those in another countries such as United States namely investors, consumers, and businesses seeking inexpensive land where congestion is low cost auto travel which allow people to accommodate far of their work places. This development resulted in distinctive sprawl similar to sprawl character in United States by the followings: Commercial band, Leapfrog development, large scattered expanses, and low-density residential improvement (Mubarak 2004).

IV. THE IMPACT OF PLANNING ON GROWTH AND DEVELOPMENT IN RIYADH, SAUDI ARABIA, 1970–1990

The unsustainable trends in the transport sector on a global scale are made obvious by the rapidly growing demand for transport activity (for both passenger and freight) where “it is predicted to roughly double between 2005 and 2050” (UNEP, 2011). In the absence of institutional capacity that can introduce regulations and offer incentives for more sustainable patterns of transport, the economic, societal, and environmental costs of these trends will lead to deterioration in the quality of life. The effects of unsustainable trends in transportation can be summarized as follows:

- Increased energy consumption, which is associated with energy security risks for oil-importing countries, and opportunity costs for oil-producing countries.
- High contribution to greenhouse gas emissions that cause climate change.
- Traffic congestion and associated time delays and productivity losses.
- Deterioration of rural and agricultural communities (through land misuse and migration).
- Inequitable access to jobs, services and markets and hence increased poverty.
- Weak contribution to equitable social development and cohesion.
- Deterioration in public health (caused by air pollution and stress).
- Reduction in human safety (reflected by high death and injuries rates caused by traffic accidents).
- Depletion of resources and increased contribution to solid waste loading.
Furthermore, low performing transportation infrastructure in the Riyadh has adversely affected trade due to higher costs, delays, and uncertainty. As trade is one of the main drivers for economic activity, transportation infrastructure remains not fully attuned to economic growth in many countries in the region.

Population growth and urbanization in Riyadh city have induced a rapid growth in urban transport demand, while improvements in the transport system and supply have not kept pace with the growth in demand, creating a shortage in supply levels. Moreover, current transport infrastructure investment trends encourage urban sprawling, with negative social, economic, and environmental consequences. The result is restricted mixed land use practices in urban areas, increased demand for more roads, increased levels of private car ownership, and inefficient rural and urban development.

And from the social perspective in Saudi Arabia, Transportation can contribute to equitable social development by providing populations in rural and urban centres, especially the poor, affordable, dependable, and safe access to marketplaces, health care centres, schools, and other destinations where social and administrative services are delivered and economic activities take place. A World Bank (2010) transport sector brief suggests that in Saudi Arabia “there are specific areas, namely road safety, women’s empowerment, and the accessibility of persons with reduced mobility (PMR), where the sector’s contribution could be enhanced if there was greater understanding of issues among governments and focused interventions whenever justified.” Although several Arab countries are signatories to the Convention on the Rights of Persons with Disabilities, none seem to have started to implement the Convention in the transport sector especially Saudi Arabia. Although action towards transport infrastructure growth and expansion is taking place in Saudi Arabia, the benefits have not been large enough or equally distributed, forfeiting social, environmental, and economic opportunities.

According to research done by Royal HaskoningDHV, the data of bottlenecks have been identified in 30 locations with priority order based on an un-weighted combination of:

- Level of congestion
- Actual and predicted traffic volumes
- Actual delays
- Problem solving capabilities

The resulting priority order of the bottlenecks to be involved in this paper is only based on traffic related criteria. In preparation of the realization of the measures, other priorities can be added for example combining measures on signalized intersections together, or combining measures that are geographical close to each other. These locations have prioritized and shorted in 30 bottlenecks as follows (Table 2):

**A. Location of bottle necks**

The figure below indicates the 37 locations that were studied by Royal HaskoningDHV and analysed as part of the short lists.
Riyadh has experienced speed population tumour, spatial scattered expanses, and low-density residential improvements: Commercial band, Leapfrog development, large cost auto travel which allow people to accommodate far of businesses seeking inexpensive land where congestion is low, such as developed ones namely investors infrastructure development. Riyadh suburban sprawl has been spatial expansion has been largely coincided by transportation travel requirement, and result in congestion. While urban population growth. This growth caused more daily trips and outward growth. It was found that the growth of urban growth, they could be recognized as sprawl expansion transportation infrastructure. Riyadh city has two different economic progress, population increasing, government forces have caused the spatial changes over time, mainly development during the last forty years. Various driving growth, and land use change and transportation infrastructure [2] (Mubarak 2004).

V. CONCLUSION

Riyadh has experienced speed population tumour, spatial growth, and land use change and transportation infrastructure development during the last forty years. Various driving forces have caused the spatial changes over time, mainly economic progress, population increasing, government attitudes, the city master plans, and the growth of transportation infrastructure. Riyadh city has two different urban growth, they could be recognized as sprawl expansion and outward growth. It was found that the growth of transportation infrastructure has been mainly affected by population growth. This growth caused more daily trips and travel requirement, and result in congestion. While urban spatial expansion has been largely coincided by transportation infrastructure development. Riyadh suburban sprawl has been a result of causes not similar to those in another countries such as developed ones namely investors, consumers, and businesses seeking inexpensive land where congestion is low cost auto travel which allow people to accommodate far of their work places. This development resulted in distinctive sprawl similar to sprawl character in United States by the followings: Commercial band, Leapfrog development, large scattered expahses, and low-density residential improvement (Mubarak 2004).

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