CHAPTER 9

The Urban and Regional Economy
Directing Land Use and Transportation Planning and Development

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Abstract

This chapter locates the urban and regional economy in the context of integrated land use and transportation development planning. Dialogue departure points that constitute and represent the rural and urban interdependencies are explored. The discussion takes into account the scale, hierarchy and swing in land use and transportation theoretical and practical interventions regarding urban and regional economy contestations. On one level, the nature of urban and regional economy relations is unpacked (i.e. is it forward or backward; is it positive and or negative; is it parasitic or symbiotic, etc.). On another level, questions regarding the form, nature and extent of the urban and regional economy exchange systems are investigated (i.e. does this involve labour (skilled, semi-skilled or unskilled), resources (raw crops, raw fruits, minerals or processed products, or services, etc.). In addition, the nature and format of the urban and regional economy dependencies is addressed (is it a value chain activity, does it promote local economic development, empowerment or otherwise, etc.) between the continuum, noting the contribution and role that the urban and regional economy plays in state growth and development paths. The issues raised before are discussed in the context of understanding better how land use and transportation can be used in advancing the goals and objectives of urban and regional economies. Making use of case studies, reviewed from literature, key strands are isolated for policy options and intervention choices. Sustainable and integrated land use and transportation options are introduced and discussed as catalytic and flagship measures for valorizing urban and regional economies.

Keywords: Directing, land use, planning, transportation, urban and regional economy.
1 Introduction

People, goods and resources move along the urban and regional economy spectrum. Likewise, the problems and challenges that communities face are structural and systematic as well, meaning that one community’s problem in a region spills over into the broader region. Peer effect and spill overs inextricably link urban regional economies with the rest of the immediate and distant regions. Rural and urban regional development is therefore much more than agriculture and industrial development; it entails a hierarchy of linkages that connect local, national and international resources (such as labour in terms of migration and or migrants, cultural mixing and dynamics, spatial adjustments, transportation corridors, etc.), markets, distribution, services and enterprises. A hierarchy of transportation links and networks undergirds the forward and backward movement and distribution of goods and services across different spatial spheres of any urban or regional economy [1]. Studies exist that indicate that there is a high degree of connectedness between urban and regional economies [2–4]. No bright lines separate the two types of areas, either geographically or economically. This suggests that urban economies are to drive national prosperity, urban areas will need a healthy and sustainable regional economy and culture. Likewise, if rural regional economies are to flourish, they will surely depend on vibrant, well-functioning cities and suburbs. Past research has demonstrated that economic prosperity (or economic decline) is experienced across an entire region because of the interdependences between urban economies and its extended rural regional economies and these interdependences are dynamic [5]. Employment is probably the most noticeable way that relative economic prosperity is shared across an urban region and its suburbs (and exurbs) [6]. Central city decline can reach a tipping point where further decline becomes impossible to stem, with large negative implications for neighbouring suburbs/exurbs or peri-urban or immediate rural hinterland [5,7]. In order to properly situate the discussion in context key terms and concepts framing the urban and regional economy are provided. The purpose is to establish a common platform and understanding of how such terms are consistently used and interpreted in the context of this chapter.

1.1 Definition of key concepts and terms

1.1.1 The urban and regional economy
This is defined as the collective (re) construction and structuring of the spatial organization of activities within, between and across cities and regions. In attempts to explain observed patterns of land use, the urban and regional economist examines the intra-city, inter-city, intra-region and inter-regional transportation, location choices of firms and households. Considering the spatial organization of activities within, between and across cities and rural regions, urban and regional economics addresses questions in terms of what determines the price of land and why those prices vary across space, the economic forces that caused the spread of employment from the central core of cities or rural regions outward, the role and
contribution of the transport network system to supporting development, identifying land-use controls, such as zoning, and interpreting how such controls affect the urban and regional economy [8].

1.1.2 Transportation planning or transport planning
This is defined as a scientific and technical process that historically follows the rational planning model of defining goals and objectives, identifying problems, generating alternatives, evaluating alternatives and developing and generating intervention plans and options to address identified constraints in any setting. The key purpose of transportation planning is to plan, design, deliver, manage and review transportation plans, programmes, policies and investment decisions while at the same time balancing the needs of society, the economy and the environment. Transportation planning therefore places emphasis on integration of the following sub-sectors, namely:

- Different modes of transport;
- Integration with the environment;
- Integration with land use planning;
- Integration with policies for education, health and wealth creation.

Urban and regional transportation is a theme of urban and regional economics because it affects land-use patterns as transportation affects the relative accessibility of different sites. Issues that tie urban and regional transportation to urban and regional economics include the deficit that most transit authorities have, and efficiency questions about proposed transportation developments such as light-rail [8].

1.1.3 Integrated land use and transportation planning and management
This concept recognises that land use and transportation are interlinked as land use affects and is affected by transportation policy. Consequently, in order to have an efficient and effective transport system, there is an implied need for getting the land use planning right, and planning for urban and rural development implies getting the transport access right. In other words, the different policy spheres and disciplines have to work together to deliver the best results for the functioning of a region, town or urban areas. While land use distribution and the design of development does not necessarily itself cause shifts towards more sustainable travel behaviour, it can provide choice and support more sustainable behaviour—and at least improve on previous practice in which the most sustainable options were often ‘designed out’ from the outset. A combination of complementary and dynamic land use planning measures can provide an integrated package where each element reinforces each other towards the ‘more sustainable’ outcome such as low carbon economies [9].

1.1.4 Sustainable urban and regional economic development planning
This can generally be defined as ‘sustainable’ if it promotes a healthy balance in terms of short trips which can be made by public and/or non-motorised transport
versus mandatory trips to be undertaken by different public and private road efficient traffic modes. In addition to the urban perspective, it is also necessary to consider transport and land-use planning in wider contexts, for example the regional context, so that transport investment can be used effectively to support regional development. The goals set for regional development and transport planning need to be consistent with each other [9].

1.1.5 Land use planning
This is defined as focusing not only on the transport system, but also on the land use patterns which generate the demand for transport. The overall emphasis of land use transport is usually on shaping the pattern of development and influencing the location, scale, density, design and mix of land uses in order to reduce the need to travel, reduce the length of journeys and make it easier for people to access jobs, shopping, leisure facilities and services by public transport, walking and cycling [9].

2 Reading and Interpretation of the Urban and Regional Economy: Hearing and Seeking to Understand the Voices and Record of Theory and Practice

2.1 Why focus on the urban and regional economy: theoretical and practical demands

Urban and rural practitioners, experts, specialist, researchers and regional science scholars continue to distinguish between ‘urban or metro’ and ‘rural or non-metro’ areas, and erroneously portray urban areas especially in South Africa to be synonymous with urbanized areas and non-urban as rural. There are policy and interventions implications that a failure to properly differentiate the two regions can have for urban and rural development planning and sustainability [10]. When it comes to a working definition of the urban–regional economic interdependencies, the point of departure is recognition that the urban–regional economic interdependencies must be perceived in a multi-dimensional way. This views urban–regional economic interdependencies that affect cities as a system exhibiting a multiplicity of dynamic biophysical and socioeconomic features shaped by the dynamics of rural-urban interdependencies and flows into and across the systems [11].

Many intensive urban-regional economic interdependencies studies and policy intervention initiatives are concerned with the supply of specific resources or the fact that migration of people increasingly occurs over very considerable distances. Furthermore, the simple idea that urban hinterlands relate only to the immediate adjacent city has become obsolete where networks of cities and the rural areas in between interact in complex ways.

1. Even in the case of megacities (metropolitan regions), there are usually subsidiary towns and even cities to which certain peri-urban activities within the megacity sub-region relate; there is increasing experience of decline in megacity attractive power and even decanting of activities and a re-orientation of
regional-urban economic interdependencies to secondary cities with the megacities themselves relating more to very long-distant, including international, resource and migration flows;
2. Since the outset of the industrialisation process, urbanisation in intensely industrializing areas, together with their related rural-urban flows, have tended to be regional rather than connected to particular cities. With the constant relocation of the centres of global manufacturing industry, this tendency has become more marked with rurally-located industries causing ad-hoc urbanisation often over wide areas;
3. In fact even traditionally rich farming areas have often developed networks of urban places with different places specialising in satisfying different regional needs such that rural economies and societies interacted with more than one village, town or city for different purposes (central place theory).

The particular emphasis of interdependency between cities and their hinterland has certain components that are near universal and others which are more specific to the particular city and the particular sub-region. Besides their internal functions common to all communities (production and retailing for immediate consumption, social services, etc.) externally-oriented functions of cities that justify their importance include urban and peri-urban agriculture including food security, the availability and protection of natural resources e.g. water and land, land access and tenure, spatial planning and land-use management, cultural practices and influence on urban-rural livelihoods, migration patterns (local and foreign nationals), availability of local economic development opportunities, and basic service delivery across the spaces including infrastructural needs.

2.2 How land use and transportation development planning can support and promote higher urban and regional economy performance: theoretical and practical demands

The connection between transportation and land use is a fundamental concept in transportation. Transportation and land use are inexorably connected. Everything that happens to land use has transportation implications and every transportation action affects land use. Transportation infrastructure and services investments help shape land use by providing infrastructure to improve accessibility and mobility. Accessibility can be measured by the number of travel opportunities or destinations within a particular travel radius, measured in terms of either travel time or distance. On the other hand, mobility is a measure of the ability to move efficiently between origins and these destinations. Thus, mobility is directly influenced by the layout of the transportation network and the level of service it offers. Land development generates travel, and travel generates the need for new facilities, which in turn increases accessibility and attracts further development.

Transportation systems, themselves influenced by a variety of public and private factors, can lead to large changes in land development patterns. However, many other factors also influence land use. These include overall population and economic
growth, individual preferences and lifestyle choices, other infrastructure, changing technology, local planning and zoning policies and geographic and topographic conditions. For this reason, state Departments of Transport is often only one of many agencies that develop programs to coordinate transportation and land use decisions. Transportation investment can be an important factor in influencing economic growth. Highway facilities can attract economic growth by increasing access to new areas, which in turn may provide access to skilled labour markets and inexpensive land for new businesses. As transportation systems change, increased accessibility to new areas will make them attractive for development. In addition, land and economic impacts of transportation must be understood in their geographic context. The increased access to land provided by new or upgraded transportation facilities can either induce new development or change existing development patterns. The extent of the impact depends upon the geographic scope of the analysis. A small impact area can show an increase in economic activity, but when a larger area is defined, the impact will appear as a shift in development within the region or local jurisdiction. The gains to one location are matched by losses at another location. These are called ‘transfer effects.’ Economic benefits resulting from roadway improvements or initial construction vary depending on the viewpoint of the analyst. Benefits observed at the local level or surrounding the highway interchange may not be realized when observed at a national level. If the regional economy is growing, transportation improvements are likely to have a big effect on land development patterns. If the economy is stagnant, transportation system improvements are less likely to induce new land development, but rather cause it to shift from one location to another. When considering the potential impact of transportation projects it is important to recognize that there are many other factors, locally, regionally and nationally, that influence where land development occurs [12].

In current practice, very few Metropolitan and Regional Planning Agencies attempt to capture the effects of transportation system changes on land use, and the consequent feedback effects on transportation system performance, despite substantial evidence that these effects may be significant [13]. The impact of transportation improvements on urban and regional development is perhaps one of the most important, and contested concerns in metropolitan and regional transportation planning today. On the one hand, it has long been known that transportation accessibility fundamentally influences firm location, household location, real estate development, land prices and density [14]. The practice of transportation planning, however, has until recently routinely ignored the effects of major transportation improvements on urban form, and the consequent indirect effects that such induced development can have on the efficacy of alternative transportation investment strategies [13].

2.3 What has been the missing link: reflections on 1 and 2 above and inherent shortcomings or gaps identified and discussed

In the 1950s, communities (urban and rural) were seen to be detached from their neighbours. The economies of rural and urban communities were separate and
distinct. However, in the twenty-first century, new technologies and transportation innovations have changed these circumstances. Communities now are linked in a web of interrelated networks amidst a growing non-metro-to-metro commuting evidenced by increasing urban spillovers that blur the distinction between rural and urban areas. These spillovers, among other things, are indicative of a need for new urban–regional economic interdependencies that affect cities regional approach as opposed to existing segregated approaches to economic development and policy making in rural as well as urban communities. Figure 1 depicts the reciprocal urban–regional economic interdependencies ‘wheels’ that can exist in any national space.

Dahms and McComb [16], e.g. recognise that *counter-urbanisation* includes the redistribution of population from urban to regional economies involving population movement from larger cities to smaller towns. In this respect, it is useful to classify urban and regional economic areas into three broad categories:

1. Areas possessing ‘amenity’ qualities; attracting particularly retiree migrants.
2. Accessible rural areas that lie within commuting distance of metropolitan areas.
3. Remote rural areas outside the commuting distance of metropolitan or urban centres.

Typically, a large proportion of rural out-migration occurs directly to large urban areas, bypassing nearby settlements. For instance, the largest number of out-migrants from remote rural areas tends to move directly into large cities. On the

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**Figure 1:** Typical reciprocal urban and regional economic interdependencies ‘Wheels’. *Source:* Atkinson [7], Adell [11] and Hall [15].
other hand, generally, almost all population movements from large urban areas are accounted for by short-distance movements to nearby accessible rural areas or accessible small towns. In addition, Atkinson [7] makes the case that desegregating investment in metropolitan areas into non-metro areas among other thing, could have significant effects for both urban and non-metro areas. Some of the impacts include the following: Helping to protect and restore the environment by paying rural people for their stewardship of natural resources; produce high quality de-commodified food and fiber to meet an increasing demand for safer and better products; serve as laboratories for social innovation and test tubes for innovative solutions to societal problems to build on the merits of small community size and strong social bonds [17]; to produce healthy, well-educated future citizens who will be assets to the country generally, and to maintain population distribution and prevent urban crowding by creating smaller population centers that will expand and take off some of the development pressures on congested metropolitan areas [17–19].

Equally, transport policies can affect land use decisions. New roads are often built to stimulate economic development, but travel time savings from new road and rail capacity will typically encourage more travel over longer distances. When location choices are made, firms and residents will be influenced by the access that transport provides, but may well choose to move away from areas that are congested, noisy or polluted. Policies aiming to restrict the demand for travel in congested areas may also encourage firms to relocate. One of the most serious impacts of all of these reactions is the encouragement of urban sprawl, which consumes green space and agricultural land, and reduces the sustainability of development. These complex interactions, as illustrated in Fig. 1, can take place over a considerable time. Some developments will anticipate the building of a new road or airport; others will only occur when changes in business opportunities or family life stage prompt a move. Some decisions will be made by governments, such as the location of new schools and hospitals; others will be influenced by government policy on land use control; but the majority will be taken by individuals and firms within the context of current land use controls. While land use policies may have a less immediate impact on the transport system than policies that impact directly on transport, they are very important in providing the context within which transport policies may succeed or fail [20].

2.3.1 The effects of land use on transport demand
A given development will affect transport demand in three ways, in terms of the number of person and freight journeys attracted, the origins or destinations of those journeys (and hence their length), and the modes of transport used. These impacts are relatively well understood. Most countries have databases that allow planners to estimate the number of person journeys that a given type of development will attract; some also cover freight activity. Journey length and mode will be affected to a greater extent by local conditions, but the general trends are well understood. These considerations suggest a number of land use policies that might help meet transport policy objectives. These include land use controls on the
nature and density of development, controls on parking provision in new developments, controls on the way in which developments are used and pricing of land use to reflect transport impacts and benefits. The last of these, in particular, has attracted relatively little research activity to date.

2.3.2 The effects of transport on land use
The impacts of transport on land use are generally less well understood, and have been the focus of significant recent research. Much work has focused on the effects of improved accessibility, through faster, lower cost journeys, on relocation of activities and the stimulus of new development. The converse effect of reduced accessibility and higher travel costs, which might arise through demand management and pricing policies, has attracted less attention. Transport policies can also affect land use by changing environmental conditions or, more subtly, by changing the image of an area. These impacts are less well understood than those of changes in accessibility.

2.3.3 The resulting interaction between transport and land use
A land use policy change will affect demand for travel, which may well in turn lead to pressure for new transport investment or demand management. At the same time, transport policies will influence land use, which will also lead to new patterns of travel and pressure for further changes in transport policy. These land use–transport interactions, which may take place over an extended timescale, have been the focus of a substantial recent research programme (refer to Table 1 [20]).

Transport policies can affect the scale, size and patterns of development and land use activity by making locations more, or less, accessible but also by changing the quality of the environment and the image of an area. Accessibility will be increased where the cost of travel or the time spent travelling are reduced. Thus

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<th>Indicator</th>
<th>Factor</th>
<th>Impact area</th>
<th>Observed impacts</th>
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<tbody>
<tr>
<td>Land use implications for transport</td>
<td>Residential density</td>
<td>Trip length</td>
<td>Numerous studies support the hypothesis that higher density combined with mixed land use leads to shorter trips. However, the impact is much weaker if travel cost differences are accounted for</td>
</tr>
<tr>
<td>Trip frequency</td>
<td>Little or no impact observed</td>
<td></td>
<td></td>
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<tr>
<td>Mode choice</td>
<td>The hypothesis that residential density is positively correlated with public transport use and negatively with car use is widely confirmed</td>
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(Continued)
Table 1: Observed impact of land use in empirical studies (Continued).

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Factor</th>
<th>Impact area</th>
<th>Observed impacts</th>
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<tbody>
<tr>
<td>Employment density</td>
<td>Trip length</td>
<td>In several studies the hypothesis was confirmed that a balance between workers and jobs results in shorter work trips. However this could not be confirmed in other studies. Mono-functional employment centres and dormitory suburbs however have predominantly longer trips.</td>
<td></td>
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<tr>
<td>Trip frequency</td>
<td></td>
<td>No significant impact has been found to date.</td>
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<tr>
<td>Mode choice</td>
<td></td>
<td>Higher employment density is likely to induce more public transport use.</td>
<td></td>
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<tr>
<td>Neighbourhood design</td>
<td>Trip length</td>
<td>American studies confirmed that 'traditional' neighbourhoods have shorter trips than car orientated suburbs. Similar results are found in Europe.</td>
<td></td>
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<tr>
<td>Trip frequency</td>
<td></td>
<td>No effects are reported</td>
<td></td>
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<tr>
<td>Mode choice</td>
<td></td>
<td>Traditional neighbourhoods have significantly higher shares of public transport, walking and cycling. However, design factors lose in importance once socio-economic characteristics of the population are accounted for</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Trip length</td>
<td>Distances to main employment centres is an important determinant of distance travelled</td>
<td></td>
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<tr>
<td>Trip frequency</td>
<td></td>
<td>No effect observed</td>
<td></td>
</tr>
<tr>
<td>Mode choice</td>
<td></td>
<td>Distance to public transport stops strongly influencing public transport use</td>
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<tr>
<td>City size</td>
<td>Trip length</td>
<td>Mean travel distances are lowest in large urban areas and highest in rural settlements</td>
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</tr>
<tr>
<td>Trip frequency</td>
<td></td>
<td>No effect observed</td>
<td></td>
</tr>
<tr>
<td>Mode choice</td>
<td></td>
<td>Public transport use is highest in large cities and smallest in rural settlements</td>
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Source: European Communities [20].
new higher speed roads and railways will encourage development close to junctions and stations, and lower fares will encourage longer distance travel, particularly to work (refer to Table 2 [20]).

2.3.4 The resulting interaction between transport and land use
It is clear from empirical study results that there is a two-way interaction between transport and land use policies, with the potential for each to support or undermine the other. Moreover, these interactions can take place over an extended period. There is virtually no empirical evidence on these interactions, given the difficulty of finding cities that have introduced changes in both sets of policies together, and of isolating the impacts over time from changes in context. The only exception is the cross-sectional studies which have compared cities in different countries and with different approaches to transport and land use policy. The danger with these is that they suggest a causal process which may not be transferable to a different context.

Sieverts [21], however, stresses that it is imperative not to draw a rigid line between urban sprawl and the compact city and emphasizes the importance of avoiding a polarizing debate in this regard. In his book, Cities without Cities, Sieverts asserts that the modern built environment is not simply a city, but increasingly a number of large urban conurbations connected by transportation corridors. Using the German term, Zwischenstadt, Sieverts discusses the creation of a city web or ‘mega city’. This emergence has been facilitated by a movement from a

<table>
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<tr>
<th>Indicator Factor</th>
<th>Impact area</th>
<th>Observed impacts</th>
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<tbody>
<tr>
<td>Accessibility</td>
<td>Residential location</td>
<td>More accessible locations are developed faster. If accessibility in the whole</td>
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<tr>
<td>Transport and</td>
<td></td>
<td>region grows, residential development will be more dispersed</td>
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<td>land use</td>
<td></td>
<td></td>
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<tr>
<td>integration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retail location</td>
<td></td>
<td>Retail development occurs either at highly accessible inner-city locations or on peripheral sites with ample parking and good road accessibility</td>
</tr>
</tbody>
</table>

Source: Adapted from European Commission [20].
strong social cohesion and interest in towns and cities to individuals pursuing their own goals, with global social links and little interest in ‘their’ city [22]. Sieverts points out that the ‘difficulties in managing or even controlling the city web, which is divided arbitrarily into areas of limited size and political power, are enormous’. As a consequence, various areas compete with each other rather than co-operate. Instead of applying the simple conjecture of ‘sprawl’, a better understanding and improved planning systems for a new, emerging urban form is needed. Zwischenstadt is described as a new form of urbanity experienced internationally. It is the urbanized landscape or the landscaped city. Sieverts calls this the Zwischenstadt, or ‘in-between city’, as it exists between old historical city centres and open countryside, between place as a living space and the non-places of movement, between small local economic cycles and the dependency on the world market. Land use and transportation are therefore two sides of the same coin. The shape and form of road networks have always corresponded closely to the location, structure and size of towns, cities and the countryside. Yet, as the number and size of cities and urban regions grew, as auto travel became ubiquitous and as land-use and transportation planning became increasingly specialized, the symbiotic relationship between land use and transportation becomes difficult to manage. The recent popularity of growth management and smart growth stems from the recognition that land-use and transportation planning must be interconnected to benefit safe and effective travel. This interconnectedness needs to happen not only in planning, but in implementation as well as in management [23].

3 Building Common Platforms for Urban and Regional Economy Development through Employing Land Use and Transportation Interventions

3.1 Towards a Conceptual framework for directing the urban and regional economy through land use and transportation levers

The major theoretical approaches to explain this two-way interaction of land use and transport in metropolitan areas include technical theories (urban mobility systems), economic theories (cities as markets) and social theories (society and urban space). These systems vary with regard to spatial structure, residential density, distribution of land uses and predominant transport mode. Attempts to determine the distribution of land use in contemporary cities have yielded different results. While it has almost become common wisdom that systems involving dispersed development are much less favourable with regard to average trip length, energy consumption, greenhouse gas emissions and land take, there is no unequivocal evidence for the advantages of either compact-city or decentralised concentration policies. The results of empirical studies of land-use transport interaction conclude that residential density has been shown to be inversely related to trip length [24]. Centralisation of employment results in longer trips, while trip lengths are shorter in areas with a balanced residents-to-workers ratio. American studies confirm that
attractive neighbourhood facilities also contribute to shorter average trip lengths. The theoretical insight that distance of residential locations to employment centres is an important determinant of average trip length, has been confirmed empirically. The larger a city is, the shorter are mean travel distances, with the exception of some of the largest metropolises. None of the studies reported a significant impact of any factor on trip frequency. Residential and employment density as well as large agglomeration size and rapid access to public transport stops of a location were found to be positively correlated with the modal share of public transport. Accessibility was reported to be of varying importance for different types of land uses. It is an essential location factor for retail, office and residential uses. Locations with high accessibility tend to be developed faster than other areas.

The value of accessibility to manufacturing industries varies considerably, depending mainly on the goods produced. In general, ubiquitous improvements in accessibility invoke a more dispersed spatial organisation of land uses. Regarding impacts of transport policies on transport patterns, causal relationships are relatively undisputed, and empirical studies largely agree on the impact mechanisms. While travel cost and travel time tend to have a negative impact on trip length, high accessibility of a location generates longer work and leisure trips [25]. Land use planning policies have a major impact not only on spatial development but also on travel patterns. Development restrictions, e.g. a green belt around the city, can retard the sub urbanisation of population and workplaces thus strengthening the economy of the city centre. The construction of an outer ring road results in further decentralisation, relief of congestion and increasing travel distances. New public transport lines have little impact on location choice but tend to strengthen the inner-city economy. Introducing speed limits results in shorter trips and increased use of public transport. The effect of increased fuel taxes on the number and length of car trips is particularly strong. Significant fuel tax increases curb the further dispersal of residences and workplaces. Higher downtown or CBD parking fees generate negative economic effects in the centre and make out-of-town shopping centres more attractive. Public transport use that is free of charge reinforces a pattern of centralised employment and decentralised residential locations. Volume and length of car trips remain by and large unaffected by this measure. The ESTEEM study (1998) showed that the share of automotive travel in modal choice decreases with increasing size for cities above a threshold of 750,000 inhabitants. For cities below the threshold, a slightly positive relationship between city size and car use was found [25].

In contributing to how the rural-urban interdependence could be harnessed, Kubisch [26] utilized a framework titled ‘people-place-prosperity.’ She posits that the challenges of rural and urban areas as a result of their interdependence can be addressed through a rural-urban alliance that focuses on improved and responsive public education that builds the capacities of individuals in both regions. The requirements for the ‘place’ in Kubisch’s framework focuses on countryside stewardship where urban areas are required to compensate rural areas for taking care and preserving the natural environment. She posits further that regional responses to globalization will reap economic prosperity for both rural and urban
areas because as Miller [27] puts it, globalization rewards regions with critical mass. And in the case of the framework proposed by Kubisch [26], public education will enable communities to build the human capacity and critical masses to deal with environmental and natural resource challenges and eventually globalization.

It is important to stress that adequate infrastructure such as transportation, communication, energy and basic human and social services that are necessary for social capital development are exceptionally vital for a strong urban and regional inter-connectivity and dependence. Okpala [28] has argued that the availability of adequate infrastructure such as transportation facilities has the power to generate ease of mobility and access to employment and also bring about enhancements in the incomes of individuals and households. What this means is that there is an emerging interdependence between metro and non-metro areas and hence between urban and rural areas which can generate both opportunities and challenges for economic development policymakers. Figure 2 presents a schematic illustration of urban and regional economic interdependencies processes.

Figure 2 indicates that urban and regional areas can be classified into a number of archetypes making use of the urban–regional economic interdependency phenomena, namely:

- Urban and regional areas as concentrations of work (both old and new)
- Urban and regional economic cluster formation
- Urban and regional economic network formation
- Urban and regional economies–region formation
- World supply development regions

Urban and regional economic areas as concentrations of work both old and new relates to the materialist position where one seeks to answer what work is done in the urban regions. Jane Jacob’s two types of work: i.e. old work (production work) and new work (development work) come into play. Urban and regional areas can therefore grow by adding old work but this does not expand the economic life. Urban and regional areas adding new work are dynamic because their division of labour becomes more complex. Urban and regional cluster formation relates to the formation of either urban or rural clusters as part of the centralization mechanism within urban areas. If urban areas and regional areas are rich milieu with associated divisions of talented labour, such areas will provide the human raw material for creating new work via innovation and imitation.

Urban and regional network formation identifies that no urban or rural area is an island. Instead every urban or regional area is networked in relations with other urban areas thus providing the vital cosmopolitan nature of urban areas. This underscores that urban areas and regional areas are inherently co-operative. If one conceptualizes urban areas as rich milieu, this is owed to them being the product of urban region networks. Urban and regional region formation indicates and extends to urban and rural regions extending to immediate neighbours to create urban-region or rural-region economies. This is the economic power of cities and
rural areas to mould landscapes to their needs. This represents a balanced power projection of cities and rural regions which is a win-win situation. Globalisation is associated with multi-nodal, mega-city regions. Two such regions can be identified, namely dynamic nodes in stagnant regions and dynamic nodes in dynamic regions. This is an example of two different processes that require completely different policy and planning responses. World supply development regions refer to a concept in which there is also a negative impact of city power with unbalanced projection. Simple regional economies are created to service the various supply needs of cities. This is the ‘development of underdevelopment’ that produces vulnerable dependent regions in a classic exploitative win-lose situation. This

Figure 2: Schematic illustration of urban and regional economic interdependencies processes.
phenomenon is associated with the ‘curse of resources’, outsourced offices, de-peasantization (‘mega-city slums’). Delinking or Jacob’s ‘poorer cities need each other’ concept comes alive.

4 Unfolding and Unravelling the Story of Urban and Regional Economies: The Land Use and Transportation Dimensions

4.2 Case studies in the urban and regional economy demonstrating how land use and transportation can be used to galvanize and focus development better

Table 3 provides an overview of integrated transport and land use planning case studies focusing on the urban perspective solely. It is important to realise that a better understanding and location of integrated transport and land use planning at both the urban (micro and meso scale) level is important in complementing macro and regional scale integrated transport and land use initiatives if sustained higher rates of growth and development are to be the hallmarks of our national economies.

Table 4 provides an overview of integrated transport and land use planning case studies taking into consideration the wider regional perspective. Urban and regional economies can be directed more effectively if wider regional development approach supported by appropriate deployment of catalytic regional infrastructure and services is pursued. Thus a better understanding and location of integrated transport and land use planning at both the urban and regional scale will result in higher rates of growth and development in the national economy.

4.2 An Emerging urban – regional economic diamond’ development framework of analysis

A recently completed 2013 study in South Africa commissioned by the South African Cities Network (SACN) [29] provides useful insights regarding a better understanding of urban and regional economic linkages and their role in promoting regional and national development. The outcome of the study was the development of an Urban-Regional Economic ‘Diamond’ Development Framework of Analysis for South African cities. Four quadrants were developed, namely incubator phase (stage 1), early development (stage 2), late development (stage 3) and full (mature) development (stage 4). The incubator phase refers to cities or urban areas that exhibit weak interpretation and implementation of urban-regional economy interdependencies. Such cities or areas are still at the conceptual stage, theoretical or strategy level or do not consider at all urban economy-regional interdependencies in policy and planning initiatives. Examples as confirmed by the city interviews of such cities are Nelson Mandela Bay, Mangaung, Msunduzi and Buffalo city. Cities at the early development stage refer to cities that have an emerging and evolving structure and methodology of dealing with urban and regional economic interdependencies. There is a clear
Table 3: Integrated transport and land use planning—the urban growth and development perspective.

<table>
<thead>
<tr>
<th>Project name</th>
<th>Programme and focus</th>
<th>Findings, results and policy implications</th>
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<tbody>
<tr>
<td>SPATIAL EFFECTS 1 (Spatial Effects of the Vereina Tunnel)</td>
<td>National (Switzerland): OSD-Sustainable Mobility-Sustainable spatial development and mobility (internal research plan)</td>
<td>A study of the impact of the Vereina Tunnel (a rail tunnel providing piggyback services for both passengers and freight in a mountainous area with relatively poor roads) found that the tunnel led to a large improvement in accessibility, though not to the extent that it removed the problem of peripherality. The tunnel led to an increase in rail freight, but no significant decrease of road freight transport. Tourism in the region was boosted but there were no identifiable impacts on business location or residential location. The goals of regional development and transport planning need to be consistent.</td>
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<tr>
<td>SPATIAL EFFECTS 2 (Spatial Effects of the transport infrastructure in the Magadino Plain)</td>
<td>National (Switzerland): OSD-Sustainable Mobility-Sustainable spatial development and mobility (internal research plan)</td>
<td>A case study of land-use patterns on the Magadino Plain identified benefits from linear developments along lines of main transport routes, such as those found following rivers or in the floors of valleys, particularly if major use can be made of rail routes to connect activities along the line of development (SPATIAL EFFECTS 2). The potential spatial implications of transport infrastructure investment, such as the implications for land use, must be better and properly understood for informed decisions and catalytic intervention generation. Climate change and possible future energy scarcity present new challenges for urban planning and require policy-oriented research to provide decision makers with reliable information on the likely impacts of possible integrated strategies to cope with rising energy costs and to achieve the greenhouse gas emission targets.</td>
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Table 3: Integrated transport and land use planning—the urban growth and development perspective (Continued).

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<tr>
<td>STEPS (Scenarios for the Transport System and Energy Supply and their Potential Effects)</td>
<td>FP6-SUSTDEV-2 - Sustainable Surface Transport research shows that integrated approaches— including land use policies—are likely to prove more successful than the use of individual policies in isolation (STEPS).</td>
<td>It is particularly important to consider the interactions between transport and land use when taking a longer term view of future transport policy, such as the assessment of the future use of transport against the backcloth of future trends in energy supply and use, because these interactions are more significant in the longer term (STEPS). As we move towards a future in which energy for transport is scarcer and more expensive, there will need to be much greater co-ordination between different government sectors in order to design and implement integrated strategies covering transport policy, regional policy, urban land use policy and environmental policy (STEPS). Whilst considerable progress has been made in developing the conceptual frameworks, methodologies and toolkits for integrating transport planning and land-use planning, most notably in an urban context, much work still needs to be done on testing and proving these in real-world applications as well as rolling the concepts in wider regional development initiatives, for example to understand how they need to be adapted especially for use in particular locations and in documenting and disseminating best practice (Assess implementations in the frame of the Cities-of-Tomorrow programme (ASI), Arterial Streets towards Sustainability (ARTISTS), THE ATTRACTIVE CITY).</td>
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*Source: Adapted from Stanchev and Whiteing [9].*
Table 4: Integrated transport and land use planning—the wider regional development perspective.

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<td>(METKA, SPATIAL EFFECTS 3) (Spatial Effects of the urban railway system in Zurich)</td>
<td>National (Switzerland): OSD-Sustainable Mobility-Sustainable spatial development and mobility (internal research plan)</td>
<td>Increasing urbanisation will lead to the growing significance of large metropolitan regions, and integrated transport and land-use strategies are needed for such metropolitan areas (METKA, SPATIAL EFFECTS 3). The improved Zurich urban railway network has been found to lead to a major increase in accessibility though reduced travel times, and has had significant impact on spatial development. Development has been promoted near suburban rail stations, leading to additional jobs and the relocation of service industries as well as changes in residential patterns, all taking advantage of the rail system. These benefits did not extend to some other parts of the city region, which although designated as areas for economic redevelopment did not benefit from the enhanced rail system (SPATIAL EFFECTS 3). Planning in metropolitan regions must fully consider the range of land-use impacts of strategies such as the enhancement of suburban rail networks. Whilst such impacts can be highly positive, they can also be negative, especially when migration from central areas is encouraged. Such negative impacts can be mitigated through a holistic planning approach and the use of appropriate incentives and development controls (METKA, SPATIAL EFFECTS 3). Theoretical research is still needed to better understand the reciprocal flows between land use activities and transport systems. More research is needed to better understand and model the interaction between environmental quality and land use.</td>
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Table 4: Integrated transport and land use planning—the wider regional development perspective (Continued).

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<td>(COMPETITION POSITION AND ACCESSIBILITY ‘RANDSTAD’)</td>
<td>National (The Netherlands): CONNEKT-Public private innovation network for traffic and transport</td>
<td>Dutch research in the Randstad region has highlighted the importance of appropriate transport infrastructure investment to ensure good accessibility to the major transport international nodes (especially Schipol Airport and the port of Rotterdam) which play a key role in maintaining the competitiveness of the regional economy. Accessibility provided through coherent, well-planned transport investment can lead to important benefits in terms of labour costs and productivity, the availability of a highly educated workforce, attraction of international businesses and institutions and a more diverse economy with for example a higher profile for tourism (COMPETITION POSITION AND ACCESSIBILITY ‘RANDSTAD’). At the regional level, transport planning and investment needs to be considered alongside economic development planning and land-use planning, taking into account a wide range of issues including, for instance, the viability of major transport hubs in the region, the encouragement of inward investment, employment and the potential for tourism (COMPETITION POSITION AND ACCESSIBILITY ‘RANDSTAD’).</td>
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<tr>
<td>METKA ('Sustainable Structure for the Metropolitan Area')</td>
<td>Research project under the ‘EKOTULI - An Ecologically Efficient and Safe Transport System’ research programme, Finland.</td>
<td>Research in Finland has found that the spatial impacts of such improved rail commuter systems are not easy to predict and if beneficial outcomes are to be achieved, it is important to combine regional land-use and transport planning to ensure an integrated approach to regional planning (METKA).</td>
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(Continued)
incorporation of urban–rural linkages in activities, service delivery and growth responses. However, the cities are still struggling in terms of coming up with a clear cut policy and intervention framework to respond to the urban and regional economic phenomena. City of Cape Town and eThekwini falls in this category. Cities in the late development stage refer to cities that have established a clear and well sustained response and approach to urban and rural interdependencies. Such cities have stabilised and now view the urban and regional economic interdependency as city–regions or view themselves as mega-regions who need to tackle common problems from a strategic position rather than as individual cities. City of Johannesburg, City of Tshwane and City of Ekurhuleni fall in this category. The full development stage refers to cities that have mastered and generated a sustainable urban and regional economic interdependency phenomena policy and intervention platform that works and produces economic growth and expansion. There is no city in South Africa in this stage currently as informed by the analysis and interviews. However, world class cities such as London, Paris, Frankfurt, Washington DC and Tokyo for example have attained these stages. However, this does not mean that such cities are immune from the need for continuous development and improvement regarding urban and regional economic linkages and engagement platforms.

Table 4: Integrated transport and land use planning—the wider regional development perspective (Continued).

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<td></td>
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<td>Ready availability and relatively low prices of energy, especially fossil fuels, has led to intensive use of motorised transport.</td>
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<td>In the future, the need for energy conservation and lower emissions will feature much more prominently in transport policy. It is likely that both ‘push’ and ‘pull’ measures will be employed to influence transport use to achieve these objectives.</td>
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<td></td>
<td></td>
<td>In addition to the urban perspective, it is also necessary to consider transport and land-use planning in wider contexts, for example the regional context, so that transport investment can be used effectively to support regional development.</td>
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Source: Adapted from Stanchev and Whiteing [9].
5 Conclusions

A range of policy measures are available to influence travel demand. Of these, land use planning measures can contribute, but these may take a long time to take effect. On the other hand, this long term nature means that land use planning measures can set the physical pattern upon which mobility patterns are based for generations. Therefore, effective transport planning requires long-term vision to plan financial requirements for infrastructure and vehicles, to design incentive schemes to promote high quality public transport, safe cycling and walking and to coordinate with land-use planning at the appropriate administrative levels. The environmental problems in cities are particularly complex as their causes are inter-related. Local initiatives to resolve one problem can lead to new problems elsewhere and can conflict with policies at the national or regional level. Sustainable urban design (appropriate land-use planning) will help reduce urban sprawl and the loss of natural habitats and biodiversity. Integrated management of the urban environment should foster sustainable land-use policies which avoid urban sprawl and reduce soil-sealing, include promotion of urban biodiversity and raise awareness for urban citizens. Avoiding urban sprawl through high density and mixed-use settlement patterns offers environmental advantages regarding land use, transport and heating contributing to less resource use per capita [9]. Recommendations and
suggestions for sustainable direction of urban and regional economies making use of land use and transportation interventions should include the following:

1. **Understanding urban and regional economic interdependencies and linkages as platforms and levers for fostering higher regional development**
   It is important to recognize that the nature of the urban and regional economic interdependencies and linkages differs from one place to another and from one function to another. *Project, programme interventions and policy directions that have to be generated for application and replication in national landscapes need to be crafted taking into account the local context and unique historical circumstances of cities and immediate regions history of interdependencies with contiguous rural settlements.* What is necessary is the recognition of namely the existence of a regional economy as a reality, irrespective of administrative boundaries, and the need to develop knowledge about such regional (i.e. sub-national) economies [2].

2. **Integration of regional economic and urban policies through appropriate land use and transport solutions**
   The growing interdependence of urban and regional economies reduces the significance of the rural-urban distinction. The flow of people, capital, goods, services and ideas between urban and rural areas, made possible by improvements and cost reductions in communication and transport, is reinforcing the existing urban and regional economic strong interdependencies and linkages and more than ever conditions and developments in the urban areas have an impact on the rural areas and vice versa. Such regional planning should not be an urban-centred exercise as it often has been in the past. Rural and urban areas need each other and each can benefit when the other’s needs are met. Backward linkages (including interdependencies) and forward linkages (including interdependencies) between agricultural production and industry and services can foster positive rural-urban interdependencies and interactions and a virtuous circle of development. However, policies that encourage such mutually reinforcing interdependencies and linkages need to overcome the traditional separation between rural and urban planners. They also need to avoid generalizations and be grounded in the specifics of the regional context [30].

3. **Urban regional economic products for urban markets**
   Today’s reductions in transport costs and improvements in information and communication technology make it easier for producers to obtain information about market conditions. They are now in a better position to respond to changing market demand and to negotiate higher prices with intermediaries and end-users. However, to do so requires that the infrastructure for transport and communication is not only in place and that the necessary information is available, but also that the producers adopt a market-oriented attitude. Literature confirms that urban areas often obtain goods not so much from the surrounding rural areas, but either directly from more distant rural areas or through other urban centres. The reason why urban areas do not rely on the surrounding rural areas may be the cost of the product, its quality or the availability. The local
producers need therefore, to ensure the competitiveness of their products in terms of quality, price and availability and to expand their marketing efforts to make the urban consumers aware of the local products. Big urban centres play a big role as centres for the trading of rural products at urban, national and global markets. However, there is a need for urban local government to remove market imperfections, as Gaile [31] calls them, and develop infrastructure and services in the urban area that can support the marketing of rural produce from the surrounding rural areas. This includes markets, storage, transport, communication and information infrastructure linking the small centres with towns and cities, and eventually with the global market.

4. Regional migration and the urban system
Off-farm employment in the rural areas may be able to absorb part of the rural labour force, but local off-farm employment also has its limitations. Therefore, large sections of the current and future rural population will have to find part-time or full-time employment in the urban areas. Improved transport and communication has made it feasible for some rural residents to work on a part-time (daily, weekly, monthly or yearly) basis in nearby or distant urban areas or abroad, and to return at regular or irregular intervals. Circular and temporary migration is already a common pattern in many countries especially developing ones but working and housing conditions in the urban areas may not always be conducive to this form of migration. Housing is often an acute problem for temporary migrants who prefer to rent rather than to own housing, because they feel that their home is in the rural areas. Local governments and private employers in the urban areas should accept temporary rural-urban migration as inevitable and perhaps even as desirable, and they may consider measures to facilitate such forms of rural-urban migration.

5. Regional local economic development
The motive behind employment in the urban areas may not be to earn a daily income, but to save urban earnings for investment in the rural area. While remittances to the rural areas by family members in the urban areas or abroad is a common phenomenon, productive investments in agriculture and other sectors may be less common. Returning migrants may have an inadequate insight on what constitutes a productive investment. Investments in rural housing and beauty salons are easy to make, but will only have a limited impact on rural poverty and the rural economy. Central and local government leadership may consider the need to explore the advisability and typical catalytic capital investments in rural areas that can significantly transform the nature of capital flows from urban to rural areas to contribute more to poverty alleviation and regional economic development.

6. Linkages between urban service centres and regional economic areas
One of the main aspects of urban and rural poverty is the lack of access to basic infrastructure and services, such as roads, communication infrastructure, health care, credit, education and market information. Governments tend to develop infrastructure and provide services initially in the urban areas only, because of their economies of scale. The scattered settlement pattern of the rural areas
renders the provision of infrastructure and services too expensive. Urban centres are expected to play a role as service centres for the rural areas. Towns and secondary cities, therefore, require more investments in infrastructure and services for both the growing urban population and the population in the surrounding rural areas. However, small towns are also actual or potential destination for rural-urban migration. If they are destination for rural-urban migration, they need improved urban infrastructure and services in order to reduce urban poverty. If they do not serve as destinations for rural-urban migration and are by-passed by migrants who move directly to the city, the development of urban infrastructure and services could help to redirect migration flows to smaller towns rather than primate cities.

7. Integrated Transportation and land use driven wider regional development initiatives

Development of a regional transportation plan, or one sponsored by a coalition of local governments and agencies in a sub-region, would have special merit in urban areas. Such a regional or area wide plan would be cooperatively developed, based on the local plans and programs, and could be used to identify important existing or needed multijurisdictional facilities for urban and regional economic growth and development.

The principal elements of land use policy designed to support transport policy should be a focus on higher density development, mixed development, development associated with public transport and development with limited on-site parking provision. Adopted alone, these policies will have limited impact on transport problems, since people will continue to make longer trips to maximize the opportunities available to them. However, these policies are important in the long run as they provide the preconditions for less car dependent lifestyles [20]. The interactions between transport and land use have been most fully studied and understood at an urban level. The application of the interrelation between problems associated with poor quality of the built environment and socio-economic problems with transportation as a window and catalyst for fixing regional economic problems should consider the following aspects, namely;

- The need for integrated approaches to managing the urban environment;
- Land use planning as an integral part of transport planning;
- Appropriate land-use planning as a means to reduce urban sprawl and the loss of natural habitats and biodiversity; and
- Land use policy measures aimed at avoiding urban sprawl through high density and mixed-use settlement patterns and hence contributing to reduced natural resource use per capita.

Conversely, transport policies that increase the cost of travel by car, reduce the speed of travel and increase the service provided by public transport and walking and cycling are able to increase sustainability without limiting access. It is these policies that are most likely to be reinforced by the land use policies advocated
Above. Overall, transport policies are more direct and efficient than land-use planning controls, in moving towards a sustainable urban transport system. However, land-use policies are essential as an accompanying strategy for creating less car-dependent cities in the long run.

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