UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

URBAN ECONOMIC DEVELOPMENT: A CONCEPTUAL FRAMEWORK

by

ANDRé CILLIé JORDAAN

Submitted in partial fulfilment of the requirement for the degree

DOCTOR COMMERCII (ECONOMICS)

in the

FACULTY OF ECONOMICS AND BUSINESS MANAGEMENT

at the

UNIVERSITY OF PRETORIA

PRETORIA OCTOBER 2000

ACKNOWLEDGEMENTS/DANKBETUIGINGS

Buiten almal wat my studies deurentyd gevolg en ondersteun het, wil ek graag die volgende in besonder bedank:

Die Departement Ekonomie (UP) vir die geleentheid om hierdie studie te kon onderneem.

Prof Chris Harmse, my studieleier vir sy waardevolle bydrae, hulp en bystand gedurende hierdie studie. Die onselfsugtige wyse waarop hy altyd bereid was om raad en ondersteuning te gee sal my altyd bybly.

Prof James Blignaut, my medeleier wie se insette bygedrae het om hierdie studie te vorm, te skaaf en te voltooi. Sonder sy bydrae en insig sou hierdie studie veel minder trefkrag gehad het.

Yolanda, my vrou wat saam met my die uitdagings en frustrasies van hierdie studie die hoof gebied het. Baie dankie vir jou ondersteuning, opoffering en liefde. Jou geloof in my om hierdie studie te voltooi, was deurentyd my inspirasie. Ek is baie lief vir jou.

My ouers, wat my tydens al my studiejare ondersteun en bemoedig het op vele wyses. Baie dankie vir die opofferings en gebede asook die geleentheid wat my gegun was om te kon studeer en sodoende ook hierdie studie te kon voltooi.

My skoonouers, wie se volgehoue belangstelling in my studies motivering verskaf het vir die voltooïng van hierdie studie.

My Hemelse Vader, sonder wie geen taak suksesvol aangepak en voltooi kan word nie.
AAN HOM AL DIE EER!

If the Lord does not build the house, the work of the builders is useless;
if the Lord does not protect the city, it is useless for the sentries to stand guard.

Psalms 127:1

SUMMARY

URBAN ECONOMIC DEVELOPMENT: A CONCEPTUAL FRAMEWORK

by

ANDRé CILLIé JORDAAN

SUPERVISOR:	PROF C HARMSE
CO-SUPERVISOR:	PROF JN BLIGNAUT
DEPARTMENT:	ECONOMICS
DEGREE:	D.COM. (ECONOMICS)

The purpose of this study is to develop an economic policy framework for local urban authorities to empower them to increase economic growth and development and thus quality of life of its residents. The study integrates conventional economic growth theories with the urban environment and shows their applicability within the urban environment. An urban area is perceived as an economic powerhouse within the national economy where the majority of economic activity is generated. The concentration of people and economic activity creates certain positive externalities that should be exploited by residents, businesses and local authorities. High levels of research and development as well as innovation is possible in urban areas and contribute to realise increased economic growth and development.

Unfortunately, urban areas also experience negative externalities and this should be addressed because this leads to a decrease in economic efficiency and thus a decline in quality of life. The study thus introduces several options of urban economic policies for use by the local urban authorities. The main aim of these policies is to serve as a framework for local urban authorities to address the typical relevant urban problems in order to stimulate sustainable economic growth and development and quality of life.

SAMEVATTING

STEDELIKE EKONOMIESE ONTWIKKELING: 'N KONSEPTUELE RAAMWERK

deur

ANDRé CILLIé JORDAAN

LEIER:	PROF C HARMSE
MEDE-LEIER:	PROF JN BLIGNAUT
DEPARTEMENT:	EKONOMIE
GRAAD:	D.COM. (EKONOMIE)

Die doel van hierdie studie is om 'n ekonomiese beleidsraamwerk vir plaaslike stedelike owerhede daar te stel om sodoende ekonomiese groei en ontwikkeling en dus die lewenskwaliteit van inwoners te verhoog. Die studie integreer konvensionele ekonomiese groeiteorieë met die stedelike omgewing en dui die toepasbaarheid daarvan binne die stedelike omgewing aan. 'n Stedelike gebied word gereken as 'n ekonomiese magsbasis binne die nasionale ekonomie en genereer die meerderheid van ekonomiese aktiwiteit. Die konsentrasie van mense en ekonomiese aktiwiteit bring sekere positiewe eksternaliteite na vore wat uitgebuit moet word deur inwoners, besighede en plaaslike owerhede. Hoë vlakke van navorsing en innovasie is ook meer moontlik in stede en dra sodoende by tot die verwesenliking van verhoogde ekonomiese groei en ontwikkeling.

Stedelike gebiede ervaar ook noodwendig sekere negatiewe eksternaliteite en dit moet aangespreek word aangesien dit tot 'n afname in ekonomiese effektiwiteit kan lei en dus tot 'n verlaging in lewenskwaliteit. Hierdie studie stel verskeie opsies van ekonomiese stedelike beleid voor vir gebruik deur plaaslike stedelike owerhede. Die hoofdoel van hierdie beleid is om as raamwerk vir plaaslike stedelike owerhede te dien vir die aanspreek van tipiese relevante stedelike vraagstukke ten einde volhoubare ekonomiese groei en ontwikkeling te stimuleer asook lewenskwaliteit te verhoog.

TABLE OF CONTENTS

LIST OF ANNEXURES

PART A

INTRODUCTION

INTRODUCTION

Part A consists of the introductory section of the study where the following important aspects will be analysed:

- Firstly, the background to the study will be addressed.
- Thereafter, the problem statement, capturing the essence of the problem addressed in the study, will follow.
- The methodology and the structure of the study are then explained.
- Following the structure of the study, the definitions and concepts concerning urban economics will be explained. This serves as an introduction to the rest of the study and leads in to Part B: the theory of economic growth and development.

CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION AND BACKGROUND TO STUDY

Urban economics embraces the economics of urban areas. In any urban study, it is important to take cognisance of the various economic activities, social matters as well as environmental issues within urban areas. A rapid expansion in metropolitan areas and the concomitant growth of the population in these areas leads to an increase in population densities. An urban area acts as a melting pot where the majority of new modus operandi, goods and services are invented and developed, and where efficient information designed to satisfy certain needs and desires is produced.

Although other approaches to urban economics are possible, the emphasis in this study will be the fact that an urban environment is characterised by high population density levels, proximity, production specialisation, economic opportunities and technology. These characteristics obviously generate not only positive externalities but also an abundance of negative externalities, and economic opportunities may therefore be lessened by these externalities. Although economic growth in an urban area is essential, it is merely a necessary but not sufficient condition for economic development.

Although economic growth implies that the volume of final goods and services produced is on the increase, it does not, however, ensure that the welfare and thus quality of life of the total population also improve. Sometimes only a section of the population benefits from economic growth, while the rest remain poor and may even become poorer. Economic growth is therefore not sufficient in itself, but must be underpinned by social change. Social change, in this context, means a steady improvement in the total population's quality of life. This is called economic development. Economic development is thus a process that enables society as a whole to improve its economic position. Economic growth means quantitative change, while economic development

means both quantitative and qualitative change. Economic growth is thus a necessary condition for economic development. In this study, a developing economy, consisting of both developed and developing urban areas, will be assumed. Both these types of urban areas will be accommodated.

To sustain and maintain urban economic growth as well as development, the correct goals, strategies and complementary policies should be developed and implemented to improve quality of life. It is thus extremely important that special institutional conditions affecting the nature and quality of governmental decisions be in place to address and guide negative externalities, the social order, environmental issues and economic activities. Agents of government sometimes have limited authority to address these factors and need guidelines to strengthen their competence to limit the potential dangers of resource wastage or misallocation.

1.2 PROBLEM STATEMENT

Since an urban environment is, generally speaking, the economic powerhouse of a country, what urban economic growth and development goals, strategies and polices should be developed and implemented to enhance quality of life within urban areas?

1.3 METHODOLOGY

A literature study, combining economic growth, economic development, urban economics, project-management principles, goals, strategies and policies for urban authorities and macro-economic objectives, will be analysed.

The methodology of this study comprises:

i) A review of the theoretical aspects of economic growth and development with specific reference to the fact that knowledge is applicable to the advanced capitalist society, predominantly generated within urban areas.

The mere fact that a concentration of people and ideas is combined in urban areas contributes to the stimulation and diffusion of knowledge and innovation and ultimately to growth.

ii) A strategic assessment for urban economic growth and development will then be explored. Factors such as land use, localisation, transportation, labour and migration issues and housing will be analysed.

iii) Finally, urban areas are managed by authorities. Support to these authorities in the form of goals, strategies and policies is necessary. These goals, strategies and policies should contribute towards urban economic growth and development and will consequently be analysed. Endogenous factors affecting the workers and business firms will be explained. Here it is important to determine the natural attractions of workers and firms to urban areas. The exogenous factors concerning the policy environment or milieu will also be explored. These factors ultimately influence the endogenous environment and create a climate that may attract firms, create a viable location, lead to the shedding, enhancement and proliferation of knowledge and lastly, generate economic growth and development.

1.4 STRUCTURE OF THE STUDY

The study is divided into five parts, based on the methodology explained above. A policy-planning package and a quality of life index will also be developed and provided in an appendix.

Part A, consisting of Chapter 1, intends providing an introduction to the study. This chapter is thus devoted to the background, problem statement, methodology and structure of the study. It also defines certain urban economic concepts and serves as a point of departure for the rest of the study.

Part B consists of Chapters 2 and 3, which explain the theory of economic growth and development with specific reference to urban areas.

Chapter 2 explores the conventional neo-classical theories of economic growth and development with reference to urban areas. The growth theories of Harrod-Domar, Solow and Romer will be analysed and the implications for urban economic development highlighted. An institutional and organisational framework within which the urban environment could flourish, namely the Economic System Approach (ESA) will also be analysed. The ESA aims to identify alternative assumptions and interpretations of economic activities and changes relative to the neo-classical theory. Attention is focussed on the technical and managerial capabilities of economic subjects such as economic decision-makers or economic agents, as well as on the importance of improving the productive capacity of economic subjects through education and training. The importance in human capital development and the role of proliferating knowledge is thus highlighted.

In Chapter 3, the nature of knowledge as the engine of economic growth in urban areas, is analysed. Knowledge, as well as economic and technical innovation may be enhanced in urban areas - more so than in non-urban areas - and therefore serves as an instrument that could be readily available in urban areas, if purposely stimulated. The essential nature of urban areas in providing the environment and contributing towards capacity building in general, should thus not be underestimated. It is therefore important to explore the possible economic contribution of urban areas towards reaching this ultimate goal.

Part C consists of Chapters 4 to 10, explaining the generic urban concepts within the field of urban economics. To gain insight into the urban environment, an analysis of the urban environment will be made in Chapters 4 to 9. In Chapter 10 the economic growth theories and their impact on the urban environment will be analysed and integrated. To

improve the technical and managerial capabilities of economic subjects, cognisance should be taken of these important generic urban factors in improving quality of life.

The various factors that may influence and affect economic growth in an urban area will be explained in Chapter 4. Agglomeration economies cause firms to cluster in cities and this clustering engenders economic growth and development in cities. According to agglomeration economies, cost reductions occur because economic activities are located in one place. The advantages of spatial concentration resulting from economies of scale are thus explained. Because of the spatial concentration of people and economic activities, optimal use of resources, such as land use, is vital.

In Chapter 5, land-use planning is explored as an important factor for urban economic development because land-use patterns contribute to the desirability and productivity of a city. The ability to influence land-use decisions is therefore an essential economic development instrument. The most basic justification for land-use controls is the prevention of resource misallocation. The misallocation of urban land inevitably entails misallocation of other valuable resources. This may lead to uncontrolled or poorly controlled urban growth without regard for the impact on the infrastructure and environment. Ways to control land use exist, the most widely accepted approach being the principle of zoning. Land use is an important factor in improving the image of an urban area, and may contribute to the attraction and location of new firms and workers.

Chapter 6 explains the fact that the location of new firms or the expansion of existing firms stimulates the possibility of economic growth in an area. An urban environment conducive to the location of firms is thus vitally important. It is therefore necessary to determine the factors that will encourage firms to choose a specific area to locate. It is important to realise that for any factor to influence location decisions, it must vary across locations. An aspect that may contribute to the attraction and location of new firms and workers is the efficiency of the transportation system.

Chapter 7 explains the difficulty of urban transportation due to the highly concentrated number of people as well as goods and services that are moved on a daily basis. This leads to a high level of strain on the capacity of the transportation system and facilities available. One of the major externalities arising from a concentration of people and goods is the concept of congestion. Ways in which congestion may be alleviated are also discussed in this chapter. The size, structure and efficiency of an urban area are to a large extent influenced by the transportation system. A well-developed transportation system is also needed because urban areas are characterised by a high density of people living in close proximity. Urban labour and migration factors may thus influence the functioning of an urban area.

Urban labour and migration are analysed in Chapter 8 by means of the supply and demand of labour in an urban environment. Factors affecting urban population growth are also analysed. Individuals and households normally settle in places to maximise their utility and firms usually locate in areas to maximise their profit. Economic and non-economic factors influence urban labour migration, this being a main problem facing urban areas. A major challenge to authorities, namely unemployment due to poor employment opportunities and crime, will also be analysed in this chapter. The migration of people leads to other basic needs having to be met, such as housing or shelter.

Housing is one of the largest categories of privately-owned assets, as well as one of the most durable. This is explained in Chapter 9. Housing is an essential component of living standards, comfort, security and social status within an urban environment. Large parts of land use in urban areas are devoted to the provision of housing and this affects a major portion of any household's annual income. The provision of housing sometimes implies decisions concerning public goods. The role of urban authorities can be one of supplying or encouraging the upgrading of the quality of housing. This presents another important challenge to authorities.

Chapter 10 firstly analyses the implications of Chapters 4 to 9 for urban economic growth and development. The economic growth theories and their impact on the urban environment will then analysed and integrated indicating their contribution to improving quality of life.

Part D consists of Chapter 11 and provides possible goals, strategic priorities, policies and policy objectives to urban authorities, to curb the negative externalities and potential threats and to stimulate growth-enhancing opportunities of urban areas. The decisions made by the urban authorities will inevitably affect the inhabitants of a specific area. It is thus important that local governments in urban areas set the goals, develop the correct strategies and implement complementary policies. The challenges arising from a concentration of people consuming, and firms producing, in an urban area need to be addressed. It is important to reach sustainable economic growth and development and careful planning is thus a prerequisite. The common goal for the majority of urban areas would be to achieve an enhanced quality of life and thus needs economic growth and development.

A concise summary of the goals, strategic priorities, policies and policy objectives as well as possible actions of local authorities will be provided in Annexure A. This is intended to enable them to determine the focal areas in each economic sector, in order to address and improve the quality of life of the respective residents.

A tool for measuring urban economic policy success by urban authorities will be provided in Annexure B. This tool takes the form of an exposition of a quality of life index that may be applied by authorities to determine the changing quality of life. The purpose of this index is to develop a quality of life indicator as an index that may be used at national, regional or urban level. The idea is to develop a single index that may be used as an instrument to measure quality of life over time. From the individual items of the index it would be possible to indicate which variables were mainly responsible for the changes in the quality of life index. Furthermore, the possible changes in national

quality of life may be measured and compared to the quality of life of various urban areas over time.

Part E consists of Chapter 12, containing a comprehensive summary and the final conclusion of the study.

1.5 URBAN ECONOMICS: DEFINITIONS AND CONCEPTS

Urban economics is the study of economics where different geographical units organise themselves as urban areas. An urban area can be defined as a place with a very high population density, compared to the surrounding area (McDonald, 1997: 1). It can also be an area where the total population is greater than some minimum number. This is to distinguish urban areas from small towns. Urban areas can also be defined in terms of their density of economic activity. The intensity and frequency of interactions between people is thus greater than elsewhere (Bogart, 1998: 3). An urban area can also be seen as a system of interacting industries, housing and people (Hirsch, 1973: 3). This intensity of interactions leads both to increased opportunities as well as to problems or negative externalities. The fundamental economic explanation for urban areas is the positive externalities that result from the economic activities that are closely located. The main limitation on urban growth, however, is the negative externalities that arise from this dense pattern of activities (Bogart, 1998: 4).

The most useful way to think about urban areas in economic terms is as small open economies. They are small in the sense that the market price is given and their actions do not affect the market. They are open because they are not self-sufficient and thus do not operate in isolation and prefer to interact in trade with other open economies. The dominant model of an urban economy for many years was the so-called *monocentric city* model (Bogart, 1998: 4). In this model all employment was assumed to be concentrated in the inner city with the remainder of land devoted to housing. This type of model also assumes that locational choice depends only on commuting costs and space consumption and the fact that all housing capital is mobile (Wheaton, 1979:

124). A relatively recent change in the urban structure led to the *polycentric city* or *multiple-centre* model, which allows for various employment centres throughout the metropolitan area, including the traditional inner city, suburban malls, office parks and manufacturing areas (Wurtzebach & Miles, 1994: 55). This change in urban structure is important because it could lead to higher levels of urban expansion. This would ultimately put more pressure on local authorities to provide the public services demanded by new residents and businesses.

In urban economics it is important to look at two of perhaps the strongest trends underlying civilisation – industrialisation and urbanisation. Industrialisation is mainly focussed on production, while urbanisation is essentially the study of human settlement. These two trends should reinforce each other but recently industrialisation and urbanisation have been on a collision course. Environmental concerns and population growth are significant dimensions of this potential clash (Hirsch, 1973: 6).

The field of urban economics is closely related to its sister field regional development economics. The latter is the study of regions and although an urban area can be classified as a region, not all regions are urban. Many social scientists may define urban areas in terms of lifestyle rather than density and urban society is often contrasted with traditional society (Blair, 1995: 15). In this sense, a social change is reflected within the urban areas in which diversity, functional relationships, bureaucratic organisations etc. become important.

It is thus essential to acknowledge that urban areas in general have the best opportunity to effect the potential economic growth and development in any economy. Economic growth theory implies that research and development (R&D) is important. Urban economic growth and development thus forms a vital part of national economic growth and development. The main concern, however, is to determine how local authorities can create an urban environment conducive to such economic growth and development.

The emphasis on urban local economics does not ignore the notion of globalisation. Globalisation conveys the widely accepted idea that we are living in a borderless world. According to this view, globalisation signifies the end of geography. No notice is taken of distance or national policy any more, and national governments must accommodate the dictates of global markets (Veseth, 1998: 21).

In general terms, globalisation imparts a notion of compression or shrinking. It is also the process of economic, political and social change that occurs when all participants in a system have access to a common pool of resources. The common resource pool includes markets for capital, science, technology, goods and services as well as cultural goods. Access to the global resource pool changes the dynamics of the system as well as the nature of competition (Veseth, 1998: 26). Financial markets are the element of the common resource pool that come closest to being truly global. It is therefore important to realise that financial markets constrain what governments can do – not the other way around.

A common resource pool implies that a country has the necessary means to share in that pool. This cannot be taken for granted in the case of a developing country however, due to inadequate access to global resources. It thus cannot be assumed that all urban areas will be able to reap the perceived benefits of globalisation in the same way as other areas. For the purpose of this study, globalisation will therefore be regarded as the fact of life that no country or local urban economy can function in total isolation, but does not necessarily have automatic access to global resources and may influence or be influenced by the rest of the world. Globalisation will thus not be ignored in the study, although the emphasis will be on developing the local urban economy before entrance into the global world can be realised.

In Part B, the theory of economic growth and development will be analysed and will serve as an introduction to the rest of the study.

CHAPTER 2

ECONOMIC GROWTH AND DEVELOPMENT

Once one starts to think about economic growth, it is hard to think about anything else

(Robert Lucas)

2.1 INTRODUCTION

The purpose of this chapter is to identify and describe the role of various macro-economic factors and their contribution to economic growth and development in an urban economic environment. The identification of these factors is important in evaluating their availability and quality in an economic system, be it national or local. The availability and quality of these factors, to a large extent, determine the potential opportunities for economic growth and development. As stated earlier, it is important to realise that economic growth is merely a necessary but not sufficient condition for economic development. Economic growth implies a quantitative change while economic development implies both a quantitative and qualitative change. In this study, both concepts will be seen as complementary to the enhancement and improvement of an urban environment.

Standards of living differ all around the world and the implications of this for the welfare and quality of life of its inhabitants are enormous. These differences can be associated with large discrepancies in literacy, nutrition, life expectancy and other related factors. It is thus of great importance for an economy to identify the factors that will influence its potential economic growth and prosperity. This will enable an area to enhance the quality of life of its residents and thus ensure a qualitative change or economic development. Various phases of interest in economic growth theory have activated thoughts on this very important issue. This progress in economic thought concerning

contributing factors to economic growth and development will now be analysed as a starting point for growth and development in urban economies.

2.2 THE HARROD-DOMAR THEORY

2.2.1 The growth model

The Harrod-Domar model involves the manipulation of two basic relationships, *viz.* the fixed output/capital ratio and the equality between savings and investment (Brown, 1988: 374). The rate of economic growth is the product of the investment-output ratio and the output-capital ratio. Net investment spending adds to the nation's stock of capital, increases the economy's productive capacity and raises its potential level of income. The change in productive capacity will depend on the level of investment and the potential social average productivity of new investment (Brue, 1994: 491). Suppose that the required labour input per unit of output is falling at rate m, the labour productivity is thus rising. If the labour force is increasing at rate n, the output must grow at m + n on average. If this does not happen the unemployment rate will rise indefinitely if output growth is too slow, or the economy will experience a shortage of labour if growth is too fast. The consequence may be that economies will for the most part experience continued periods either of increasing or falling unemployment rates.

On the other hand, they may experience continued periods of rising or falling capacity utilisation (Brown, 1988: 377). The first problem could be evaded by a developing country with a large pool of rural labour. Such an economy could merely improve its long-term rate of industrial growth by increasing its investment quota. If it were that simple, it would be hard to understand why poor countries have not followed that route to economic growth. To avoid these awkward conclusions is to recognise that at least one of the variables used is likely to be endogenous. The Harrod-Domar model doubts whether annual investment growth would automatically be sufficient to maintain full employment. If investment failed to grow at the required rate, the economy would recede. On the other hand, if the growth of investment spending exceeded the required

rate, demand-pull inflation would result. The essential result of this theory is that the economy will be prone to instability (Brown, 1988: 374).

2.2.2 Implications for urban economic development

The link between the Harrod-Domar growth model and its implications for urban economic development is that it relates more closely to problems faced by a developing economy. The emphasis in this growth model - to generate economic growth and development - is based on increased levels of savings and investment. Although these factors cannot be ignored by developed economies, they are seen as a given. However, in a developing economy, capacity building is the order of the day and high levels of savings and concomitant investment are still very important prerequisites for economic growth and development. The level of growth and development in a developing urban economy necessitates basic investment, which would not necessarily be required in a developed urban economy. Other than increasing levels of savings and investment, various related factors will also contribute to urban economic development.

2.3 THE SOLOW GROWTH MODEL

The model of Solow focuses on four variables *viz.*: output (Y), capital (K), labour (L) and knowledge or the effectiveness of labour (A). Certain amounts of capital, labour and knowledge are present at any stage in the economy. These are then combined to produce output. The production function takes the form:

$$Y(t) = F[K(t), L(t), A(t)],$$

where t denotes time (Solow, 1957: 312). The variable t for time appears to allow for technological change. Technological change refers to any kind of shift in the production function. Any economic slowdown or boom, better educated labour force, etc. will appear as technical change (Solow, 1957: 312). It is also important to note that time does not enter the production function directly but only through K, L and A. Output will

change over time if the inputs into the production process change. AL is seen as effective labour and any technological progress that enters through them is considered to be labour augmenting. The central assumption of this model concerns the production function and its three inputs into production (capital, labour and knowledge) over time, which will now be discussed.

2.3.1 Assumptions concerning the production function

A critical assumption is the fact that constant returns to scale are experienced. This implies that if the quantities of capital and labour are doubled, with A fixed, the amount of output (Y) also doubles. Using this argument and multiplying it by any positive constant (c) causes the output to change by the same factor:

$$F(cK, cAL) = cF(K, AL) \text{ for all } c \geq 0 \qquad (2.1)$$

This is assumed to happen in an economy that is big enough for the gains from specialisation to have been exhausted. In a very small economy (e.g. urban economy) there is a possibility for specialisation which may lead to more than a doubling of the output with a doubling of inputs.

By assuming constant returns to scale, the production function can now be analysed further. Setting c = 1/AL in equation (2.1) yields

$$F(K/AL,1) = (1/AL)F(K,AL) \qquad (2.2)$$

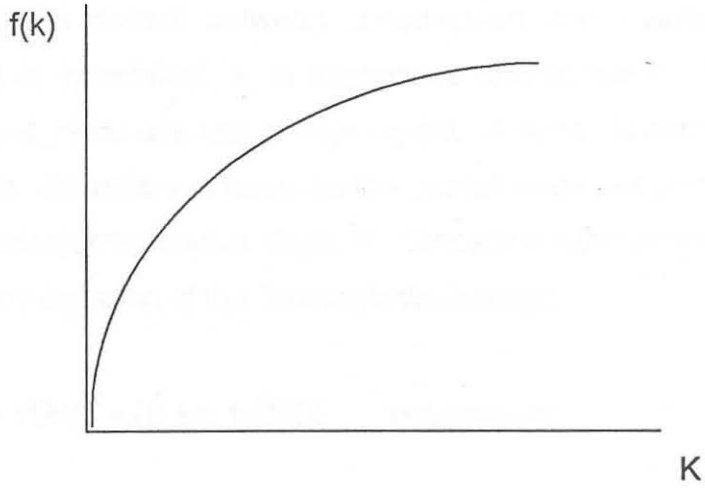
K/AL is the amount of capital per unit of effective labour and F(K,AL)/AL is Y/AL, output per unit of effective labour. Define k = K/AL and f(k) = F(k,1). Now (2.2) can be rewritten as:

$$Y = f(k) \qquad (2.3)$$

Output per unit of effective labour can be written as a function of capital per unit of effective labour. To understand (2.3) better, divide the economy into AL small economies (e.g. urban economies), each with 1 unit of effective labour and K/AL units of capital. With constant returns to scale, each of these small economies produces 1/AL as much as it produced in the large, undivided economy. The amount of output per unit of effective labour thus depends only on the quantity of capital per unit of effective labour and not on the overall size of the economy. This is the mathematical meaning of equation (2.3). If the total amount of output is wanted, instead of the amount per unit of effective labour, it needs to be multiplied by the quantity of effective labour: $Y = ALf(k)$.

From the intensive-form production function, f(k), it is assumed to satisfy $f(0) = 0$, $f'(k) > 0$, $f''(k) < 0$ and thus it is possible to derive the marginal product of capital, *viz.* $f'(k)$. This implies that the marginal product of capital is positive, but it declines as capital (per unit of effective labour) rises. It also states that the marginal product of capital is very large when the capital stock is relatively small and that it becomes very small as the capital stock becomes large (Solow, 1991:397). A production function satisfying all of these conditions is shown below in Figure 2.1.

Figure 2.1: A production function



A specific example of this type of production function is the Cobb-Douglas function.

$$F(K, AL) = K^{\alpha} (AL)^{1-\alpha},\ 0 < \alpha < 1 \qquad (2.4)$$

Multiplying both inputs by c will give

$$\begin{aligned} F(cK, cAL) &= (cK)^{\alpha}(cAL)^{1-\alpha} \\ &= c^{\alpha}c^{1-\alpha}K^{\alpha}(AL)^{1-\alpha} \\ &= cF(K, AL) \end{aligned} \qquad (2.5)$$

It is thus possible to see that the Cobb-Douglas function has constant returns to scale. This critical assumption of constant returns to scale can be seen as one of the major constraints of the Solow growth model.

2.3.2 Development of inputs into production

The remaining assumptions of this model are concerned with the change in the stocks of labour, capital and knowledge over time. To determine the behaviour of the economy, it is necessary to analyse the behaviour of capital, since labour and knowledge are exogenous. Solow's model shows that initial levels of labour, knowledge and capital are taken as given, with labour and knowledge growing at constant rates (Solow, 1987: 10). Output is divided between consumption and investment. The fraction of output devoted to investment, s, is exogenous and constant. One unit of output devoted to investment yields one unit of new capital. A dynamic economy grows over time and therefore it is convenient to focus on the capital stock per unit of effective labour, k, rather than the unadjusted capital stock, K. Since k = K/AL and the fact that Y/AL is given by f(k), the key equation of the Solow model is found:

$$\dot{k}(t) = sf[k(t)] - (n + g + \delta)k(t) \qquad \text{(see footnote)}^{*} \qquad (2.6)$$

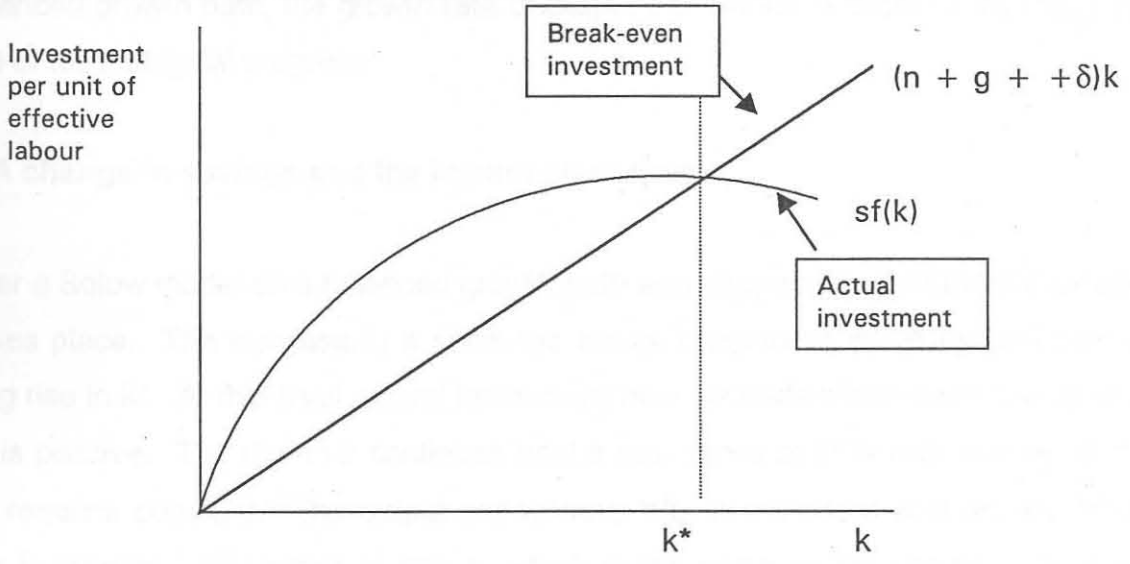
---

* (The dot next to the variable denotes a derivative with respect to time, i.e. $\dot{k}(t)$ is a shorthand method for dk(t)/dt).

This equation states that the rate of change of the capital stock per unit of effective labour is the difference between two terms. The first term, sf(k), is the actual investment per unit of effective labour: output per unit of effective labour is f(k) and the fraction of that output that is invested is s. The second term, $(n + g + \delta)k$, is the break-even investment, meaning the amount of investment that must be done just to keep k at its existing level.

Two reasons explain why some investment is needed to prevent k from declining. Because existing capital is depreciating, it must be replaced to keep the capital stock (K) from falling. This is denoted by the term δk. Secondly, the quantity of effective labour is growing and to keep the capital stock per unit of effective labour (k) constant, some investment is needed to keep this relation constant. Since the quantity of effective labour is growing at rate n + g, the capital stock must grow at rate n + g to hold k steady. This is shown by the term $(n + g)k$ in equation (2. 6). If the actual investment per unit of effective labour exceeds the investment needed to break even, k will rise. When the investment is less than the break-even point, k is falling and when the two are equal, k is constant. Solow mentions that profitability is a determinant of investment but continues to argue that the meaning of profitability becomes unclear when the future is unclear (Solow, 1987: 18).

Figure 2.2: Actual and break-even investment



In Figure 2.2 the two terms from the expression for •k as functions of k are shown. The break-even investment, $(n + g + \delta)k$, is proportional to k. Actual investment sf(k), is a constant times output per unit of effective labour. Since f(0) = 0, actual investment and break-even investment are equal at k = 0. The conditions imply that at k = 0, f'(k) is large and this means that the sf(k) line is steeper than the $(n + g + \delta)k$ line. Thus for small values of k, actual investment exceeds break-even investment. The conditions also imply that f'(k) moves closer to zero as k becomes large.

At some point the slope of the actual investment curve falls below the slope of the break-even investment curve. With the sf(k) curve flatter than the $(n + g + \delta)k$ curve, it eventually crosses. The fact that $f''(k) < 0$ implies that the two curves intersect only once for $k > 0$. Where the actual and break-even investment are equal, k is denoted by k*. From this figure it is possible to see that if k is initially less than k*, actual investment exceeds break-even investment and so •k is positive (rising). If k exceeds k*, •k is negative. If k equals k*, •k is zero. It can thus be concluded that regardless of where k starts, it converges to k*.

Due to the convergence to k*, the Solow model implies that, regardless of its starting point, the economy converges to a balanced growth path. This refers to a situation where each variable in the model is growing at a constant rate (Solow, 1987: 11). In this balanced growth path, the growth rate of output per worker is determined solely by the rate of technological progress.

2.3.3 A change in savings and the impact on output

Consider a Solow model on a balanced growth path and suppose a permanent increase in s takes place. The increase in s shifts the actual investment curve upward with a resulting rise in k*. At this level, actual investment now exceeds break-even investment and •k is positive. The rise in k continues until a new value of k* is reached, at which point it remains constant. The output per worker, Y/L, is important and equals Af(k). When k is constant, Y/L grows at rate g, which is the same as the growth rate of A.

When k increases, Y/L grows not only because A is increasing but also because k is increasing. Its growth rate thus exceeds the rate of g. The moment that k reaches the new value of k*, however, only the growth of A contributes to the growth of Y/L. The growth rate of Y/L now returns to g. A permanent increase in the saving rate thus produces a temporary increase in the growth rate of output per worker (Solow, 1987: 12). The rise in k takes place for some time but eventually increases to the point where the additional saving is devoted entirely to maintaining the higher level of k*.

The output per worker begins to rise above the path it was on and then gradually settles into a higher path parallel to the first. A change in the saving rate has a level effect but not a growth effect. It changes the economy's balanced growth path and thus the level of output per worker but it does not effect the growth rate of output per worker on the balanced growth path. In the model of Solow no other change will lead to growth effects other than technological progress, which is exogenous.

2.3.4 Central questions of the growth theory

The Solow model identifies two possible sources of variation in output per worker, *viz.* differences in capital per worker (K/L) and differences in the effectiveness of labour (A). Only growth in the effectiveness of labour can lead to permanent growth in output per worker. The changes in capital per worker on output per worker are modest. The differences in wealth between economies can to a certain extent be accounted for by differences in effectiveness of labour.

The effectiveness of labour is seen as exogenous and is not identified by the model. This residual, or portion of economic growth which cannot be attributed to growth in labour or capital is seen as "advances in knowledge and other miscellaneous factors that influence the growth rate" (Brown, 1988: 379). One possibility is that the effectiveness of labour corresponds to abstract knowledge. To understand differences between the growth rate of various countries, one needs to explain why certain firms have access to more knowledge than other firms and why knowledge is not rapidly

transferred to other firms. Another way of interpreting effectiveness of labour may be to consider the following: The education and skills of the labour force, the strength of property rights, the quality of infrastructure and cultural attitudes toward entrepreneurship and work in general. The effectiveness of labour may also reflect a combination of forces.

The central question remains that of how knowledge affects output, how it evolves over time and why it differs between different economies. The other possibility is that capital is more important than the Solow model implies. If capital encompasses more than just physical capital, or if physical capital has positive externalities, then the private return on physical capital is not an accurate guide to capital's importance in production. Solow's own estimates showed that the output per hour of work in the economy of the United States between 1909 and 1949 increased. Of this increase, seven-eighths could be attributed to technological change in the broadest sense and only the remaining eighth could be attributed to a conventional increase in capital intensity (Solow, 1987: 21). The work of Denison showed the similar results. For the period 1929 to 1982 he suggested that the single most important factor was the residual, which accounted for 55 per cent of the per capita income growth (Brown, 1988: 380).

It must be borne in mind that the Solow model is simplified in a number of ways: The model uses only a single good; government is absent; fluctuations in employment are ignored; the production function explains production, making use of only three inputs; and the rates of saving, depreciation, population growth and technological progress are constant. It is obvious that important features explaining growth are omitted. The limitations of Solow's model were first expressed by Abramowitz (1956: 11) who characterised the residual as "a measure of our own ignorance".

This conclusion leads to the work of the new growth theory, known as the Endogenous Growth Theory, where the role of knowledge was endogenised and seen as an explanatory factor for the residual in the Solow model.

2.3.5 Implications for urban economic development

It is important to determine the link between the Solow growth model and its implications for urban economic development. Solow identified three possible sources contributing to output, *viz.* capital, labour and knowledge or the effectiveness of labour. The only factor that could lead to permanent growth in output per worker, according to Solow, was knowledge, which was seen as exogenous and therefore not identified by the model. The three factors above are important building stones in generating economic growth and development in both developing and developed urban economies. The importance of the knowledge factor for the study is that the majority of knowledge is generated within urban areas. It is thus important to realise that Solow's residual, although not explained in detail, identified a most important factor contributing to economic growth and development within urban areas. In this way Solow paved the way for Romer to explore the factor of knowledge or effectiveness of labour in greater detail.

2.4 ENDOGENOUS GROWTH

Any increase in Gross National Product (GNP) that cannot be attributed to adjustments in the stock of capital or labour is ascribed to a third category, commonly referred to as the Solow residual (Todaro, 1994: 88). The residual, despite its name, is responsible for approximately 50 per cent of historical growth in developed countries. Solow credits the bulk of economic growth to an exogenous variable called technological progress. The Endogenous Growth Theory distinguishes itself from the Solow model by emphasising that economic growth is an endogenous result of an economic system and not the result of forces that impinge from outside.

An interesting aspect of the endogenous growth approach is that it helps to explain that the potentially high rates of return on investment are greatly eroded by lower levels of complementary investments in human capital, infrastructure or research and development (Meier, 1995: 103). In less developed economies individuals generally

receive fewer personal gain from the positive externalities created by their own investments and this leads to the accumulation of less than the optimal level of complementary capital.

Various economists have stressed increasing returns as an endogenous explanation for economic growth. Adam Smith (1776) referred to the growth in productivity due to the division of labour and the extent of the market. Alfred Marshall (1890) emphasised that the role of "nature" in production may be subject to diminishing returns, but the role of "man" is subject to increasing returns. JM Clark (1923) also observed that "knowledge" is the only instrument of production that is not subject to diminishing returns.

The Endogenous Growth Theory involves four variables, *viz.* labour (L), capital (K), technology (A) and output (Y). Two sectors are used in this model: A goods-producing sector where output is produced, and a research and development (R&D) sector where additions to stock of knowledge are made. A fraction (a_L) of the labour force is used in the R&D sector and a fraction ($1 - a_L$) is used in the goods-producing sector. Similarly, fraction (a_K) of the capital stock is used in the R&D sector and the rest in the production of goods. A piece of knowledge being used in one place does not prevent it from being used elsewhere; thus both sectors use the full stock of knowledge (A). The quantity of output produced at time t is thus:

$$Y(t) = [(1 - a_K)K(t)]^{\alpha}[A(t)(1- a_L)L(t)]^{1-\alpha} \qquad (2.7)$$

Equation (2.7) implies constant returns to capital and labour with a given amount of technology. The production of new ideas depends on the quantities of capital and labour engaged in research and the level of technology (Romer, 1996: 97):

$$\dot{A}(t) = G[a_K K(t), a_L L(t), A(t)] \qquad (2.8)$$

If a generalised Cobb-Douglas production function is assumed, equation (2.8) becomes:

$$\bullet A(t) = B[a_K K(t)]^{\beta}[a_L L(t)]^{\gamma} A(t)^{\theta}, \qquad B > 0,\ \beta \geq 0,\ \gamma \geq 0 \qquad (2.9)$$

where B is a shift parameter. The fact that the production function does not necessarily have constant returns to scale is the reason for referring to it as a generalised Cobb-Douglas function (Romer, 1996: 97). In the case of knowledge, constant returns to scale would cause the same set of discoveries to be made twice, thereby leaving $\bullet A$ unchanged. Thus, diminishing returns are also possible in R&D. On the other hand, interaction among researchers may be so important in R&D that the doubling of labour and capital more than doubles output. There is also then a possibility of increasing returns to scale. There does not appear to be a restriction on how increases in the stock of knowledge affect the production of new knowledge. No restriction is thus placed on (θ) in equation (2.9). If $\theta = 1$, $\bullet A$ is proportional to A; the effect is stronger if $\theta > 1$ and is weaker if $\theta < 1$. The saving rate is assumed to be exogenous and constant as in the Solow model and depreciation is set to zero for simplicity [$\bullet K(t) = sY(t)$]. The growth rate of the population [$\bullet L(t) = nL(t)$, $n \geq 0$] is treated as exogenous.

2.4.1 The dynamics of knowledge accumulation

If no capital is used, the production function for output becomes:

$$Y(t) = A(t)(1 - a_L)L(t) \qquad (2.10)$$

Similarly, the production function for new knowledge, equation (2.9), now becomes:

$$\bullet A(t) = B[a_L L(t)]^{\gamma} A(t)^{\theta} \qquad (2.11)$$

The output per worker is proportional to A, as implied by equation (2.10), and thus the growth rate of output per worker equals the growth rate of A. The focus will now be on the dynamics of A, which are given by equation (2.11).

The growth rate of A, denoted by g_A, is:

$$g_A(t) = \dot{A}(t)/A(t)$$
$$= Ba_L{}^{\gamma}L(t)^{\gamma}A(t)^{\theta-1} \qquad (2.12)$$

Since B and a_L are constant, whether g_A is rises, falls or remains constant depends on the behaviour of $L^{\gamma}A^{\theta-1}$. Equation (2.12) implies that the growth rate of g_A is γ times the growth rate of L plus $(\theta - 1)$ times the growth rate of A (Romer, 1996: 99). Thus

$$\dot{g}_A(t) = [\gamma n + (\theta - 1)g_A(t)]g_A(t) \qquad (2.13)$$

Equation (2.12) determines the initial value of g_A and equation (2.13) then determines the subsequent behaviour of g_A. The production function for knowledge (2.11) implies that g_A is always positive. Thus g_A is rising if $\gamma n + (\theta - 1)g_A$ is positive, falling if this quantity is negative, and constant if it is zero (Romer, 1996: 99). The term g_A is therefore constant when:

$$g_A = \gamma n/(1 - \theta) \qquad (2.14)$$
$$= g_A{}^*$$

To describe the growth rate of A further, three different cases should be investigated *viz.* if: $(\theta < 1)$, $(\theta > 1)$, and $(\theta = 1)$.

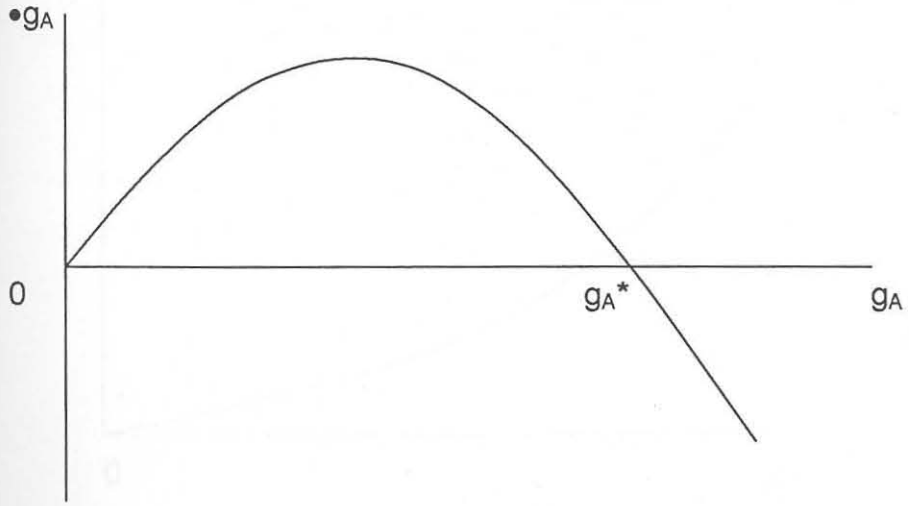
Case 1: $\theta < 1$

According to equation (2.13), g_A is falling if it exceeds $g_A{}^*$ and is rising if it is less than $g_A{}^*$. Regardless of the initial conditions, g_A thus converges to $g_A{}^*$.

In Figure 2.3 it is shown that once g_A reaches $g_A{}^*$, both A and Y/L grow steadily at this rate and the economy is on a balanced growth path. This is the first example of a model of endogenous growth. This model implies that the long-run growth rate of output per worker, $g_A{}^*$, is an increasing function of the rate of population growth, n. A

positive population growth is necessary for sustained growth of output per worker. It is, however, true that the growth rate of output per worker is not on average higher in countries with faster population growth. If the model is seen as a model of worldwide economic growth, A would then represent knowledge that can be used anywhere in the world. From this perspective the model does not imply that countries with greater population growth enjoy greater income growth, but only that higher worldwide population growth raises worldwide income growth. Higher population growth is thus beneficial to the growth of worldwide knowledge because the larger the population, the more people there are to make new discoveries. If adding to the stock of knowledge becomes more difficult as the stock of knowledge rises (that is, if $\theta < 1$), economic growth would diminish in the absence of population growth (Romer, 1996: 100).

Figure 2.3: Growth rate of knowledge when $\theta < 1$

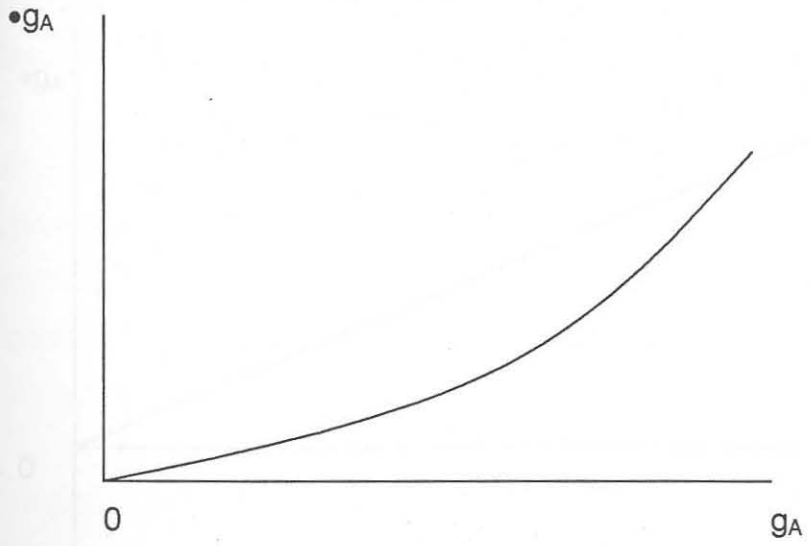


Although the rate of population growth affects long-term economic growth, equation (2.14) shows that the fraction of the labour force engaged in R&D (a_L) does not. The reason for this is that θ is less than one and the increase in a_L has a level effect and not a growth effect on the path of A. According to equation (2.12), the increase in a_L causes an immediate increase in g_A. However, the limited contribution of the additional knowledge to the production of new knowledge will result in this increase in the growth rate of knowledge being unsustainable (Romer, 1996: 100).

Case 2: $\theta > 1$

The second case is considered where θ is greater than one. According to equation (2.13), $\bullet g_A$ is increasing in g_A and since g_A is positive it also implies that $\bullet g_A$ must be positive. In Figure 2.4 this implication is manifested where the economy now exhibits ever-increasing growth rather than converging to a balanced growth path. Knowledge is so useful in the production of new knowledge that each marginal increase in its level results in increasing levels of new knowledge. As soon as the accumulation of knowledge begins, the economy thus embarks on a path of increasing economic growth.

Figure 2.4: Growth rate of knowledge when $\theta > 1$



The impact of an increase in the fraction of the labour force engaged in R&D is now dramatic (Romer, 1996: 102). From equation (2.12) an increase in a_L causes an immediate increase in g_A, but because $\bullet g_A$ is an increasing function of g_A, $\bullet g_A$ rises as well. The more rapidly g_A rises, the more rapidly its growth rate rises. The increase in a_L thus leads to an ever-increasing gap between the new path of A and the path it would otherwise have followed.

Case 3: $\theta = 1$

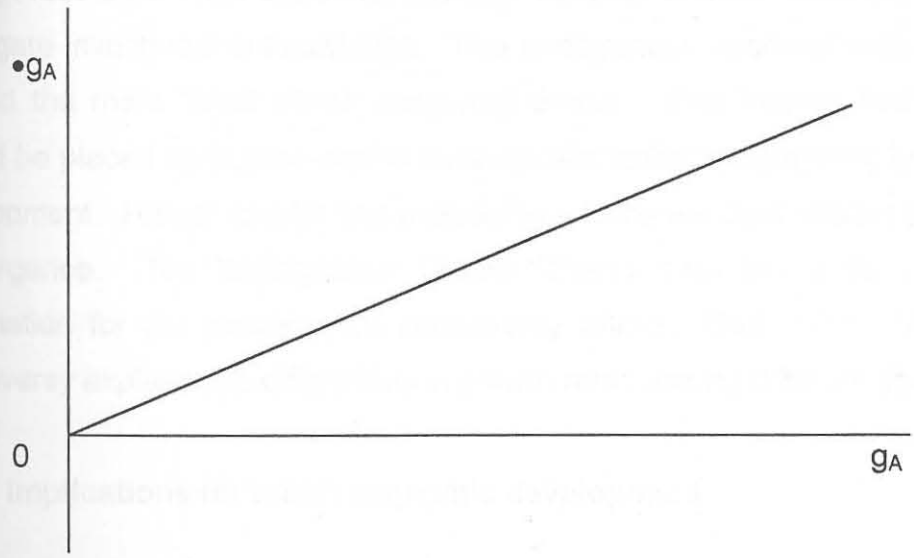
When θ is equal to one, the expressions for g_A and $\bullet g_A$ is simplified to:

$$g_A(t) = Ba_L^{\gamma}L(t)^{\gamma} \quad (2.15)$$

$$\bullet g_A(t) = \gamma n g_A(t) \quad (2.16)$$

If the population growth is positive, g_A will grow over time, and the dynamics of this model become similar to those where $\theta > 1$. The result in the case where $\theta = 1$ is shown in Figure 2.5.

Figure 2.5: Growth rate of knowledge when $\theta = 1$ and $n > 1$



If the population growth is zero (or if γ is zero), g_A is constant regardless of its initial position. Knowledge is now just useful enough in producing new knowledge that the level of A has no impact on the growth rate (Romer, 1996: 103). No adjustment towards a balanced growth path occurs; the economy thus immediately exhibits steady growth. In this case equations (2.10) and (2.15) show that the growth rates of knowledge, output and output per worker are all equal to $Ba_L^{\gamma}L(t)^{\gamma}$. The long-term growth rate of the economy is thus affected by a_L in this case.

Each of the above three cases displayed different implications, which determined whether these were decreasing, increasing or constant returns to scale to produced factors of production. Capital was eliminated from the model and the growth of labour was considered exogenous. Knowledge was thus the only produced factor. Whether there are decreasing, increasing or constant returns to scale in this economy, is determined by the returns to scale to knowledge in knowledge production. This occurs whether θ is less than one, greater than one or equal to one.

This Endogenous Growth Theory examines functions of production that show increasing returns because of investment in "knowledge" capital (Meier, 1995: 102). Technological progress and human capital formation is endogenised within general equilibrium growth models. Knowledge is treated as a public good and new knowledge can be generated through research. This allows for spillover benefits to other firms that may then allow aggregate investment in knowledge. This endogenous approach has a "growth effect" beyond the mere "level effect" explained earlier. This implies that more emphasis should be placed on human capital development rather than merely on physical capital development. Human capital and increasing returns are also related to the question of convergence. The Endogenous Growth Theory provides a far more acceptable explanation for the convergence controversy (Meier, 1995: 103). The convergence controversy explains the differences in growth rates among different economies.

2.4.2 Implications for urban economic development

It is important to determine the link between the endogenous growth model and its implications for urban economic development. This growth model uses a goods-producing sector where output is produced and an R&D sector where additions to stock of knowledge are made. Romer thus provided a solution to the unexplained exogenous Solow residual called knowledge, or the effectiveness of labour. Knowledge is now endogenised and the accumulation of knowledge is important for generating economic growth and development in both developed and developing urban economies. This

implies that urban areas are very well positioned to engage in R&D and to generate knowledge, which could improve the growth-enhancing urban environment.

The notion of knowledge thus means that local urban governments can promote growth by providing incentives to knowledge-enhancing human capital sectors. In an urban environment, due to their proximity, more individuals could engage in R&D with a greater potential spillover effect. It is thus important that local authorities follow an approach conducive to the contribution to and enhancement of economic growth and development.

Although conventional economic growth theory thus provides a theoretical base for urban growth and development, it still lacks an organisational and institutional system within which to realise its stature. The Economic System Approach provides such a framework, which will consequently be analysed.

2.5 ECONOMIC SYSTEM APPROACH

The Economic System Approach (ESA) initially emerged in an effort to stress a sense of dissatisfaction and disagreement with the conventional neo-classical account of the economic development success in East Asia. The ESA represents an attempt to re-examine the methodological premises of the policy prescriptions by the neo-classical school (Yanagihara, 1997: 8). The approach aims to identify deficiencies in the neo-classical paradigm in its assumptions and interpretations of economic activities and changes. The term "economic system" is used to describe the way in which productive capacities exist, personified in co-operative relationships within and between firms and in relation to various factor markets. The economic system can further be seen as an interrelated and mutually reinforcing process comprising the improvement of organisational capabilities of firms and the expansion and deepening of inter-firm relationships.

The ESA accentuates the strengthening of organisational capacities of economic agents and views markets as interrelationships among these agents formed and shaped through their interactions. It also focuses its attention on the technological and managerial capabilities of economic subjects such as economic decision-makers or economic agents (Yanagihara, 1997: 11). Markets on the other hand, refer to the relational arrangements among these agents. The process of decision-making and actions taken by subjects to establish and change the interrelations between them leads to the creation and development of markets. The ESA therefore revolves around building and improving the productive capacity of economic subjects by focusing more on their personal capacities such as education, training, health, etc. It furthermore concerns the development of the institutional framework in which the subjects operate, which includes both the physical and social infrastructures and the natural environment surrounding these. The process of production and employment is enhanced in this way and the subjects therefore consider themselves active participants and not merely spectators or recipients.

ESA sees economic growth and development as a joint process driven by economic subjects. As regards the infrastructural framework, the economic process is also embedded in an institutional, physical and social framework surrounded by the natural environment. These are the building blocks of the process and should be of a good character and quality, requiring constant revision and adaptation to ensure sustained growth and development. The subjects responsible for driving the process also need to possess certain capabilities. It is therefore important that the productive capacities of the economic subjects and a production-enhancing process be developed within the supporting sphere of an institutional, physical, social and natural environment. The role of government is one of promoting and supporting, and also deals with any failures or breakdowns in the system and the capacity-generating process. The government should furthermore define and establish institutional environments that set the rules of the game for private economic agents, thus affecting the design and working of institutional arrangements (Yanagihara, 1997: 21).

A comparative assessment between the ESA and the conventional neo-classical approach to economic growth and development reveals a marked difference illustrated in Table 2.1.

Table 2.1: Comparison of the Neo-Classical and Economic System Approach (ESA)

Neo-Classical Approach	Economic System Approach
Economic functions	Economic relationships
Mechanical/Deterministic	Dynamic
Prescriptive	Accommodating
Narrow, specific development path	Broad playing-field - openness
Segregation of processes	Integration of processes
Abstracting	Focus on the real world
Analytical	Descriptive
People are instruments	People do matter
Policy	Capabilities
Markets are neutral	Markets are part of the development process

Source: Blignaut, 1997.

According to this comparative analysis, the neo-classic approach emphasises the role of economic functions that are deterministic and universal by nature. The approach can therefore be prescriptive and leads to a narrowly-defined development path using abstraction and assumptions, based on a segregation of processes. The ESA, on the other hand, focuses on economic relationships which acknowledge the dynamic nature of the real world. Theory and policy should therefore be accommodating with enough room for openness, based on the integration of processes.

The more analytical neo-classical approach regards people as objects (recipients or spectators) where policy-making and economic determinism are extremely important in

the achievement of the "prescribed" results. The ESA, on the other hand, is descriptive and concentrate on people and their capabilities in order to achieve progress.

Furthermore, since the neo-classical approach views markets as homogenous in nature, markets act neutrally according to a specific order. The diversity of the participants is however, acknowledged by the ESA and markets are regarded as an integral part of the diverse economic process. People and infrastructure will influence markets, their quality, volume, scope and nature. The ESA constitutes a decisive paradigm shift in that it postulates that people and dynamic relationships are essential to economic growth and development.

2.5.1 Implications for urban economic development

The ESA has important implications for urban economic development as it provides an organisational and institutional framework. The institutional framework in which economic decision-makers and agents operate should be improved. This includes the physical and social infrastructures as well as the natural environment. In developing economies infrastructure development is an extremely important factor, and this usually takes place within urban areas. Another important contribution is the fact that the ESA views knowledge as implicit and it focuses on people, capabilities and economic agents. The enhancement of the technological and managerial capabilities of economic decision-makers or economic agents is vitally important. The acquisition and proliferation of knowledge is thus a prerequisite for improving the capabilities of these economic decision-makers and agents to enable them to improve the quality of life of the area's residents.

The ESA thus supplements the conventional economic growth theories and provides an institutional framework in which urban growth and development may be stimulated. Developing economies are under pressure, more so than developed economies, to develop and improve quality of life. Urban areas in developing economies are well-positioned in guiding and directing economic growth and development.

2.6 SUMMARY

Both Harrod and Domar developed models to explore the existence of a long-term growth path by increasing the levels of savings and investment. The models were very similar and have since been combined as the Harrod-Domar model. This model ultimately found that the economy was relatively unstable. The economy would therefore move in cycles of unemployment and stagnant growth followed by periods of inflation and shortages.

In the mid-1950's, Solow and others developed an alternative approach to modelling economic growth. This growth model assumed variable capital/labour and output/capital ratios and thus implied stable growth. Higher levels of investment and lower levels of population growth explained economic growth. This would allow countries to accumulate more capital per worker and increase labour productivity. The permanent rate of growth of output per unit of labour input was, however, independent of the saving (investment) rate and depended entirely on the rate of technological progress in the broadest sense. Technological progress could offset the tendency of the marginal product of capital to fall. The effectiveness of labour was seen as exogenous and was not identified by the model. The effectiveness of labour could also be seen as abstract knowledge or it may reflect a combination of forces.

Endogenous growth theory was able to identify and explain the Solow residual. Knowledge or the effectiveness of labour was no longer a mere residual but endogenously part of the process of growth. The importance of R&D was accentuated to enhance and proliferate knowledge. The endogenous growth theory examined functions that show increasing returns because of investment in human capital or knowledge. Technological progress and human capital formation was thus endogenised within the general equilibrium growth models.

The Economic System Approach (ESA) is mainly concerned with an analysis of technological and organisational or institutional innovations. The strength of this

approach lies in its ability to identify the determining factors for dynamism and sustainability of economic development at the level of an individual industry or industry cluster. It also provides a basis for formulating and evaluating the policies to foster industries. This will be harnessed in the ESA philosophy because the policy philosophy is complex and dynamic. Urban areas are interdisciplinary and interactive. As the neo-classical approach is linear it will therefore not contribute as much as the ESA.

The emphasis on knowledge by the endogenous growth theory as a main contributing factor to economic growth is an important factor in urban areas. It needs to be proliferated to the advantage of the total urban environment including the local authorities. The ESA also provides a structure according to which local authorities may enhance the economic capacity-building process. Further elaboration on the ESA will follow in Chapter 11. The concept of knowledge also needs further investigation in terms of this study.

The next chapter will be devoted to the analysis of knowledge and its contribution to urban economic growth and development and thus an improvement in quality of life.

CHAPTER 3

THE NATURE OF KNOWLEDGE

We are drowning in information, but starved for knowledge.
(J Naisbitt)

3.1 INTRODUCTION

The purpose of this chapter is to analyse the contribution of knowledge to an improved urban environment conducive to economic growth and development. The presence and enhancement of knowledge (technology) also explains the potential for economic growth. Technology was seen by Solow (1957), inter alia, as exogenous and was neglected in terms of explaining economic growth. The endogenous growth model endogenised knowledge and thus R&D, while the ESA views knowledge as implicit and also focuses on people. Generating knowledge contributes to the enhancement of the capabilities of people and to the capacity of the urban economy.

Instead of assuming that growth occurs because of some exogenous improvement in technology, the economic forces underlying technological progress will be investigated in this chapter. Innovators continuously seek better and more efficient ways to improve the process of production and hence economic growth. The possibility of earning a profit may be the motivational factor for improvements in technology. In this sense, the improvements in technology and economic growth are an endogenous outcome of the economy.

It is thus necessary to explore the notion of knowledge in greater detail to determine in what ways it could enhance the capabilities of economic decision-makers or agents. It is important to generate and diffuse knowledge to empower such people. The creation of an environment conducive to the generation and proliferation of knowledge is, however, also an important aspect for local urban authorities. They themselves could benefit from such an environment to enable them to develop efficient and effective

urban policies. The acquisition of knowledge is a non-linear function and the attainment of an improved quality of life is thus more likely.

3.2 THE NATURE OF KNOWLEDGE

The different types of knowledge play important roles in explaining economic growth. The determinants in accumulating these different types of knowledge cannot be expected to be the same. The forces underlying the accumulation of knowledge in the development of science would thus not be the same as the development of knowledge in the fast-food industry. No-one can thus expect to find a unified theory of the growth of knowledge (Romer, 1996: 111). It would rather be a set of factors (or a system) that determines the accumulation of knowledge.

According to Romer (1990), all types of knowledge share one characteristic in that they are "non-rival". Simultaneous use of knowledge by more than one person is therefore possible. The marginal cost of supplying knowledge to other users, once it has been acquired, is zero, except for the distribution cost. The price of knowledge in a perfectly competitive market is thus zero and the motivation behind the acquisition of knowledge cannot be contributed to any economic gain. Knowledge should therefore be sold above its marginal cost otherwise market forces will not motivate its development (Jones, 1998: 75). Although knowledge is non-rival, it may be excludable. A good is excludable if it is possible to prevent a person from using it.

The nature of the knowledge and the institutions governing property rights will determine the excludability of such knowledge. Patent laws protect the inventor of a specific design from possible imitators. In another country under another set of laws the inventor may have less control in protecting his design. This implies that there are different degrees of excludability. Excludability is sometimes more dependent on the nature of the knowledge than on the legal system. Patent rights may not protect a secret recipe but some people might still be excluded from the "knowledge" of the recipe. If knowledge is fully non-excludable, no private economic gain will flow from its

development. If knowledge is excludable, this knowledge can be made available at positive prices with profits for the research and development efforts. The generation of knowledge without its diffusion is not worth much. It is thus important to determine in what way knowledge could contribute to economic growth and development.

3.3 KNOWLEDGE AS THE ENGINE OF GROWTH

The mere fact that knowledge is non-linear means that the technological frontier is continuously being pushed outward. A similarity between Solow's and Romer's model exists in that both describe a production function and a set of equations describing how inputs evolve over time. However, there is one major difference in the model of Romer where capital stock (K) and labour (L_Y), combine to produce output Y, using the stock of ideas (A) (knowledge) (Jones, 1998: 90):

$$Y = K^{\alpha}(AL_Y)^{1-\alpha} \tag{3.1}$$

where α is a parameter between 0 and 1. This implies that for a given level of technology A, the production function in equation (3.1) exhibits constant returns to scale in K and L_Y. However, when A is assumed to form part of the input into production, there are increasing returns to scale. The presence of increasing returns to scale results fundamentally from the fact that ideas or knowledge are non-rival in consumption (Jones, 1998: 90). A(t) is the stock of knowledge or the number of ideas that have been invented over a period of time up to time t. Then $\dot{A}$ (derivative), is the number of new ideas produced at any given point in time. $\dot{A}$ is thus the growth rate in new ideas and is equal to the number of people attempting to create new ideas (L_A), multiplied by the rate at which they create these ideas ($-\delta$):

$$\dot{A} = -\delta L_A \tag{3.2}$$

Labour is used either to produce new ideas or to produce output, so two constraints result from this:

$$L_A + L_Y = L$$

The rate at which researchers discover new ideas may simply be a constant. One should, however, take into account the stock of ideas that have previously been discovered. If discoveries from the past raise the productivity of current researchers, then $-\delta$ would be an increasing function of A. It might also be that the most obvious ideas are discovered first and subsequent ideas are increasingly difficult to discover. In such a case, $-\delta$ would be a decreasing function of A. This implies the rate at which new ideas are produced as:

$$-\delta = \delta A^{\phi} \qquad (3.3)$$

where δ and ϕ are constants. If $\phi > 0$, this indicates that the productivity of research increases with the stock of ideas that have already been discovered, and $\phi < 0$, that productivity declines. With $\phi = 0$, the productivity of research is independent of the stock of knowledge.

The number of people searching for new ideas may also determine the average productivity of research. The duplication of efforts is more likely when more people are engaged in research. Here one can suppose that it is L_A^{λ}, rather than $L_{A,}$, that enters the production function for new ideas, with λ, some parameter between 0 and 1. If equations (3.2) and (3.3) are combined with this, the following general production function for ideas can be derived:

$$\bullet A = \delta L_A^{\lambda} A^{\phi} \qquad (3.4)$$

Although a single person engaged in research in the economy would contribute fewer new ideas relative to the economy as a whole, it clearly changes with an aggregate

research effort. If $\lambda < 1$, it may reflect an externality associated with duplication, because some of the ideas of the individual researcher may not be new to the economy as a whole. If $\phi > 0$, it would reflect a positive knowledge spillover in research, thus enhancing the use of discovered knowledge. An important consequence here is that people are the key input into the creative process of generating new ideas (Jones, 1998: 94). A larger population, given that they engage in research and development, generates more ideas and because the ideas are non-rival, everyone in the economy benefits. In order to generate growth, the number of ideas must increase over time.

This suggests that progress in economics is not merely a mechanical application but involves a creative act as well. Discoveries differ from other inputs and can be used by many people simultaneously, whereas other inputs cannot. In this sense, ordinary goods are rival goods but information is non-rival in consumption. Although the information from economically important discoveries is non-rival in consumption, it does not meet the other criteria of a public good. These discoveries are partially excludable, at least for some time. People, as firms, have some control over their information from discoveries. Hence information cannot be treated in the same manner as pure public goods. Information can be sold and therefore the owner can earn monopoly profits because regarding information no opportunity cost is involved (Romer, 1994: 12).

If someone is prospecting for gold, the discovery will seem to be exogenous in the sense that forces outside the control of the prospector will determine success or failure. The aggregate rate of discovery, however, is endogenous. If many more people start prospecting for gold, eventually more valuable discoveries may be made. This will be true even if the discoveries are accidental side effects. The aggregate rate of discovery is still determined by things that people do. Thus if more effort is put into R&D in developing urban economies, this could contribute to economic growth and development even if it is just an accidental side effect. The search for new knowledge should, however, never be considered the responsibility of someone else or a time- and money-consuming exercise not worth engaging in. Innovation involves the decisive effort to search for new knowledge and the application of such new-found knowledge.

3.4 ECONOMIC AND TECHNOLOGICAL INNOVATION

An invention is no more than an idea for a new product or process of production. Practicality and economic feasibility are not the main ingredients of an idea. Inventions are merely part of the stock of knowledge from which the developers of new technology may draw. Most inventions never get beyond the conceptual stage. Some inventions may be the result of a "flash of insight", whereas the majority normally involves the commitment of resources to the purposeful research for potentially new ideas. In order to prevent the absorption of resources only, an invention should be turned into an innovation. Innovation involves the purposeful search for new knowledge and the application of this knowledge in production (Rosegger, 1996: 21). Innovation also sometimes refers to doing things differently from one's competitors in order to gain an advantage over them. It is thus important that the new idea pass all tests of technological and economic feasibility as well as market acceptance. The size of an innovator's economic return depends entirely on the demand for the idea. In order to ensure that innovators continuously seek new ideas, intellectual property rights should be protected (Rosegger, 1996: 21).

According to Brue (1994: 494) innovation is defined as:

> *changes in the methods of supplying goods such as introducing new goods or new methods of production, opening new markets, conquering new sources of supply of primary materials or semi-manufactured goods, or carrying out a new organisation of industry, such as creating a monopoly or breaking one up.*

Innovation is therefore much more than mere invention. Invention can only be classified as innovation if the invention is applied to the industrial processes. The key to economic change is the introduction of innovations with the central innovator being the entrepreneur. The entrepreneur is the person who tries out new ideas and who introduces innovations. They are always pioneers in introducing new products, new

processes, new forms of business organisations or penetrating new markets. This person is normally one with exceptional abilities, who seizes opportunities that other people are oblivious to, or who creates opportunities through his own daring and imagination. Without innovation, economic life would reach static equilibrium and a stationary state in which the accumulation of wealth would cease (Stonier & Hague, 1964: 534).

This is in line with Schumpeter (1934) who felt that the key process in economic change was the introduction of innovations and the central innovator the entrepreneur. According to Schumpeter (1943: 83):

> *The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumer's goods, the new methods of production or transportation, the new market, the new forms of industrial organization that capitalist enterprise creates.*

He regarded economic fluctuations as an integral part of economic growth and emphasised the role of the innovator in fostering such growth. Endogenous forces which bring about economic evolution and qualitative change were stressed. A society thus has to do more than just adapt to changing market conditions. Development is therefore viewed as changes in economic life not enforced from without, but which arise as a result of society's own initiative, from within. Schumpeter, (1934: 64) proceeds by saying:

> *Every concrete process of development finally rests upon preceding development. Every process of development creates the prerequisites for the following.*

The creation of a market niche leads to the swarming of new innovations by imitators, with opportunities coming in clusters. Although these clusters are unevenly distributed, it is still possible to locate their epicentre. The changes brought forward by the

opportunities are not relatively smooth, but proceed in fits and starts (Clark & Juma, 1988: 213). To Schumpeter, two essential features are important for economic growth and development: Firstly, the introduction of new products is essential to the process of growth; an essential characteristic is that this implies alterations in combining production factors. This entails radical changes in production methods, management and organisation, and the exploitation of new markets or sources of raw materials. The introduction of radical new products and the continuous improvement of existing ones, give an extra dimension to economic growth. Secondly, reaping the economic benefits derived from economic development is an important factor. Schumpeter maintains that only if the innovator could sell his/her product to the masses, would he/she be able to reap the rewards of large-scale and highly-mechanised production. Schumpeter continued that (1949: 67):

> *The capitalist achievement does not typically consist in providing more silk stockings for queens but in bringing them within the reach of factory girls in return for steadily decreasing amounts of effort.*

Economic growth meant not only an increase in the quantity of output, but also a revolution in its quality and composition. Schumpeter maintained a firm belief in economic fluctuations. He viewed each long wave of economic upswing as a miniature industrial revolution, followed by the absorption of its effects by the economy during its long-wave downswing. Each period of upswing brought new production methods, new forms of economic organisation, new products and new markets. All forms of innovation were present during this period. Once the period of upswing ended, there was a halt in expansion as the economy adjusted itself to the new situation and consolidated the ground it had gained (Stonier & Hague, 1964: 549).

Schumpeter (1943: 133) describes this process of upswing and downswing as one of creative destruction. Certain parts of the economic structure are destroyed from within as new structures are being created to fill these gaps. This process is continuous and here the importance of the innovator is emphasised. The innovator is a forceful pioneer,

who extends the boundaries and the process of creative destruction by exploiting commercially new products and processes. The innovator - the entrepreneur par excellence - is exploiting inventions, most of which were invented by others. He/she is not merely trying to satisfy the demand for existing products more effectively, nor is he/she satisfying old needs with new goods - he/she is driven by the concern to initiate economic change, create entirely new demands and "educate" consumers if need be. Consumers are brought to the point where they want new things. The activities of the innovator are thus not only to facilitate economic growth and progress, but to transform the whole nature and role of competition (Stonier & Hague, 1964: 550).

The progress and success of the capitalist system would, however, eventually come to a halt. According to Schumpeter the economic and social foundations of capitalism would crumble because of (a) the obsolescence of the entrepreneurial function, (b) the destruction of the political strata, and (c) the destruction of the institutional framework of the capitalist environment (Brue, 1994: 495). This is because the "progress" in the capitalist system will either cease or become completely automatic and therefore break to pieces under the pressure of its own success (Schumpeter, 1943: 133). Without innovation, the economy will be forced into a near steady state.

Contrary to Schumpeter's notion of creative destruction, creative accumulation can also be associated with innovative activities (Malerba & Orsenigo, 1997: 264). Certain indicators play a major role in capturing the degree of creative destruction or the degree of creative accumulation associated with innovative activities. The concentration of innovative activities (clusters) combined with the size of a firm are two important indicators. Stability is also a key factor affecting international technological specialisation, emphasising that creative accumulation is a fundamental property of technological change. Firms that are continuously active in the innovative environment accumulate knowledge and expertise and are able to perform successfully within given technology. A correlation thus exists between technological performance and a stable group of innovators who are engaged in continuous efforts of innovation (R&D) over time. As far as policy is concerned, the primary focus of government should be on

creating, supporting and strengthening a core group of innovators continuously and consistently.

According to Dosi (1988: 222), innovation concerns:

> *the search for, and the discovery, experimentation, development, imitation and adoption of new products, new production processes and new organisational set-ups.*

A few features concerning innovation should be kept in mind when dealing with the process of innovative activities (Dosi 1988: 222). It is obvious that what is searched for cannot be known with any certainty before the activity of search and experimentation is completed. Therefore the technological and commercial outcomes of the innovative efforts can hardly be known *ex ante*. This feature of uncertainty is the first factor concerning innovative activities that should be kept in mind. An increasing reliance on new technological opportunities stems from major advances in scientific knowledge, which can be viewed as a second feature concerning innovative activities. The third major feature of innovative activities is the increasing complexity of research and innovative activities that tend to favour formal organisations such as firms' R&D laboratories, government research institutions, universities, etc. as opposed to individual innovators. The fourth feature is that firms can primarily learn how to use, improve and produce by the very process of doing them. This can happen through the informal activities of solving production problems, meeting specific requirements of consumers, etc. Fifthly, the process of innovation and technological change is a cumulative activity.

According to Malerba & Orsenigo (1997: 241) Schumpeter proposed two major patterns of innovation activities. The first pattern of innovative activity is characterised by the technological ease of entry into an industry and by the major role played by new firms in the process of innovation. A new entrepreneur enters the industry with new ideas, products or processes and launches new enterprises that challenge established ones. This continuously disrupts the existing methods of production, organisation and

distribution and also eliminates the quasi-rents associated with previous innovations. This pattern of innovation could also be called the "widening" of innovation. A widening pattern of innovative activity refers to an innovative base that is continuously enlarged through the arrival of new innovators and the erosion of the traditional competitive advantages of established firms.

The second pattern of innovation is characterised by the prevalence of large established firms with certain restrictions to entry for new innovators. These large firms are able to create R&D laboratories and with their accumulated stock of knowledge, competence in large R&D projects, production and financial resources, are able to keep out new entrepreneurs and small firms. This pattern of innovation could be viewed as "deepening" of innovation. A deepening pattern of innovation refers to the dominance of a few firms that are continuously innovative through the accumulation of innovative capabilities over time (Malerba & Orsenigo, 1997: 242).

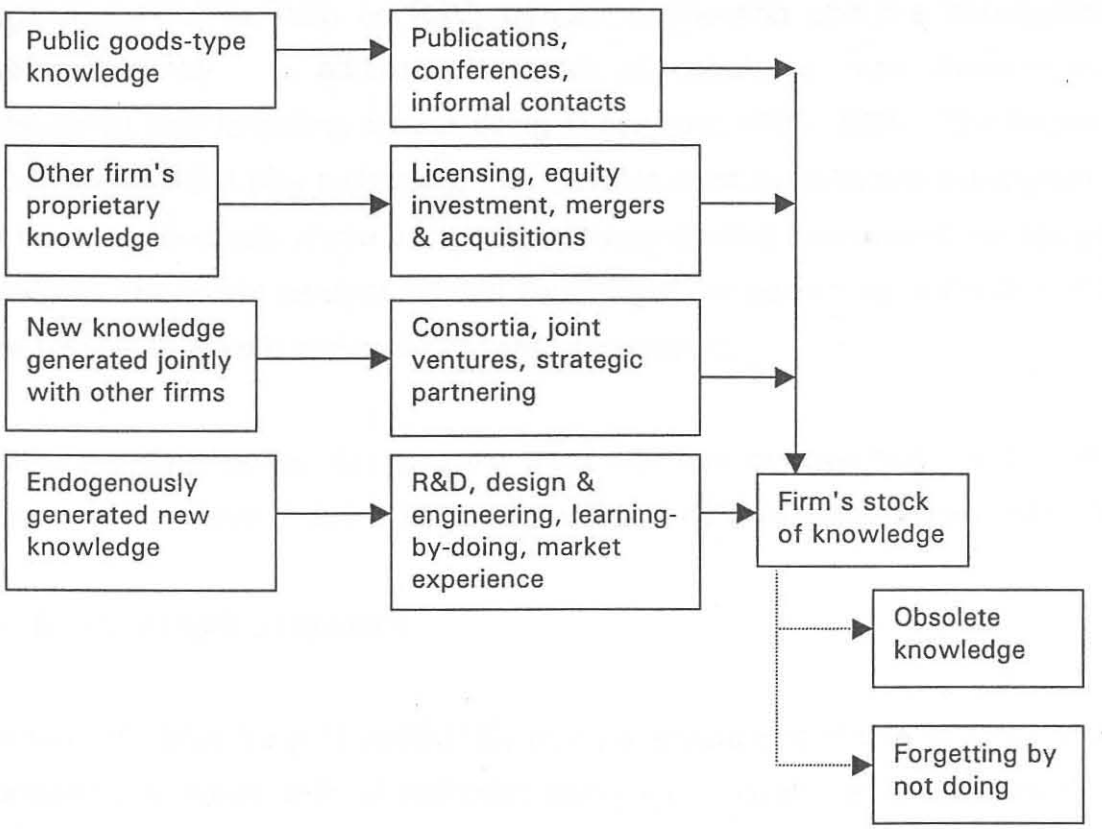
Developing urban economies should be able to combine their production factors in such a way as to alter production methods and exploit new sources of inputs and markets. Economic growth and development should therefore be viewed as changes in the economy without these being forced via external elements, but rather from within, using its own initiative. The endogenous forces within the urban economy should be exploited to create an environment conducive to inventions and innovation. This could stimulate new ideas, providing economic opportunities to the entrepreneur. An urban developing economy should thus acquire knowledge by purposefully stimulating research to enable optimal endogenous growth.

3.5 SOURCES AND MEANS OF KNOWLEDGE

A number of theories attempt to explain when and why inventions occur. Some are of the opinion that inventions are the result of random genius and are therefore unpredictable, sporadic and inexplicable (Rosegger, 1996: 127). Another view is that inventions are the result of social evolution and thus occur when the "time is ripe" for a

new invention. Some also feel that inventions are due to the pressure of social or technological needs where actual or potential demand is probably the most important determinant (Rosegger, 1996: 127).

Figure 3.1: Sources and means of knowledge acquisition



Source: Rosegger. 1996.

From an economic point of view the most agreeable explanation is the notion that inventions are the result of purposeful search and research (Rosegger, 1996: 129). The potential success of a firm's searchers for new ideas and the transformation of these into innovation, depend greatly on the firm's ability to acquire the necessary knowledge. Figure 3.1 illustrates the sources of knowledge and also shows the means whereby knowledge is created and transferred.

The first type of knowledge takes the form of large amounts of information that are public goods by nature, and are accessible at a relatively low cost. The second major source is the proprietary knowledge of other firms, which may be obtained through contractual agreements (such as licensing) or by actually acquiring the person in whom the knowledge is vested. Another method of acquiring knowledge is to engage in joint R&D efforts with other firms. Finally, the stock of knowledge can be enhanced by endogenous activities such as R&D, design, engineering and the accumulation of market experience. In addition, the stock of knowledge may diminish through obsolescence and forgetting by not doing (Rosegger, 1996: 183). The former type refers to the fact that new technology may devalue existing skills and experience. The latter refers to situations where a firm specialises and relies on external sources without maintaining a requisite level of internal knowledge. In such a case the firm may no longer be able to absorb and apply acquired information.

Some of the main forces receiving the most attention in governing the allocation of resources to the development of knowledge will now be discussed (Romer, 1996: 113).

3.5.1 Basic scientific research

Basic scientific knowledge is traditionally made available free of charge. This research is normally undertaken without economic gain as a motivational force. Governments and wealthy individuals support this research and individuals are motivated in this pursuit by the desire for fame or by love for their field of study. This type of knowledge is made available at zero cost and is seen as a positive externality due to its contribution to production.

3.5.2 Private incentives

Many innovations such as the development of new products or small improvements in existing goods are motivated almost entirely by the possibility of private economic gain. The knowledge created by this type of research should at least have some form of

excludability, affording the inventor some economic bargaining power. The price attached to this new idea is limited by its usefulness in production or the potential returns that others can gain by acquiring it. Under conditions of imperfect competition, the equilibrium condition would not be optimal. Inefficient divisions of resources between research and development and conventional goods production may occur.

Three externalities of research and development have been identified (Romer, 1996: 114). The consumer surplus effect is the first externality where innovators obtain some surplus since they cannot engage in perfect price discrimination. This will be classified as a positive externality of research and development. The business-stealing effect is the second externality, where the introduction of superior technology makes existing technology less attractive and therefore harms the owners of those technologies. This externality is negative in nature. The research and development effect is the final externality where innovators do not control the use of their knowledge in the production of new or additional knowledge. Innovators only receive a return on their knowledge in the production of goods but not in knowledge production. The development of new knowledge is a positive externality for other researchers.

The net effect of these three externalities is dubious. In some cases the business-stealing externality may outweigh the other two. The incentives to capture the profits earned by other innovators may cause the allocation of too many resources to research and development. Normally the overall externality of research and development is believed to be positive. Additional externalities are also possible. If only partial excludability is possible there is an additional reason for the private return to research and development being below social return. On the other hand, excessive incentives for some kinds of research and development are possible if an innovator is awarded exclusive rights to a new innovation. In this case the private returns would exceed social returns.

3.5.3 Talented individuals

Baumol (1990) and Murphy, Shleifer and Vishny (1991) have shown that improvements in knowledge are often ascribed to the work of highly talented individuals. These individuals also have opportunities other than pursuing innovations. Therefore, economic incentives for highly talented individuals are very important in stimulating the accumulation of knowledge. According to Baumol (Romer, 1996: 115) these individuals were traditionally attracted by other high-profile jobs such as politics or military positions. These activities often lead to negligible or even negative social returns and are seen as a form of rent-seeking. These individuals attempt to capture existing wealth and opportunities rather than create new opportunities and wealth. A strong link between the efficient use of the skills of these talented people and the level of economic progress in a country is also clear.

Three factors that would influence talented individuals to pursue activities that are socially productive, were identified. Firstly, the size of the relevant market determines the potential returns for an individual and this represents an incentive for research and development. The second factor, is the degree of diminishing returns. Activities that limit the innovators' time do not represent the same potential returns as activities whose returns are limited only by the size of the market. The final factor is the ability to retain the returns (money) from one's activities. Well-defined property rights tend to encourage innovations and entrepreneurship.

3.5.4 Learning by doing

This last determinant of knowledge accumulation is somewhat different to the three already mentioned. In the production process, individuals may think of creative ideas to improve the production process. The Nobel Laureate Arrow gave a dynamic interpretation to increasing returns through "Learning by Doing" (Meier, 1995: 102). This was an attempt to render technological progress endogenous to growth models by making productivity an increasing function of cumulative aggregate investment for the

industry. The accumulation of knowledge is sometimes merely a side effect of conventional economic activity and is not due to deliberate efforts by anyone.

3.6 RESEARCH AND DEVELOPMENT

In the theoretical literature on economic growth, technological progress is perceived either as a "free good", as a by-product (externality) of other economic activities or a result of intentional R&D activities by private firms. It is increasingly accepted that the third source of technological progress (intentional R&D activities by private firms) is one of the most important sources of technological progress in an economy (Fagerberg, 1994: 1170).

Although some of the greatest inventions of the past came from the work of individuals working independently, it seems as if the days of the freelance inventor are limited, due to modern inventions being almost made to order in R&D laboratories of big enterprises. A number of reasons are given to emphasise this possibility (Rosegger, 1996: 137):

i) Scientific work sometimes necessitates the combining of engineers and scientists in one setting.
ii) The high capital requirements of modern applied research.
iii) The advantage of economies of scale.
iv) Growing control over resources and markets of large enterprises.
v) The increasing reluctance of financiers to finance inventor-entrepreneurs.

Since there is no measure of the importance of a specific invention ex ante, it cannot be said that the role of the individual inventor has completely disappeared. Different types of research may demand different approaches and as some may require major organised structures, others may require small-scale methods. Decisions as to who should conduct the research are not completely clear, although the opinion of an experienced researcher is illustrated by the following (Rosegger, 1996: 140):

The best person to decide what research work shall be done is the man who is doing the research. The next best is the head of the department. After that you leave the field of best persons and meet increasingly worse groups. The first of these is the research director, who is probably wrong more than half the time. Then comes a committee, which is wrong most of the time. Finally, there is a committee of company vice-presidents, which is wrong all the time.

Some sectors may rely mainly on the informal process of "learning-by-doing"; others rely heavily on formal research activities of their R&D division; in some innovation is primarily generated by big firms or sometimes small firms. Pavitt (1984) identified a group of sectors to determine why sectors differ in their rates and modes of innovation in terms of the origin and use of R&D. This group of sectors are (Dosi, 1988: 231):

i) *Supplier dominated* sectors

These sectors will include textile, clothing, leather, printing and publishing and wood products. Innovations in these sectors are mainly process innovation. Innovative opportunities arise due to new forms of capital equipment and intermediate inputs, originating from firms who are primarily involved outside these sectors. The process of innovation is thus mainly a process of diffusion of best-practice capital goods and of innovative intermediate inputs such as synthetic fibres. The base of knowledge in these sectors relates in principle to incremental improvements in the equipment elsewhere. Technological capabilities are rather low and firms are not very big, with the exception of textiles, which present economies of scale opportunities.

ii) *Scale intensive* sectors

In these sectors innovation relates to both processes and production. The production activities generally involve mastering complex systems and economies of scale in production and R&D, to mention but a few. Firms tend to be big, produce a relatively large portion of their own process technology, devote

a fairly large share of their own resources to innovation, and manufacture some of their own equipment. This group of sectors includes transport equipment, electric consumer durables, metal manufacturing, food products, parts of the chemical industry, glass and cement. A distinction concerning the nature of the production process can be made between assembly-based industries (cars, electrical consumer durables, etc.) and continuous process industries (cement, food products, etc.).

iii) *Specialised suppliers*

Innovative activities relate mainly to product innovations that enter other sectors as capital inputs. Firms are usually relatively small, operate close to their users and embody a specialised knowledge in designing and equipment building. This group includes mechanical- and instruments engineering. A high level of opportunities exists and is often exploited through informal gatherings of design improvements, introduction of new components, etc.

iv) *Science-based* sectors

This group of sectors includes the electronics industries and most of the chemical industries. Innovation is often directly linked to new technological frontiers due to scientific advances. Opportunities are great and mechanisms range from patents (chemicals and drugs) to learning curves (electronics). Innovative activities are formalised in R&D laboratories and this product innovation enters a wide variety of other sectors as capital or intermediate inputs. Firms sometimes tend to be big, with the exception of highly specialised producers.

In the process of innovation, R&D is very important in generating new ideas. Four characteristics that have central importance can be identified (Kay, 1988: 282). Non-specificity is relevant at the level of the product and the firm, and much of the R&D is not product specific insofar as a particular piece of work may feed into a variety of final products. Much of the R&D is also not firm specific, generating externality and property right problems. Lags and delays are a particular feature of R&D activity with a given

piece of R&D often taking many years before it becomes available for commercial ventures, if at all. Uncertainty is also a problem (meaning unmeasurable uncertainty) in contrast to predictable or measurable risks. This also refers to general business uncertainty, meaning all decisions concerning the future. This again is linked to technological uncertainty, which is the achievement of specified performance and market uncertainty, which refers to the possible achievement of a commercially viable product or process. Lastly, another major problem may be if R&D cost levels exceed the internal financing capability of the firm and there are barriers to external capital market financing of corporate projects.

It is important for firms engaging in R&D activities to keep in mind that the new technologies emanating from their research effort do not compete in the literal sense. Only firms compete as decision-making entities articulating a technology to achieve specific objectives within a certain environment. The outcome of their decisions is precisely what determines the significance of rival technologies. Such a firm possesses a certain knowledge base and design capacity to translate that base into products and processes of production. Three attributes of a firm are important is this respect (Metcalfe, 1988: 568). Firstly, efficiency as measured by the quality of a firm's products and the productivity of the methods it uses in its production activities. Efficiency depends on two interwoven aspects of the firm's knowledge base: the first one of the two is its technological knowledge of how materials and energy are combined into the desired products, and secondly, its organisational knowledge base which determines the firm's managerial skills to plan, co-ordinate, control and monitor its productive activities. The second attribute of a firm is its propensity to accumulate the ability to translate profits into the expansion of the capacity to produce. Accumulation refers to the possibility of growth opportunities, the ability to command internal and external funds, the investment requirements to expand capacity, the ability to manage growth without sacrificing efficiency, as well as the willingness to expand. A firm that does not wish to grow will have zero propensity to accumulate. Lastly, the creativity of a firm is the ability to enhance product and process technology either through improvements within existing design configurations, or by the addition of new design configurations to

the technological base. The creativity of a firm will depend on the richness of a firm's technological environment, the resources that can be directed towards R&D, the incentives to advance technology, the ability to manage the process of acquiring new knowledge and its ability to move from knowledge to artifact.

3.7 HUMAN CAPITAL INVESTMENT

A characteristic of the modern economic society is the fact that technological innovation has removed inhibiting factors like space and time. The relative demand for information, services and intellectual capital will rise. This implies that businesses will tend to become smaller in terms of people but more dynamic and bigger in terms of turnover. Their single most important asset will be the intellectual capital residing within their people. Investment in education and training plays a central role in technological progress and thus economic growth. Considering the importance of knowledge and innovation, the role of investment in the education and training of human beings cannot be overestimated. Investment in education and training of humans over the centuries has brought us to a position where the accumulated stock of capital assets that it represents is our most valuable possession (Stonier & Hague, 1964: 551). The influence of accumulated human skill and knowledge on economic growth could be seen very clearly after the rebuilding of Germany and Japan after World War II. The amazing process of rebuilding these countries in such a relatively short period was due to the accumulated knowledge and skill of the Germans and Japanese people not having been destroyed during the war. It would almost certainly have taken much longer to rebuild these countries without the accumulated knowledge of these countries, and the process of scientific and technological discovery and learning would have had to be repeated.

The process of investment in people has three critical elements (Stonier & Hague, 1964: 551). Firstly, new generations should have access to any appropriate parts of knowledge that have already been accumulated by previous generations. Although not all such knowledge will remain relevant, education and training should be flexible

enough to decide which particular pieces of knowledge are still relevant, and to adapt learning programmes accordingly. No one person can accumulate all existing knowledge and some form of specialisation is thus essential. It is also important to know where knowledge can be found, rather than to try to absorb all knowledge.

Secondly, investment in people should be directed towards helping the innovators to see how to apply existing knowledge in new ways. It is important to see how existing knowledge can be used to develop new products, to introduce new processes and production methods and to improve the efficiency of organisation in businesses and government. However, if people are taught merely to apply old ideas in new ways, the value added will be basically non-existent. People should be encouraged to develop entirely new ideas, products and processes as well. Education and training is therefore necessary to equip innovators with the best possible knowledge and to encourage them to use energy, initiative and imagination. Existing knowledge cannot, however, show where new ideas, new products and new processes are necessary and how to introduce them.

3.8 IMPLICATIONS FOR URBAN ECONOMIC DEVELOPMENT

Urban economic development implies that quality of life should be improved and it thus seems that developing economies should engage seriously in research and development. Urban areas could contribute to providing the infrastructure to stimulate R&D activities in developing economies. The creation of an environment to foster inventions or ideas is important, although these inventions and ideas are mainly part of the stock of knowledge. To become an innovation, these inventions should be applied. The entrepreneur or innovator should be given a fair chance to introduce innovations. Although entrepreneurs are daring people and seize economic opportunities, they still need a complementary urban environment to tackle the challenges posed. Urban policies and policy objectives of local urban authorities should carefully consider the creation of such a complementary urban environment. Local urban authorities in developing economies desperately need daring entrepreneurs to grasp economic

opportunities, to ensure economic growth and development. An improved quality of life may only become a reality once a growth-hampering environment is substituted by the creation of an economic environment complementing the revival of business activities.

3.9 SUMMARY

It is to the benefit of any economy to promote research and development and hence generate knowledge. If knowledge is non-rival in consumption everyone in the economy benefits from this, although the degree of excludability may differ. This excludability factor serves as a motivation for individual researchers to engage in research and development. The potential prospects of economic gain culminating from research are the driving force behind their efforts.

Another factor is the existence of property rights that improve the potential for innovators to earn the profits that encourage them to engage in the development of new ideas. Without research, no new ideas would be created, technology would remains static and there would be no chance of increasing per capita growth. The fact that a person receives personal gain from research does not imply that no social benefit is gained. The gap between private and social returns suggests that there are still incentives for research and development for individuals.

Knowledge is the engine of economic growth. Due to the nature of knowledge, increasing returns to scale in the production process are possible as compared to the model of Solow. Although the growth rate of the population is important because more researchers can generate a larger number of ideas, the availability of incentives to encourage R&D could be more productive. This could ultimately lead to a higher per capita growth rate. It can thus be seen that knowledge is the only instrument of production that is not subject to diminishing returns.

The theory of Schumpeter, explaining the process of growth, maintained that at intervals a number of innovators would apply new ideas commercially in the economy on a

relatively large scale. This would create an eruption of investment activity and lead to a boom in the economy. Innovation may be imitated, building up to a wave of innovating investment as others followed suit. This would lead to a lengthy upswing, followed by a downswing during which the economy would absorb the innovations. However, according to Schumpeter, the capitalist system would mature and investment opportunities would disappear with the entrepreneurial function becoming obsolete. This is because the "progress" in the capitalist system would either cease or become completely automatic and therefore disintegrate under the pressure of its own success. Without innovation, the economy would be forced into a steady state.

Although there are various views on how to acquire knowledge, one method on which there is most consensus intentional R&D activities by private firms. The research approach may be on a relatively small scale as well as major R&D projects by big firms or research institutions. High capital requirements as well as the advantage of economies of scale may favour large formal R&D institutions as compared to individual independent researchers. Due to the importance of R&D in generating knowledge and innovation, investment in education and training is essential for stimulating economic growth.

Since the urban environment can be seen as the economic powerhouse of a country where the major energy is generated to engage in R&D and thus acquire knowledge and foster innovation, a functional analysis of urban economics and the possibilities for urban economic growth will be explored in the next chapter. It is, however, important to note that Chapters 4 to 9 will mainly undertake an analysis of urban economics, the purpose being to gain insight into urban economic matters, prior to these chapters being integrated into the economic growth theories in Chapter 10.

CHAPTER 4

AGGLOMERATION ECONOMIES

The city is the place where everything affects everything else.
(Werner Hirsch)

4.1 INTRODUCTION

The purpose of this chapter is to analyse the operation and structure of urban areas as well as various factors that may influence the economic potential in an urban area. An urban area should best be positioned to address the issue of economic growth and development due to the concentration of economic activities. Since economic energy is mainly generated in urban areas, an exploration of urban dynamics is important for gaining a perspective on the contribution and role of urban areas to economic growth and development. Public officials, urban and regional planners, economists and the public in general are concerned about ways in which economic growth in their cities can be enhanced.

Due to the characteristics of a densely populated urban area, certain potential economic opportunities exist in these areas. Various concepts will be analysed to emphasise the growth opportunities in an urban area. Internal economies of scale in production allow firms to produce goods more efficiently than individual members. The principle of comparative advantage fosters trade and the development of cities. Agglomeration economies in production cause firms to cluster in cities and this clustering also causes economic growth and development in cities. The principles of both internal economies of scale and comparative advantage are part of the concept of agglomeration economies. A brief reference to the first two concepts will be made, with the remainder of the chapter being devoted to the concept of agglomeration economies in explaining economic growth in urban areas.

4.2 AGGLOMERATION ECONOMIES

Agglomeration economies is one of the central concepts in urban economics. According to this notion, cost reductions occur because economic activities are located in one place. The existence of development nodes or clusters is explained by agglomeration economies. In part, agglomeration economies mean the advantages of spatial concentration resulting from scale economies. It also refers to the advantages of spatial concentration due to the scale of an entire urban area, but not from the scale of a particular firm (Mills & Hamilton, 1994: 20). By locating close to one another, firms can produce at lower costs. This is an example of a positive externality of production. The production cost of a particular firm decreases as the production of other firms increases. The existence of agglomeration economies is fundamental to the economic explanation of urban growth.

Economies of scale are very much part of agglomeration economies of scale and will be explained briefly. The extent of economies of scale (the amount by which unit costs fall as production is increased) may vary greatly between various production activities (Mills & Hamilton, 1994: 10). Economies of scale are crucial to the existence of urban areas. In the absence of economies of scale, goods and services could be produced on an arbitrarily small scale to satisfy the demand of small groups of consumers (Mills & Hamilton, 1994: 9). The combination of economies of scale and transportation motivates producers and consumers to locate near production facilities that are large enough to satisfy the demand in the surrounding area. Goods and services can be produced more efficiently on a large scale than on an arbitrarily small scale.

Scale economies arise due to two reasons. Firstly, factor specialisation increases productivity because a worker's skills increase with repetition and workers spend less time switching from one task to another. Secondly, indivisible inputs have a minimum scale of efficiency. If an indivisible input is cut in half, the total output of the two halves is less than the output of the whole. As output increases, the firm uses increased amounts of indivisible inputs, thereby increasing productivity (O'Sullivan, 1996: 20).

If workers receive a wage that makes them indifferent to whether they work at home or at a factory, a small urban area develops around a factory. The workers live near the factory to save on commuting costs and thereby increase the value of land near the factory. To economise on land the workers occupy smaller lots of land and the population density around the factory, relative to the rest of the region, increases. Since a city is defined as an area with a high population density, the factory brings about the development of a small factory-city. The factory-city develops because workers can specialise and use their wages to buy other necessities, and economies of scale are large enough to underpin prices that workers would have asked had they been working and selling from their homes (O'Sullivan, 1996: 21).

As will be seen, the principle of economies of scale is also linked to the concept of comparative advantage. An urban area needs to identify and strengthen its comparative advantage in order to distinguish itself from other urban areas. There are three dimensions that will often determine an area's comparative advantage, its demand, its production, etc. These dimensions are depth (quality of an area's environment and ingenuity of its people), diversity of its economy, and scale of activities (Hirsch, 1973: 177).

The concept of comparative advantage can be explained briefly as follows. Assume that the productivity between two separate regions differs. The difference in productivity could be caused, inter alia, by differences in labour skills, weather or soil quantity, etc. This difference in productivity will ensure that some regions can produce certain goods and services cheaper than other regions. Because prices differ between regions, some regions may start trading various products. The location decisions of traders cause the development of market cities. People employed by trading firms tend to locate near the marketplace to save on commuting costs resulting in higher land prices. People then opt for smaller pieces of land and thus increase the population density relative to the surrounding area. A city now develops due to the high population density. The difference between the productivity that generates comparative advantage is large enough to offset transportation costs, so trade occurs (O'Sullivan, 1996: 18).

It is important to turn to agglomeration economies and explain and anlyse this concept in further detail. Assume that a production function for the manufacturing sector of an urban area can be specified as follows:

$$Q = A(z,t)F(K,L) \qquad (4.1)$$

In this equation z is a collection of factors that create agglomeration economies, t the level of technology and F(K,L) the function of capital and labour (McDonald, 1997: 339). There is, however, a critical distinction between agglomeration economies and technological progress. Technological progress implies that a firm applying new technology can produce more output with a given amount of capital and labour. Technological progress is therefore seen as internal to the individual firm. Agglomeration economies, by contrast, are external to the individual firm in an urban area. However, it may be that agglomeration economies act by increasing the rate of technological change for firms in a given urban area. Thus, there may be agglomeration economies in the invention and development of new technologies and there may be agglomeration economies in the adoption of new technologies.

It is now important to classify different types of agglomeration economies. A distinction within agglomeration economies is that they may be static or dynamic. Static agglomeration economies mean that the level of some agglomerative factor may be associated with some level of output from industry. In the production function (4.1) above, the level of z creates a level for A(z,t) and hence for output. In this example, a larger urban area may have a better and cheaper form of air transport (the z factor). This will create a once-off increase in A(z,t) and thus a once-off decrease (a level effect) in the industry's cost curves. By contrast, a dynamic agglomeration economy means that the level of the agglomerative factor is associated with a continuous increase in the output of the industry. More inventive innovators will be available in a large urban area, which will create a continuous flow of technological change (growth effect) that exceeds that of smaller areas. The size of the urban area (the z factor) causes technology (the t

factor) to increase continuously with a positive effect on economic growth (McDonald, 1997: 340).

The other major distinction within agglomeration economies is between localisation and urbanisation economies. Localisation economies of scale, occur when firms benefit from being close to other related firms. Urbanisation economies of scale, occur when firms benefit from being located in a large city, even though its firms may be unrelated (Bogart, 1998: 12). Both types can be static or dynamic. The clustering of activities will unfortunately lead to congestion and related negative externalities. The marginal benefits of clustering should at least exceed the marginal cost to some degree, or else the formation of cities will never be observed. The two types of agglomeration economies will now be discussed in more detail.

4.2.1 Localisation economies

Localisation economies occur when production costs of an entire group of firms in a particular industry decrease as the total output of that industry increases at that location (O'Sullivan, 1996: 24). Localisation economies generate clusters of firms in the same industry. Firms in the cluster exploit scale economies in the production of specialised inputs, by sharing the suppliers of these inputs. The cluster attracts not only the demanders of intermediate inputs, but also the suppliers. Firms also exploit scale economies in the provision of specialised business services and local public services. Urban planners may develop a strategy designed to create a cluster of closely related firms in order to attract further growth. The sources of localisation economies will now be discussed.

4.2.1.1 Pool of labour and knowledge

Related firms, locating close together, may contribute to the development of a skilled labour pool. If firms face unstable labour demands, the labour market advantages culminating from agglomeration are particularly useful. Firms can then expand their

workforce quickly due to the large amount of qualified workers available. Fluctuations in employment may increase the advantage of a concentration of skilled labour. A shortage of skilled workers for a particular industry may be addressed by developing a school or training college to improve the quality and availability of labour.

The notion of localisation may contribute to employment creation because of an increased demand for and thus concentration of employment. Employment growth in the local industry can be divided into three parts: The first is that which can be attributed to total employment growth in the country. Next, a certain percentage may be attributed to the fact that national employment growth in a particular industry was more rapid (or slower) than in the country as a whole. The third part is where a comparison is drawn between the employment growth in the local industry and that industry's national growth rate. Here, a direct comparison is made between the industry's growth locally and nationally and is therefore normally called the competitive position of the local industry (McDonald, 1997: 359). A possible test for dynamic agglomeration economies is whether an industry is growing more rapidly in the local economy than in the national economy.

At the centre of dynamic agglomeration economies is the production and use of knowledge. External economies arising from knowledge spillovers are critical to the level of productivity or the rate of economic growth in a country. The question is whether knowledge spillovers come primarily from firms within one's own industry or from firms in other industries. From a static point of view, localisation economies can stem from labour specialisation, better training or learning about the most efficient production process from other firms in an urban area. In a dynamic sense, however, a mechanism for continued reduction in costs is necessary. The greater concentration of firms in a particular industry in an urban area will cause a greater rate of new product development, improvement in existing products, as well as improvements in the methods of these products (McDonald, 1997: 344). The rate of innovation will increase if more highly trained people engage in trying to improve the industry. The information may be transmitted through highly trained workers who move from firm to firm, or

through business meetings and conferences, industrial spying, copying of competitor's products and improved training programmes.

In modern times, due to the availability of the Internet, the question may be asked whether innovators and imitators have to be located in close proximity. In certain cases they do not, but in some of the most important cases close proximity is necessary. Mills (1992) has called this situation the transmitting of ambiguous information. He defines ambiguous information as "information that requires an interactive and convergent set of exchanges before the final exchange can be consummated" (Mills, 1992: 11). In the case of an industrial buyer and seller of a specialised piece of electronic equipment, a series of meetings between specialists in design, production, marketing and other departments is necessary before the contract can be signed. In the same way innovators who live in close proximity are more productive than if they are isolated because they communicate interactively. Knowledge spillovers also take place across different industries. A diversity of industries may be more stimulating to the production of new ideas than the size of an individual industry. Sometimes, it is diversity rather than uniformity that delivers new products and new technologies (McDonald, 1997: 345). The knowledge spillover is thus wider than in an individual industry but not as wide as the entire urban economy.

4.2.1.2 Market structure

The central question here is whether a monopoly (or oligopoly) nurtures technological change because it can afford research and development, or is such change due to competitive industries seeking a competitive edge?

Schumpeter (1942: 32) states the following:

> *Possibilities of gains to be reaped by producing new things or by producing old things more cheaply are constantly materialising and calling for new investments. These new products and new methods*

> *compete with the old products and old methods not on equal terms but at a decisive advantage that may mean death to the latter.*

He believes that the existence of large firms would increase the rate of product and process innovation. Galbraith (1956) argued that an oligopoly is the natural outcome of industries in which firms have reasonable economies of scale. He continues that these firms charge excessive prices and engage in wasteful advertising and product differentiation but also produce socially beneficial technological progress. Galbraith (1956: 88) states that:

> *the net of all this is that there must be some element of monopoly in an industry if it is to be progressive.*

The adoption of new technologies tends to be associated with larger firms, lower cost innovations, more flexible management and more complete information.

By contrast there is also a belief that competition will foster innovation. The feeling is that stiff competition leads to the creation and adoption of innovations. A competitive market structure has more entrepreneurs; people who are willing and able to take the risk of starting up new businesses. An urban area with competitive industries is likely to create new businesses and more growth. Financial institutions should thus be prepared to deal with smaller borrowers and should be more receptive to the entrepreneur.

It is generally agreed that both the development and adoption of new technology depends on (McDonald, 1997:347):

i) Appropriability (ability to capture the benefits);
ii) market structure; and
iii) technological opportunity.

It seems that there is no apparent association with the size of the urban area.

4.2.1.3 Specialised machinery

Another source of localisation economies is the ability to share specialised machinery and other production factors. If, for example, enough firms locate together, developing a distribution and warehouse centre, a large enough volume of activity may develop. This may lead to the establishment of a distribution equipment firm that sells, produces or modifies loading and handling equipment. This specialised distribution equipment firm could not have been established in an area where only one or two firms would have need of such equipment. As a result, all firms in the area operate more efficiently.

4.2.1.4 Imitation, modification and innovation

Firms locating close together may be able to copy and imitate one another more readily. Therefore they may respond more quickly to changes in their industry than if they were located farther from their competitors. Although the firm that is copied may be harmed in the process, the cluster of firms locating together may experience a benefit as a whole. A firm that copies a certain change from another firm may be in a better position to innovate even further. These knowledge spillover effects tend to be an important source of localisation economies (Blair, 1995: 99).

4.2.1.5 Shopping externalities

A shopping externality occurs if the sales of one store are affected by the location of other stores. If both stores experience an increase in sales, shopping externalities are generated. That means that each store attracts consumers to the cluster, generating benefits for the other store as well. There are two types of products that generate shopping externalities, *viz.* imperfect substitutes and complements. In the case of imperfect substitutes, the clustering of firms decreases shopping costs and attracts potential buyers. Clustering also occurs when firms sell complementary goods. These type of goods are often purchased on the same shopping trip. Retail clusters provide a mix of imperfect substitutes (shoe stores) and complements (food and liquor stores),

allowing both comparison shopping and one-stop shopping (O'Sullivan, 1996: 32). Retailers that choose to locate in isolated areas instead of clusters, sell goods that are not necessarily subject to shopping externalities.

The desire of individuals to compare similar products like shoes, is an example of comparison-shopping. The agglomeration of a few shoe stores in the same mall may benefit all the shoe stores because it is a more desirable place to shop for shoes. Although one new shoe store in the mall may lower the percentage of shoes purchased at each existing shop, the total sales may increase due to a greater number of consumers. The shopping costs of households may be reduced but retailers, due to more sales, may capture some of these advantages. The owner/s of the shopping centre may also benefit because they can charge retailers higher rents due to the popularity of the shopping centre.

This display-variety agglomeration will occur in cases where products are differentiated with price variations for comparison-shopping. Automobile and shoe stores are examples of agglomerations based on display variety. Complementary products also tend to cluster, although they do not necessarily fall in the same industry. An example of this may be a theatre and a restaurant locating together. Agglomeration clusters may have similar outputs, similar production techniques (but different outputs), or similar input requirements (Blair, 1995: 100).

4.2.1.6 Internal agglomeration economies

Internal agglomeration economies are cost reductions per unit that accrue to a firm that expands its plant in a particular area. The firm receives the benefit of this expansion and therefore the agglomeration economies are internal. In this case the fixed costs are spread over a larger output. Other sources of internal agglomeration economies include division of labour, use of alternative technologies and savings through bulk purchases.

4.2.1.7 Linkages

One of the most important causes of industrial agglomeration is firms trading with one another and therefore locating in the same area. Inter-industry agglomeration occurs through backward and forward linkages. A forward linkage is where suppliers would attract buyers and a backward linkage is where buyers attract suppliers. Less developed countries (and less developed regions) are characterised by weak interdependencies and linkages. Low levels of trade occur between firms in this instance. Primary goods - normally produced by less developed countries – are often exported without encouraging additional local economic activity. Ineffective or absent linkages leads to the inability to generate further growth (Blair, 1995: 96).

4.2.2 Urbanisation economies

Urbanisation economies are cost savings that accrue to firms when the volume of economic activity in an entire urban area increases. The firms in this case may be unrelated. Urbanisation economies differ from localisation economies in two ways: Firstly, urbanisation economies result from the scale of the entire urban economy and not just the scale of a particular industry. Secondly, urbanisation economies generate benefits for firms throughout the city and not just firms in a particular industry (O'Sullivan, 1996: 28). The different sources of urbanisation economies will now be analysed.

4.2.2.1 Infrastructure

Urban infrastructure can be classified as roads, sewers, fire protection as well as recreation and health facilities. Urbanisation economies may result from economies of scale in public infrastructure. Infrastructure is an important input in a diversity of private production and consumption. If the standard and quality of infrastructure provision is on a high level, an increase in the size of an urban area allows lower per unit infrastructure

costs (Blair, 1995: 101). These savings in costs may be passed on to producers or consumers in the form of lower taxes.

The transport sector is one of the main components of an urban infrastructure. The larger the amount of firms, the higher the quality of transport facilities is likely to be. Firms using transport facilities will locate near these transportation nodes with the resulting benefits to these firms.

4.2.2.2 Division of labour

Urbanisation economies may result from a more extensive division of labour due to the greater size and activity of the urban area. In a relatively small urban area, many aspects of production and distribution must be carried out within the same plant because of a lack of specialised firms. Certain activities would therefore be purchased elsewhere or not be carried out at all. The extra costs of obtaining these goods will reduce the firm's competitive advantage relative to other firms.

4.2.2.3 Internal economies of scale

Firms selling to various other firms and households may achieve cost reductions as an urban area expands due to internal economies of scale. Internal economies of scale may be passed on to consumers or production factors.

4.2.2.4 Averaging of random variations

Larger urban markets allow for an averaging of variations in economic activity. If a decrease in the quantity demanded by one customer or group of customers is experienced, it can be offset by an increase in the demand from other customers.

Mills and Hamilton (1984: 18) summarise this aspect of agglomeration economies as follows:

> *The most important of such agglomeration economies is statistical in nature and is an application of the law of large numbers. Sales of outputs and purchases of inputs fluctuate .....for random, seasonal, cyclical and secular reasons.*

A firm within a large urban area would therefore experience less scheduling production problems than a firm located within a much smaller urban area. Labour changes can also be accommodated with more ease within a large urban area than within a small town.

4.2.2.5 Urban diseconomies

As the economic concentration increases, the presence of diseconomies starts to becomes more relevant. Urbanisation economies may, to a certain extent, be partially offset by urban diseconomies (Blair, 1995: 102). Some social scientists are of the opinion that crime, anxiety and loneliness are personal costs involved in high density areas. Urban diseconomies may take the form of inconvenience and delay associated with congestion. Due to the high level of competition among firms to locate near large agglomerations, rents increase. Higher wages may also be seen as compensation paid for the inconvenience of working in congested areas. However, the productivity generally increases as the size of the urban area increases. Therefore, urbanisation economies tend to outweigh urban diseconomies over the range of the city size (Blair, 1995: 102).

4.2.2.6 Empirical estimates of agglomeration economies

One approach to measuring agglomerative economies is to estimate the effects of changes in industry output and city size on labour productivity.

The following equation may be used (O'Sullivan, 1996: 28):

$$q = f(k, e, Q, N) \quad (4.2)$$

where

q = output per worker in a particular industry

k = capital equipment per worker

e = education level of workers (a measure of labour skills and productivity)

Q = total output of the industry

N = total population of the urban area

Output per worker (q) should increase with capital per worker (k) as well as the education level of workers (e). In the case of localisation economies, output per worker also increase with Q (industry output). In the case of urban economies, output per worker increases with N (population). With this relationship it is possible to estimate the independent effect of changes in Q (industry output) on output per worker. This is basically the increase in output per worker per unit change in Q, holding all other factors of labour productivity (k, e, and N) constant. It is also possible to estimate the independent effect of changes in N (city size) on output per worker. From equation (4.2) it is possible to see that education levels (human capital) form an important ingredient in measuring agglomerative economies. One should expect a higher number of qualified people in urban areas than in the surrounding rural areas.

It is now important to enumerate the basic economic functions performed by urban areas. The next section provides a comprehensive and realistic method for classifying urban areas according to their economic functions.

4.3 INDUSTRY CLUSTERS

Noyelle and Stanback (1983) have proposed a scheme for the enumeration and measurement of the fundamental economic functions performed in an urban area. They

grouped industries (as defined by the Standard Industrial Classification (SIC) code system) into eight basic functional areas.

Table 4.1 Basic economic functions performed by urban areas.

1. Agriculture, extractive, construction • Agriculture • Mining • Construction
2. Manufacturing
3. Distributive services • Transportation, communication and utilities • Wholesale trade
4. Complex of corporate activities • Central administrative offices • Finance, insurance and real estate • Corporate services • Business services • Legal services • General professional services • Social services
5. Non-profit services • Health • Education
6. Retailing
7. Consumer services • Hotels, etc. • Auto repair, garages • General repair services • Motion pictures • Recreation services • Private household services
8. Government and government enterprises

Source: Noyelle. & Stanback. 1983.

The first category (agriculture, extractive and construction) includes industries not necessarily linked to an urban character, although certain urban areas may specialise in one of these industries. The other seven functional areas are typically urban in character. Manufacturing of goods and the distribution of goods and services forms the next group. The following group is called the complex of corporate activities. This important urban sector includes administrative offices like finance, insurance as well as corporate services such as legal, social and other professional business services. The remaining basic economic functions are performed by the other sectors such as health and education (non-profit), retailing, consumer services and government sectors. In Table 4.1 a summary of the method of classification by type of output is shown.

To determine whether industries do cluster together in urban areas, a location quotient may be used. A location quotient is a measure of the extent to which an urban area specialises in a particular industry. It is defined as the percentage of total employment in an urban area engaged in a particular industry, divided by the corresponding percentage for the nation as a whole.

In algebraic form, the location quotient can be expressed as follows:

$$LQ = (e_i/e)/(E_i/E) \qquad (4.3)$$

where e_i is the employment in industry i in the subject urban area, e the total employment in the subject urban area, E_i the employment in industry i in a specific country and E the total employment in that same country. A location quotient that is greater than 1 indicates that the urban area is probably producing the good or service for export outside its own area. A location quotient smaller than 1 suggests the area is probably importing the good or service (McDonald, 1997: 65).

Research done by Henderson (1986) showed that industries subject to localisation economies tend to cluster in a relatively small number of urban areas rather than being spread out over a large number of urban areas. The general absence of urbanisation

economies in manufacturing industries means that these firms have no particular incentive to locate in the largest areas. Economies that arise through inter-industry linkages mean that industries with strong input-output linkages will cluster together (McDonald, 1997: 65).

4.4 SUMMARY

Urban areas are generally defined as areas with high levels of population density. This concentration of people causes certain economic side effects that may be embodied in the concept of agglomeration economies. Agglomeration economies lead to general cost reductions due to spatial concentration of economic activity. Firms trading with one another normally benefit from locating close to each other. The sources of localisation economies can broadly be divided into three major aspects. The first source is the benefit of labour pooling, including access to specialised labour skills for firms and access to a variety of employment opportunities for workers. The second source is the benefit that stems from economies of scale in intermediate inputs for a product. Lastly, the greater ease of communication made possible by proximity to competitors, suppliers and customers is also a benefit. This includes the ability to pass innovations along rapidly.

There are also three major sources of urbanisation economies of scale. The first source is access to a larger market that reduces the need to transport products over long distances. Secondly, the easy access to a wide variety of specialised services is more readily available in larger cities than small ones. Lastly, there is greater potential for cross-industry spillovers of knowledge and technology.

Location quotients are a popular method for comparing the size of a local industry to that industry's importance in the national economy. The advantage of using this quotient is its inexpensive nature and the fact that it can be applied to both goods and services.

This chapter has shown that the agglomeration economies generated in urban areas are conducive to opportunities for economic growth and development. The mere fact that firms are located within close range ensures that they are well positioned to exploit the benefits provided by proximity within urban areas. The sources of localisation and urbanisation economies are contributing to and strengthening the economic possibilities of this spatial concentration. However, the concentration of economic activities and people that are responsible for creating positive externalities are also responsible for the generation of negative externalities that could offset the expected economic outcome. It is therefore important to address these issues to limit the negative effect thereof on the urban economy. The first of these issues to be addressed is the notion of land use within urban areas.

A wide variety of land use opportunities exist within an urban area. Land use in an urban area should be optimally utilised because of the limited amount of land available. These different land uses will be discussed in the next chapter.

CHAPTER 5

LAND USE IN URBAN AREAS

5.1 INTRODUCTION

The purpose of this chapter is to show that land use is an important factor in urban economic growth and development because land-use patterns contribute to the desirability and productivity of a city. The ability to influence land-use decisions is therefore an essential economic development instrument. The most basic justification for land-use controls is the prevention of resource misallocation. This may be through unregulated private markets because of external economies or diseconomies, monopoly of power other factors. The misallocation of urban land inevitably entails misallocation of other valuable resources such as transport.

Most urban areas use some form of land-use planning to determine the best present or future use for each area of land in the region. Planning for land use involves the drawing of maps of the specified area to determine suitable locations for houses, industries, businesses, open spaces, roads, water and sewer lines, reservoirs, hospitals, schools, etc. An overall zoning plan is used to control and regulate the use of land. A distinction is drawn between land and property: land refers to an undeveloped natural factor of production, while property refers to land and improvements. The application of land use within urban areas will now be investigated further.

5.2 HIGHEST AND BEST USE

One of the main problems of land use in an urban area is the question of the optimal use of a specific site. This should be combined with the most profitable use of that specific site. To address this problem the concept of the highest and best use is applied. The most profitable use of a specific site will be that which provides the highest residual to that piece of land. The residual may be calculated by subtracting the

conversion costs from the present value of that piece of land. The residual may vary depending whether the site is used as a parking space or a grocery store. The highest and best use is not necessarily the most socially desirable use because various negative and positive spillovers may arise in different land uses (Blair, 1995: 212). The most profitable use may be to erect a supermarket in a specific site although it may not be the best (optimal) in a social and ethical sense.

It is thus important to be aware of the effect on any other parties that may be helped or harmed when land-use decisions are made. There is, however, a link between the most profitable and the most socially beneficial use of land. The profitability of a particular site is normally due to the willingness of consumers to purchase at that specific site. The market for land reflects societal demand for products at particular places. The most profitable use of land is not necessarily the most intensive use of that land. The key problem in determining the highest and best use is to determine the greatest return to land (residual) after construction and operating costs have been subtracted. The market mechanism reinforces the tendency of land to be put to its highest and best use. The principle of highest and best use can be applied to the use of land prior to development. It can, however, also be applied to changing pre-existing structures. The use that will provide the greatest residual after additional capital costs such as remodelling or demolition have been subtracted from the total value of the renovated property is the highest and best use. This assumes that existing construction costs must be paid even if the building is demolished. Like land, the pre-existing structures are immobile and are also treated as land. The residual is now attributed to land and pre-existing buildings.

It may be costly to determine the highest and best use for a piece of land because information is costly and imperfect. The amount of effort that goes into a land-use study depends on the scope of the project and the value of the land. It may be very costly to evaluate each possible land use for a particular site, although this may ensure an optimal application of land.

5.3 LAND-USE PLANNING

Land-use planning is a complex and controversial process involving competing values. It is based on the assumption that substantial growth in population and economic development will occur and should be encouraged. This view is derived from the fact that local governments receive revenue from residential taxes, business taxes, etc. to provide the public infrastructure. The more residents and the more businesses in an area, the greater the prospects for a higher level of revenue. This may lead to uncontrolled or weakly controlled urban growth without regarding the consequences on the infrastructure and environment (Miller, 1994: 247). In the long run, this factor alone may then motivate residents and businesses to move away, decreasing the tax base and reducing tax income. This may cause further environmental and social decay because governments are forced to cut the quantity and quality of services or raise the tax rates.

The principle of "all growth is good" endorsed by most land-use planners is not shared by environmentalists. Comprehensive, regional ecological land-use planning in which all major variables are considered and integrated to anticipate present and future needs and problems and to propose solutions is urged. A blend of economics and the ecology is vital to control the nature and speed of urban and suburban growth. In this way environmental degradation, pollution and social decay may be addressed and minimised. There are several reasons why ecological land-use planning is not widely used (Miller, 1994: 247):

i) There is tremendous pressure to develop urban land for short-term economic gain without regard to long-term effects such as ecological and economic losses.
ii) Local officials normally concentrate on short-term rather than long-term problems.
iii) There is an unwillingness to pay for costly ecological land-use planning, even though this could save money in future.
iv) Municipalities in various areas do not always co-operate in planning efforts.

This, however, should not prevent a comprehensive ecological land-use approach. There are ways to control land use, the most widely accepted approach being the principle of zoning. This will now be analysed further.

5.4 ZONING

Zoning can be defined as the division of a community into districts in which certain activities are prohibited and others are permitted. Zoning can be done in two separate ways. The first type, namely cumulative zoning, introduces a hierarchy of uses ranked from the least restricted to the most restricted, normally on the basis of perceived negative externalities arising from land use. The second type, prescriptive zoning, prescribes the allowable use for each section of property. In this case a special exception must be made if the property is used for anything other than that for which it is zoned (Bogart, 1998: 208). In theory, the purpose of zoning is to promote public health, safety and welfare. The principal means of promoting this is the separation of incompatible land uses (O'Sullivan, 1996: 288). The following principal categories could include:

i) Commercial (various categories),
ii) residential (various categories),
iii) industrial,
iv) utilities,
v) transport,
vi) recreation (parks and forest reserves),
vii) bodies of water,
viii) floodplains and
ix) wildlife reserves.

Zoning laws regulate the height and bulk of the buildings permitted on each site. They specify that buildings are not to be located too close to property boundaries. They often require that residential plots be of a certain minimum size. First and foremost, zoning

laws specify the basic use for each piece of land (McDonald, 1997: 98). Zoning can also be used to control growth and to protect areas from certain types of development. Local governments can be influenced in zoning decisions because they depend on property taxes for revenue. If zoning policies are too strict, they may discourage innovative ideas for solving certain urban problems. In addition to zoning, some local governments use land-use policies to limit population growth. The purpose of a growth-control policy is to control undesirable spillovers such as pollution, congestion, crime, etc. Two growth-control policies can be implemented to limit the rate of development. The first way to limit population growth is to limit the land area of the city. The city can refuse to extend its urban services (e.g., sewers, roads, schools, parks) beyond an urban service boundary and in this way limit growth to the area within the boundary. The second way is to control residential growth by limiting the number of building permits issued (O'Sullivan, 1996: 285).

5.4.1 Types of zoning

There are many types of zoning, each having at least one purpose. Three types of zoning will be explained below.

5.4.1.1 Externality zoning

The principle of externality zoning is the practice of separating land uses that are considered incompatible. The main objective of this type of zoning is to reduce the total social cost of externality-generating production (Bogart, 1998: 216). Industrial firms generate all types of externalities such as noise, air pollution, odour and glare. Retailers generate externalities like traffic congestion and noise. High-density housing leads to traffic and parking problems and obscuring of views and light. Low- income households are likely to spend less on upkeep and external appearances of housing, so housing quality leads to an externality to others in the same area. The value of a house depends to a certain extent on the appearance and quality of neighbouring houses. Poor maintenance implies a potential negative externality from low-income housing

(Bogart, 1998: 217). Establishing a zone for each separate land use reducing the exposure to air and noise pollution could contribute to control these externalities. Zoning is thus very appealing as an environmental policy because it is the easiest way to separate polluters from their potential victims. The problem in this case is that zoning does not reduce the total amount of pollution, it merely moves it to another venue. In Table 5.1, a summary of externalities associated with various land uses is shown.

Table 5.1: Externalities from various land uses

Land use	Externalities
Industrial	Noise, odour, vibration, pollution
Commercial	Noise, congestion, parking, obstruction of views
High-density residential	Noise, congestion, parking, obstruction of views
Low-income residential	Fiscal burden, deteriorating housing quality

Source: Bogart. 1998.

As an alternative to zoning, pollution may be countered with an effluent fee that is basically a tax on pollution. For this fee to be efficient, it should be set equal to the marginal external cost of pollution that is basically the cost to society of an additional unit of pollution (O'Sullivan, 1996: 289). If one ton of sulpfur dioxide generates a social cost of R20, the fee should be R20 per ton. The effluent fee *internalises* the pollution externality, which leads to a decrease in pollution to avoid an excessive fee. In theory, this fee would generate an optimally low level of pollution and the optimum spatial distribution of pollution. The effluent fee may vary from place to place, making it possible that fees would be higher near sensitive areas such as residential regions. If a system of spatial effluent fees were operating, a firm would base both its location and production decisions on effluent fees.

To understand the difference between zoning and effluent fees, consider the following example:

A city has the following characteristics (O'Sullivan, 1996: 289):

i) The residents live in the western part of the city and commute eastward to a polluting timber mill.

ii) The further the distance between the residential area and the timber mill, the higher the wages. Workers are thus compensated for commuting costs with higher wages. The total labour cost of the firm is the wage times the total quantity of labour.

iii) The further the distance between the residential area and the mill, the lower the effluent fees.

iv) The city starts with an industrial zoning policy, locating the mill 10 kilometres away from the residential area.

In Figure 5.1, the optimum location and spatial effluent fees are shown (O'Sullivan, 1996: 290):

Figure 5.1: Optimum location and spatial effluent fees

Benefits and costs have to be calculated as the firm moves closer to the residential area. As a benefit, labour costs would decline but effluent fees would increase because more people would be affected by the pollution. Total cost would be minimised at a location 4,2 kilometers from the residential area. If the city introduced an effluent fee instead of a zoning policy, the firm would move from the industrial zone to a location 4,2 kilometres from the residential area, decreasing its total costs. The effluent fee is more efficient than the zoning policy for two reasons. The effluent policy enables the firm to choose a location that minimises its production costs. The social benefit is that the savings in commuting costs exceed the increase in pollution costs. Secondly, the firm is now forced to pay for pollution, which it thus decreases to an optimally low level. A firm will only stay in the industrial zone if the increase in pollution costs is greater than the decrease in labour costs. The question now is why cities still prefer zoning policies to effluent fees. Industrial zoning is easier to administer and the calculation of the marginal external cost for different locations in the city is a complex matter. The monitoring of polluting firms is also a major task and it is easier to locate all polluting firms in an industrial zone. Secondly, the effluent policy system may increase pollution in some areas because firms may locate closer to residential areas. Those affected by the pollution are rarely compensated, and local opposition to effluent fees remains.

A sort of compromise between zoning and effluent fees is performance zoning (O'Sullivan, 1996: 291). A performance standard is set by the city for each zone. Performance standards set upper limits for the amount of smoke, noise, glare, odour and gas emitted by firms. Although performance zoning does not force firms to pay for pollution, it does encourage abatement because firms with less pollution have more location choices.

Retail shopping areas also create a number of externalities that may affect residential areas close by. The traffic generated by a retail outlet causes congestion, noise and parking problems. A zoning policy would decrease the exposure to these externalities and prevent the invasion of quiet residential areas by delivery trucks and shoppers. If performance zoning is used, performance standards force developers to provide

adequate parking, street improvements, and landscaping to control noise. Under this policy, the mixing of commercial and residential land use is possible because retailers shield residents from the undesirable effects of commercial development. High-density housing generates most residential externalities, as it increases traffic volume, congestion and noise. Performance zoning can help soften the effect of high-density housing by providing more parking, improving streets to minimise congestion, while landscaping can form a buffer between apartment buildings and single-family homes.

5.4.1.2 Fiscal zoning

This type of zoning occurs because local government finances public services via property tax. A fiscal burden is generated when the tax contribution is less than the cost of local public services. Low-income housing, high-density housing, households living in the fringe areas of the city and new commercial and industrial development may generate fiscal burdens (Bogart, 1998: 217).

i) Low-income housing

Low-income households normally pay less in local taxes than the value of the public services supplied and consumed, causing a fiscal burden. This requires that higher-income households pay more than the value of services they themselves consume.

ii) High-density housing

A household's tax liability increases with its housing consumption and therefore a household in a small house or apartment pays a relatively small amount in taxes. This household is thus more likely to impose a fiscal burden on local government. A local government may therefore reject an application to zone a piece of land for high-density housing purposes.

iii) Fringe land use

New housing is usually built on the fringe of the metropolitan area. If the costs of providing public services to these areas are higher, the tax contributions may be less

than the costs of public services. New housing may then impose a fiscal burden on the city. A simple way to prevent the new development and the associated fiscal burden is to zone the vacant land for agricultural use.

iv) Commercial and industrial development

In certain areas in some cities, commercial and industrial development generates fiscal burdens. The city may restrict development by limiting the supply of commercial and industrial land as well as building heights. By limiting the height of buildings, less people can be employed, resulting in less traffic, congestion and pressure on the existing infrastructure.

The city may pass on the cost of new infrastructure to consumers or new firms, which may help to restrict development.

5.4.1.3 Design zoning

This type of zoning is a form of macro-architecture where the city planner designs a city, arranging activities to promote the efficient use of infrastructure such as streets, sewage and water systems. Residential and employment growth is allowed in areas where the infrastructure can be provided efficiently. Some cities use zoning to direct residential development to particular areas. Design zoning is also used to preserve open spaces. Certain cities zone areas of land as *open space or green belts* (O'Sullivan, 1996: 296). This type of zoning provides open spaces in cities.

The alternative to open-space zoning is the outright purchase of land for open space. The city could decide to purchase the land instead of zoning it for open space, but this would happen only if the marginal benefit of open space exceeds the marginal costs. If the city has to face the full cost of open space, it would choose the optimum amount of open space. On the other hand, if the city simply zones pieces of land for open space, it is likely that too much land would be allocated to open space. The marginal benefit of open space is the diminishing marginal utility of that open space. The marginal cost of

open space is the opportunity cost of using the land for open space instead of for an alternative use, such as residential development.

5.5 REGULATION RIGHTS

A variety of distinct rights is associated with each piece of land or property. These rights represent various tools that a local government has at its disposal to organise an urban area. A government has the following tools: police power, taxation, eminent domain and escheat, of which the first three are very important development tools (Blair, 1995: 232).

i) "Police power" implies the authority of a government to regulate action to improve health, safety and general welfare. Zoning and building codes are the most important police powers.

ii) "Taxation levied" by the government affects both the returns that property yields as well as local revenues. Property taxes can affect land use because they lower the return on real-estate investment. Differentiation between various land uses may discourage development and encourage urban sprawl.

iii) "Eminent domain" is the right of government to purchase property if its use is needed for a public project or purpose such as a road. The exact meaning of "public purpose," can be a source of land-use debate.

iv) "Escheat" is government's right to all land for which a private owner does not exist. If someone dies without any heirs, the government will claim the deceased's property.

Zoning is still probably the governmental tool most significant as a determinant of land use. Although the need for zoning is widely accepted, it is not without its critics. There is a feeling that zoning is an unnecessary impediment to the operation of the free market. There are at least five definite ways that zoning may restrict economic development (Blair, 1995: 233).

i) Attempting to change land use becomes difficult and often prevents redevelopment of an area.

ii) Zoning may inflate land costs because it restricts the availability of land for a specific purpose, e.g. commercial land.

iii) Zoning sometimes leads to aesthetic and social shortcomings because it detracts from an area's quality of life.

iv) Public planners sometimes make the wrong decisions which result in inefficient or socially harmful land uses.

v) Exclusionary and fiscal zoning may lead to the exclusion of certain social groups if all but very expensive housing is prohibited.

An important factor to keep in mind is that zoning is an instrument used by local governments to anticipate conflicts in land use, and to plan accordingly in the interest of the local community.

Other important land-use controls are: a mapped street ordinance which shows existing and proposed streets; subdivision controls which impose controls on developers who want to subdivide or develop undeveloped land; building and housing codes, which regulate construction, maintenance and use of structures; and architectural controls which regulate structure design, mainly for aesthetic purposes (Wheaton, 1979: 513).

5.6 SUMMARY

It is very important that urban planners have a long-term vision in terms of allocation of land for various uses. An efficient distribution of land uses contributes to local economic development prospects. The return of land is based on productivity and in the case of urban land, this productivity is a function of access to goods in the environment. Land is in fixed supply and therefore the best and highest use of land should be the ultimate goal in restricting the waste and misallocation of this vital resource. Market forces are an important determinant to reinforce the goal that land be put to its best and highest possible or efficient use.

Land-use patterns are changing in response to urban growth, changes in transportation costs, production processes, values and income. Zoning is the most popular tool for regulating the use of land, although other methods are also used. Zoning is aimed at the reduction of land-use spillovers. Effluent fees are mentioned as an alternative to zoning, especially directed towards limiting externalities such as pollution. Zoning is sometimes criticised as being both ineffective and inefficient.

It is thus important to ensure that zoning policy or effluent fees are directed towards contributing to rather than hampering economic growth and development. Local authorities should use a long-term approach when designing and implementing these methods to determine land use in urban areas. Land use is an important factor when firms make location choices, and may either attract new firms or divert them to other, more acceptable areas.

In the following chapter, the various reasons why firms tend to locate in urban areas will be analysed as well as the economic principles on which these decisions are based.

CHAPTER 6

LOCATIONAL FACTORS

6.1 INTRODUCTION

The aim of this chapter is to analyse the factors contributing to the attraction and location of new firms in an urban area. The ability of an urban area to grow could be linked to the creation of an environment conducive to the location of firms. It is therefore necessary to determine the factors that will encourage firms to choose a specific area. The expansion and retention of existing firms is also linked to the location factors of firms.

In this chapter, general location decisions of firms will be considered. Firms will be influenced by various factors and generally a trade-off will be required among desired locational features. The trade-offs will differ, depending on the establishment characteristics. Profit-making firms will be influenced by profit considerations and political institutions by public opinion.

In this study it will be assumed that firms have a profit-maximising motive. A cardinal principle of location theory is that in order for any factor to influence location decisions, it must vary across locations. If every location is identical in its supply, then that input or factor will not influence the location decision, no matter how important some input or other factor. The most important factors that a firm will evaluate in determining location will now be analysed.

6.2 BUSINESS LOCATION

In the analysis of the location decisions of businesses, three general factors of importance in the urban economy should be kept in mind. These three factors are the market mechanism and the constraints under which they operate,

external and other agglomeration economies, and transport costs (Richardson, 1971: 15). The location decision of various types of firms will be explored in this chapter. Trading firms (commercial firms) trade goods rather than produce them. Industrial firms (e.g., sawmills, breweries, manufacturers and bakeries) process raw and intermediate inputs into outputs (O'Sullivan, 1996: 39). The location of trading firms causes the development of trading cities. Trading firms act as intermediaries between the collection of goods from suppliers and subsequent distribution to consumers. Trading firms tend to locate at shipment points (ports, railroad junctions, warehouses, etc.) because of the convenience of these points for collecting and distributing goods.

Depending on the production process, industrial firms will tend to locate closer to either the source of input or the market. Both trading and industrial firms could be sensitive to transportation costs. A transfer-oriented firm is one in which the transportation cost is the dominant factor in choosing a location. This type of firm will choose the location which minimises total transport costs, defined as the procurement cost and distribution cost. Procurement cost is the cost of transporting raw materials from the input source to the plant. Distribution cost is the cost of transporting the output of the firm from the plant to the market. A resource- or input-oriented firm will therefore locate near its raw input source and a market-oriented firm will locate close to its market. Firms providing business services such as banking, insurance, accounting, repairs etc., locate near trading and industrial firms that use their services.

Before analysing urban location factors for particular types of establishments, a few general locational principles will be listed (Richardson, 1971: 35).

i) Activities serving the city market as a whole are more likely to locate centrally as compared to activities serving non-local markets, that will tend to locate in peripheral sites.

ii) The more specialised a function, the greater the tendency to locate in the central city.

iii) The larger the site area required, the more likely it will be that the location will be in the suburban area.

iv) If the existence of spatial externalities is accepted, land-use controls and zoning may have a marked stabilising effect on location patterns in a city.

v) The presence of external diseconomies induces a degree of decentralisation.

vi) Large cities usually contain secondary centres outside the Central Business District (CBD) and sometimes these centres may offer an acceptable compromise.

vii) In old cities established firms reluctant to move may occupy a high proportion of core sites. In new cities there is greater flexibility of locational choice.

viii) The tendency towards central concentration is changing to a marked decentralisation trend towards suburban sites.

In the remainder of the chapter, the various locational factors for different types of firms will be explored.

6.2.1 Inertia

A location factor that is very important, yet often unrecognised, is inertia. Inertia implies that once a firm is established at a specific location, many forces come into action to keep it there, even if new facilities are needed. The initial reason for locating at that spot may still be the same. If success has been attained and capacity needs to be increased, the firm will remain in its location due to the experience of economic success. The initial choice may be reinforced by the economic and social structures of an area. A relationship may have arisen between the firm and surrounding community, which may hinder relocation. Ties are developed with local producers, buyers and employees and if these ties function efficiently, it may provide a strong impetus to stay at the current location. Even if the firm could be located elsewhere with success (adequate demand), the

reliability of new suppliers may be uncertain. A co-operative working relationship with the local government may also be a factor in dismissing relocation. A firm that relocates will also lose some of its workers. In the case of unskilled or semi-skilled workers, the effect may not be critical, although the loss of skilled workers may harm the firm extensively. The increase in dual-income families may also cause a reluctance to move (Blair, 1995: 42).

6.2.2 Minimising transportation costs

This is the most thoroughly analysed location factor, due to the sensitivity of firms to transport costs. These costs are also easy to quantify (Blair, 1995: 43).

6.2.2.1 Market and input orientation

Orientation implies a locational tendency that could be altered by other considerations. Producers that are market oriented tend to locate close to the market because the transportation costs from the production site to the market are extremely expensive (McDonald, 1997: 32). This is the case of a weight-gaining production process. This type of firm will locate in a city to be near its customers. A soft-drink producer may decide to locate near its market because the transport cost of the inputs used in the production process is less than the transport cost of the bottled output. Products that are bulky to transport, perishable or fragile also tend to be market oriented.

Firms that are input oriented generally locate near material inputs. Many input-oriented activities tend to be weight-losing, with the final product weighing much less than the primary input. A firm cutting down trees for firewood purposes, would rather locate near the forest, cut down the trees, chop them into firewood and then transport them to the market. The weight of the firewood will be less than the raw lumber (trees that have been cut down) and thus ensure a lower cost of transportation. Sawmills will normally locate near a forest and are

therefore seen as input oriented. Meat producers are also input oriented because it is cheaper to transport processed meat than live cattle. The transport cost of the input relative to the transport cost of the output may therefore be the deciding factor of location.

A firm will be indifferent about all sites between the input source and the market if two conditions are met. The monetary weight (the sales volume times the delivery cost per kilometre) of the input should be equal to the monetary weight of the output. Secondly, unit transport costs are independent of the transport distance (O'Sullivan, 1996: 45). In this case the total transport costs will be the same at all locations between the input source and the market.

6.2.2.2 Median location

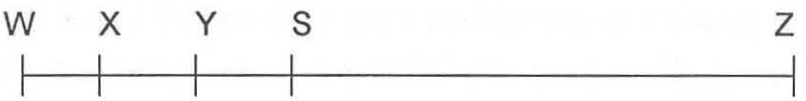
The tendency to locate in the centre of a market is known as the principle of median location (O'Sullivan, 1996: 47). This is the optimal location for a firm with several inputs and outputs. To explain this, assume Mary has to choose a location for her pizza parlour. She will have to consider the following:

i) Universal inputs: All inputs are universal (available at all locations at the same price), so input transport costs are zero.
ii) Pizza customers: Mary's customers are located along a highway. One pizza per customer is demanded and the price of pizzas is fixed.
iii) Delivery costs: The pizzas are delivered free of charge but the delivery cost is 50 cents per pizza per kilometre. One trip per customer per day is made.

It is obvious that Mary will locate where total delivery cost will be minimised. Figure 6.1 shows the distribution of customers along the highway. The western side of the highway (W) serves as the benchmark from which to measure all distances. There are two customers at point W, eight customers at point X (one

kilometre from W), one customer at point Y (two kilometres from W) and ten customers at point Z (nine kilometres from W). The monetary weight of a particular location (the sales volume times the delivery cost per pizza per kilometre) is half the number of consumers at that location (O'Sullivan, 1996: 47).

Figure 6.1 Pizza delivery and the median location



Distance from W (kilometres)	0	1	2	3	9
Number of consumers	2	8	1		10
Monetary weight	R1	R4	R0.50		R5

Source: O'Sullivan. 1996.

Total transport costs will be minimised at the median location. Point Y is the median location because it divides the monetary weights in two equal halves. The monetary weight of locations to the west is R5 (R1 for W plus R4 for X) and the monetary weight of locations to the east is R5 (R5 for Z). The amount of customers is equal to either sides of the median location. In this example the amount of customers to each side of the median location is 10 people.

The median location is the minimum cost location because it splits the pizza consumers into two equal halves. The distance between the consumers is irrelevant to the firm's choice of location. If the consumers at point Z were located 50 kilometres from point W instead of 9 kilometres away, the median

location would still be point Y. The total delivery cost would still be minimised at point Y, although at a higher level.

To illustrate that Mary is minimising her transport cost at the median location, suppose she starts at the median moving to point S, one kilometre east of Y. This movement decreases the transport cost to the east by 50 cents per trip to Z, saving a total of R5. The transport cost to the west increases now by 50 cents more per trip to points W, X and Y since there are 11 customers to the west of S. The total delivery cost to the west increases by R5.50 (R1 more for W, R4 more for X and 50 cents more for Y). The movement from Y to S increases the total delivery cost because the increase in the westward delivery cost exceeds the decrease in the eastward delivery cost. The same would be true for any movement to the west of the median point. The principle of median location works best if there is an odd number of customers (McDonald, 1997: 33). If there is an even number of customers, the precise location of the firm is not determined.

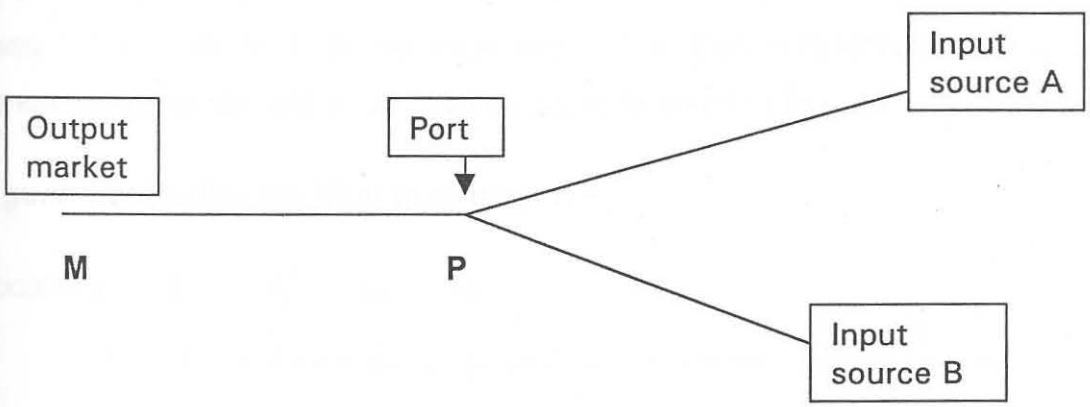
6.2.2.3 End and shipment points

It would be sheer coincidence if the transportation cost of the material to the market were equal to the transportation cost of the product to the market. Two additional factors influence the market and material sites. The first is the extra handling costs and non-linear rate structures (Blair, 1995: 44). Any location between the two sites would normally require extra terminal (loading and unloading) costs. A midpoint location requires an extra handling activity. The difference between the market or material site as opposed to the midpoint site, is that transportation companies frequently charge customers less per kilometre for long distances than for short distances. One long trip would therefore be cheaper than two short trips.

The principle of median location also explains why some industrial firms locate at a shipment point. This point is defined as a point where a good is transferred from one transport mode to another (O'Sullivan, 1996: 49). At a port, goods will be transferred from trucks or trains to ships and at a railroad station goods are transferred from trucks to trains. A shipment point represents points where loading and unloading cannot be avoided. Production locations at shipment points will therefore not increase transportation costs (Blair, 1995: 44).

In Figure 6.2, the options for the location of a sawmill are explained. The firm harvests logs at two points A and B, processes the logs into lumber and then sells this in an overseas market at point M. Assume that because of the economies of scale in production, a single sawmill is efficient and highways connect points A and B to the port and ships travel from the port to point M. A sawmill is a weight-losing activity and the monetary weights of inputs are R15 for point A and R15 for point B. The monetary weight of the output is R10. In this case there is no definite median location, although the port is the closest to a median location. The firm has a choice of moving closer to either of its inputs or to its market.

Figure 6.2: Sawmill location



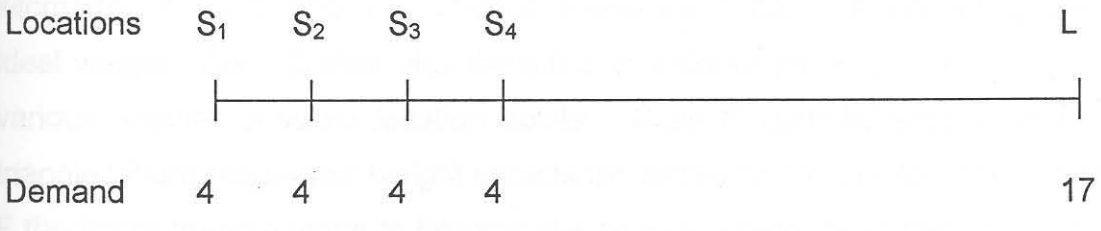
Source: O'Sullivan. 1996.

Suppose the firm starts at the port (P) and moves closer to either input A or B. A one kilometre move towards point A will cause offsetting changes in the costs of transporting logs from A and B. Output transport costs will increase by R10; therefore the port location is preferred to point A. The same argument applies to a movement towards point B. Should the firm decide to move from point P closer to the market (overseas) M, output transport costs would decrease by R10 per kilometre (the monetary weight of output). The input transport cost would, however, increase by R30 per kilometre (monetary weight of the inputs). Transport cost would increase by R20 and hence make the port location (P) preferable to the market location (M).

6.2.2.4 Growth of cities

The principle of the median location provides another explanation why large cities tend to become larger. Suppose a firm delivers its product to consumers in five different cities. In Figure 6.3, L denotes a large city with four small cities denoted by S_1, S_2, S_3 and S_4. The firm sells 17 units of its product in the large city and four units in each of the small cities. The median location would be in the large city, although it is at the end of the line. Every kilometre west of L would decrease the transport cost by R16 as the firm moved closer to the small cities. At the same time the transport cost would increase by R17 as the firm moved away from consumers in the large city. It is thus unquestionable that the concentration of demand in large cities cause large cities to grow.

Figure 6.3: Median location in large cities



Source: O'Sullivan. 1996.

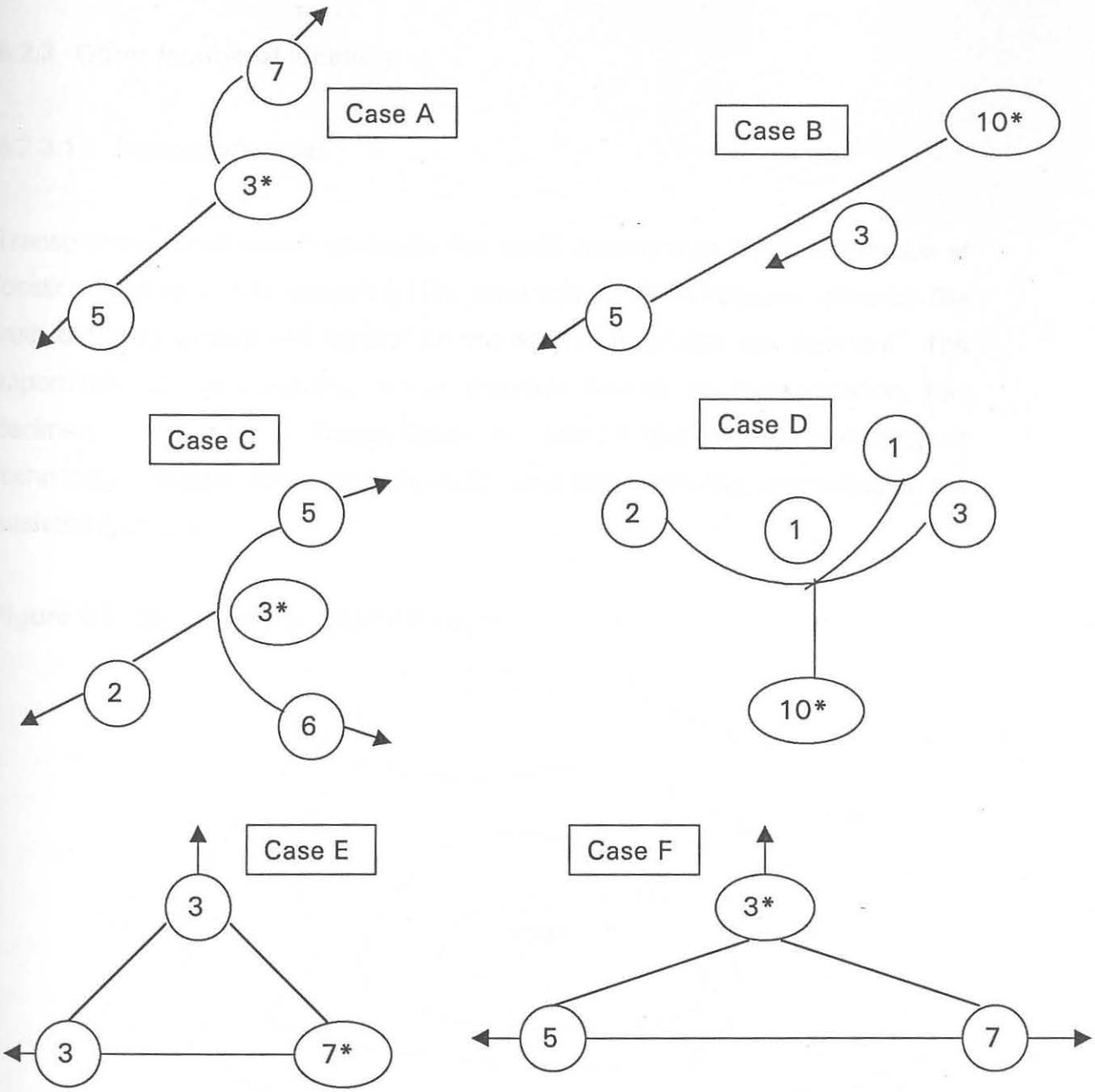
The development of several types of cities is also explained by the median-location principle. If the median location is an input source, a resource-based city will form around the input source. If it is in the centre of the region, a regional centre will develop. If the median location is the shipment point, a port city will develop. If it is in an existing city, the city will expand and grow (O'Sullivan, 1996: 50).

6.2.2.5 Road systems and multiple inputs

So far, it was assumed that only one input was utilised and the location choice was limited to a single road. If road systems, multiple input sources and markets are introduced, the location choice becomes more complicated because the opportunity cost increases. The concept of locational weights can be helpful in analysing these conditions. The locational weight of the product is the cost of transporting one unit of the product one kilometre. The locational weight of the input is the cost of transporting an adequate quantity of the input one kilometre to produce one unit of the product (Blair, 1995: 46).

In Figure 6.4, different types of road systems and the ideal weight are illustrated to simulate various situations. In case A, the location would be in the middle of the pull forces. Moving upwards from the minimum transport cost point would increase the transport cost by R8 (R5 + R3) per kilometre while saving only R7 per unit per kilometre. Case B shows a situation where the ideal weight lies at the end, which offsets the counterpull forces. Moving away from the end point saves R8 (R5 + R3) per kilometre but increases the cost by R10 per unit per kilometre. Case C shows a situation where the midpoint location may be the ideal weight. Case D illustrates the effect of a dominant weight in the region of various smaller possible location points. Case E demonstrates a locational triangle where the largest weight attracts the production to that location. In case F the flatter triangle tends to become like case A, where the midpoint location is seen as the ideal location.

Figure 6.4: Business location with different road systems



* = Transportation-cost-minimising location

Source: Blair. 1995.

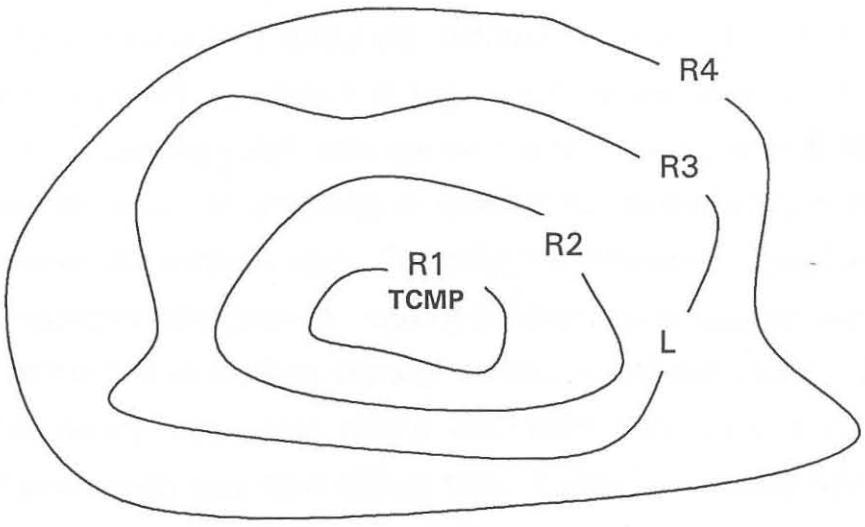
This analysis accepts that reality is even more complicated, although it provides a foundation for explaining more complicated situations.

6.2.3 Other factors of location

6.2.3.1 Production costs

Transportation cost was traditionally the most important factor in the choice of location for a firm. It is becoming less important for three reasons, although the truth of these reasons will depend on the level of economic development. The importance of manufacturing, which depends heavily on transportation, has declined. The cost of transportation is lowered due to the availability of technology. Inputs used by both direct and manufacturing technologies are easier to transport.

Figure 6.5: Minimising production costs



Source: Blair. 1995.

As the value of the product increases relative to the cost of transport, the importance of transport costs decline relative to other costs. Finally, the

importance of the other costs of production have become more widely recognised (Blair, 1995: 48). The fact that production costs may vary from location to location should be weighed up against higher transportation costs.

In Figure 6.5, the transport-cost-minimising point is shown as TCMP. The lines around the TCMP show how transport costs increase as one moves further away from the minimum transport cost point. These lines are known as isocost lines, referring to the lines that show equal production cost to the firm. Suppose point L indicates a lower production cost point due to cheaper labour costs. If the savings per unit exceed R3, the firm should rather locate at point L than at TCMP. If less than R3 is saved, TCMP is the more profitable location point.

6.2.3.2 Labour costs

A firm may be categorised as labour oriented if the cost of labour is high relative to the total value of the product. Depending on the category of labour, the wage rate may differ within a specific region. The prevailing wage for a particular type of labour would be the same throughout the metropolitan area. Therefore, the prevailing wage rate affects the choice of region but not necessarily the site within an area. The prevailing wage rates are not the sole determinant of labour costs for several reasons. In choosing a location the entire compensation package will be taken into consideration. Secondly, the difference in productivity can cause labour costs to differ between regions although the hourly rate may be the same. The firm bases its location decision on labour cost per unit of output, and not just the hourly wage rate (O'Sullivan, 1996: 52). However, the determination of productivity may be a difficult task. Finally, unemployed people may be willing to work for less than the prevailing wage rate, especially if the trade unions are not strong in that region. The fact that these workers may not remain satisfied with wages lower than the prevailing wage rate cannot totally be ignored in measuring future labour costs.

The presence and influence of labour unions may be a contributing factor to labour costs. This may also contribute to a slowdown or decline in the rate of employment. The absence of labour unions is often the most effective public policy for attracting new firms. A 10 per cent increase in the activities of labour unions in the labour force is estimated to cause a 30-45 per cent decrease in the number of new branch plants (Blair, 1995: 50).

There are four general reasons for labour costs differing across regions. If there is any undesirable feature in the local environment, such as air pollution or bad weather conditions, a firm should compensate its workers. The presence of strong labour unions generally leads to higher wages. Because households are not perfectly mobile, some areas will have a high supply of labour and correspondingly lower wages. Lastly, there is the concept of joint labour supply where the household's primary worker moves to an area, increasing the supply of secondary workers, with the resulting lower wages.

6.2.3.3 Amenities

A general viewpoint is that if amenities could be improved, economic development would be stimulated. Amenities may include good weather, roads, schools, other training facilities, hospitals, and various other factors. Amenities have become increasingly important to many industries, especially those not so bound to the traditional cost-oriented locational pulls. In the case where other direct cost-related factors are relatively equal, attractive amenities may swing the scale to that specific region. Highly-skilled professionals – because they can almost always obtain jobs wherever they choose - will rather choose regions with attractive amenities, except in the case where the compensation is substantially higher in areas with poor amenities. The demand for amenities is income-elastic and high-income workers are attracted to these areas and firms employing these people usually follow. Research and development firms, employing highly-skilled workers like scientists and engineers, are typical of firms locating in areas with

good amenities (O'Sullivan, 1996: 52). Amenity-rich areas may also attract and retain less skilled workers.

In a region with well-developed amenities, an increase in the demand for property may cause real-estate values and rents to rise. This in turn may increase the production costs of a firm due to higher rents and taxes to maintain public amenities. In spite of this, business behaviour indicates that amenities exert a strong pull factor. Negative factors such as crime and pollution may have the opposite effect (McDonald, 1997: 35).

6.2.3.4 Taxes

Although taxes were traditionally not considered a major locational factor, it seems that local taxes have at least a moderate influence on location decisions and economic growth. A study conducted in the USA concluded that a 10 per cent increase in taxes would cause a 3,3 per cent decline in job growth in the long term (Blair, 1995: 52). Different types of taxes will influence business location although they do not all have the same impact. Personal income tax affects the highly-paid executives who are mainly responsible for the location decision. High personal income tax rates also have a detrimental effect on regional growth (Blair, 1995: 52). Company income taxes directly affect after-tax profits and may be a more important location factor. Real estate and property taxes may differ within a metropolitan area and therefore also influence location decisions. The level of taxation imposed on a firm and the quality of the public goods and services rendered to the firm should at least be consistent.

There are, however, four reasons why local taxes have little or no effect on the location decisions of a firm (Bogart, 1998: 157). Firstly, some taxes do not vary much between different locations. Secondly, it can be said that even if taxes vary, other factors such as labour costs, transportation costs, etc. vary more. Next, since taxes can be shifted from the firm to the consumers, a large

difference in nominal tax rates does not reflect a difference in the actual tax burden borne by the firm. Lastly, higher taxes can be a reflection of the availability of superior public services. This suggests certain conditions where the tax rates will be important to location. Taxes will be more important in intra-metropolitan areas where labour and transportation costs are more or less equal. Taxes will also be more important when deciding between locations with similar and equivalent public services, as well as when a firm has an elastic demand curve for its product that prevents it from shifting the tax to the consumer (Bogart, 1998: 157).

6.2.3.5 Government incentives and infrastructure

Local government can encourage business location by introducing special incentives or subsidies. These incentives may range from interest rate subsidies to sale of land at below market prices, tax credits and superior infrastructure. Incentives may be weighed up against each other in different regions. Locating in the inner city may see government allowing more incentives due to the movement of firms to suburban areas. Incentives are both an intra- and inter-regional locational factor. It is difficult to determine the real effect of these incentives although it may be considered preferable to have them rather than not. A well-developed infrastructure is also essential for attracting firms to a specific location.

6.2.3.6 Local business climate

Business climate is indeed an important factor in choosing a location. This includes not only tax and expenditure programmes, but also the community's attitude towards business. Hanson and Berkman (1991: 213) refer to the business climate as a "poorly conceptually and crudely measured" concept. It is important for local government to monitor business attitude through surveys, meetings or personal visits. If the local business entertains the belief that their

local government listens and addresses issues of concern, they will tend to remain in a specific region.

6.2.3.7 Intermediate inputs

Availability and access to other intermediate inputs is also very important. Raw materials, parts and business services such as specialised legal, accounting, and computer services are also important in choosing a location. Another category of inputs is the knowledge concerning a specific industry. The location should be one where the firm can keep up with the latest trends and have rapid access to information on changes in products and production technologies (McDonald, 1997:36).

6.2.3.8 Site costs

The cost of a particular site may be expressed in terms of the rental as well as the cost of buildings. Site costs include the cost of land and building. All regions offer a variety of sites at a wide range of prices and regions can therefore use this as a tool to attract interested firms. Warehouses and office facilities are particularly sensitive to site costs (Blair, 1995: 54).

6.2.3.9 Political climate

The stability of the national political environment is a prerequisite and has the same effect as a locational factor as in the case of a region. Any investor, whether national or international, is concerned about government stability and whether satisfactory returns on investment are possible. This is one of the most important considerations for any investor. Linked to this is the stability of a country's exchange rate.

6.2.3.10 Energy costs

Energy prices directly affect the price of transportation and consequently, the choice of a location for transport-oriented activities. The cost of electricity is also a factor of location that new firms take into account. The reliability of the provision of energy, especially electricity, is a major concern in the choice of a location. The most energy-intensive manufacturing industries are paper mills, chemicals, petroleum refining, steel and aluminum industries and stone, glass and clay products (McDonald, 1997: 36). Increased reliance on computers render reliable energy supplies extremely important, as sporadic blackouts will definitely offset plans to locate.

6.2.3.11 Locational orientation

Table 6.1 lists characteristics that affect locational orientation of firms and provides examples of firms with their given orientation.

Table 6.1: Locational orientation of firms

Orientation	Relevant characteristic	Example
Transport-cost-oriented	Transport costs relatively more important	
Input-oriented	Inputs weigh more than output	Ore refining
	Inputs bulkier than outputs	Cotton bailing
	Inputs more perishable than outputs	Fruit canning
	Inputs more hazardous than outputs	Skunk deodorising
Market-oriented	Outputs weigh more than inputs	Bottling
	Outputs bulkier than inputs	Auto assembling
	Outputs more perishable than inputs	Baking
	Outputs more hazardous than inputs	Explosives

Orientation	Relevant characteristic	Example
Production-cost-oriented	Local input costs relatively more important	
Energy	Energy-intensive production	Aluminium
Labour	Labour-intensive production	Clothing
Intermediate inputs		
* Specialised inputs	Localisation economies	Software
* Business services	Urbanisation economies	Corporate head quarters
Amenity oriented	Workers are sensitive to weather and recreation	R&D, tourism

Source: Adapted from: Bogart. 1998. & O'Sullivan. 1996.

Another way to reach a decision is to use five categories *viz.*: (i) amenities (cultural opportunities and leisure activity); (ii) economy (economic vitality and community prosperity); (iii) education (educational opportunities and workforce preparedness); (iv) government (political participation and accountable leadership) and (v) people (caring people and healthy lives) (Bogart, 1998: 64). A locational plan could be drawn up from these categories. The strength of this plan is its focus on measurable outcomes, although its weakness is the arbitrary decision on the measures included and their division among categories. A brief revised locational plan follows (Bogart, 1998: 64).

Locational plan.

Amenities

- sporting events — number of hotel rooms
- number of cultural events — library card holders
- recreational facilities — park area available

Economy

- median income — regional fiscal disparity
- cost of living — employment growth
- unemployment rate — skilled employees

- business growth
- economic diversity
- number of flights in and out
- population growth trends
- commuting time
- highway accessibility
- housing affordability ratio

Education

- college and university presence
- library expenditures
- mathematics achievement level
- education attainment

Government

- financial planning strength
- administration spending
- debt ratio
- voting rate
- judicial efficiency
- ability to repay debt
- total debt

People

- poverty rate
- single-parent households
- contributions to charity
- police response time
- central city crime rate
- regional crime rate
- toxic emissions
- water quality
- air quality
- teen pregnancy rate
- infant mortality rate
- number of specialists
- hospital capacity
- hospital occupancy rate
- number of doctors
- hospital costs
- uninsured rate

The problem is, however, that some of the indicators may be either positive or negative. Affordable housing may benefit buyers, but is not beneficial to sellers. The indicators at least provide a method by which location decisions can be more structured.

6.3 DECISION-MAKING PROCESS

The choice of a location can be a complicated matter because the decision may influence a lot of people. This section seeks answers to the motives for choosing and identification of location sites.

6.3.1 Motives

The main motive for a business securing a location is surely to maximise profits. It can therefore be assumed that profit maximisation would be a cornerstone in understanding business behaviour in choosing a location. However, in some cases profit maximisation will fail to provide, or provide only part of the explanation. Non-profit institutions such as a fire station would not be influenced by profits in its search for a location. This study, as mentioned before, is only interested in profit-maximising firms and will ignore firms not related to this. Secondly, managers may place personal interest above stockholder interest and therefore choose a location with good climate etc. rather than that which maximises profit. Finally, safe locations may be preferred to locations with high risk/high return possibilities.

6.3.2 Practical limitations

Much time and energy may go into the identification of an ideal location site. If the profitability of the business is not sensitive to the location site, less time may be spent on searching for a site. However, activities that require large, long-term investments generally involve extensive analysis. The complexity of the various factors, the uncertainty of the future and the variety of motives of the participants make it a difficult task altogether. New businesses often locate in the same area as that in which the founder lives. The site may have the characteristics of a profit-maximising location, even if the initial selection was purely personal. A

sub-optimal location may also become a very suitable location if the local economic environment changes in such a way that it supports that location later.

6.3.3 Steps in the site selection process

Blair (1995) states that although a variety of motives are involved in the selection process, large businesses tend to follow similar steps in selecting a site. Schmenner (1982) has identified five basic steps that will be examined below:

6.3.3.1 Recognition

Location decisions are often part of the broader planning process of a firm. This often occurs at a critical point in the life cycle of the firm. A forecast of the future expected demand might prompt a firm to consider a locational process. If a capacity problem is anticipated, a task team should be appointed to address the issue. The expansion of one of the existing sites will normally be an option, as will an increase in the price of the product, or even subcontracting to other producers. If it is deemed necessary to find a new facility, a site selection team will be formed.

6.3.3.2 Forming the selection team

The organisational structure of the company will affect the site selection process. The selection team should however, include representitives from the key divisions such as transportation, distribution, personnel, engineering and real estate. In the case of small companies, the Chief Executive Officer will be more involved in the decision-making process. Companies usually do not reveal the fact that they are seeking an alternative location until they can start negotiating the terms of rent, land or incentives.

6.3.3.3 Developing criteria

A list containing all the "must have" characteristics of the new site must be drawn up. The role of this proposed facility in the overall corporate strategy will be focal in developing and revising this list. Desires to penetrate new markets, to segregate or integrate different functions of the company, or to strengthen the company's visibility or identity may be important elements in the location choice. Both quantitative and qualitative locational factors should be included in the list.

Trade-offs arise in developing criteria for information that is ideally desired and information available. Much of the data necessary to make an informed decision that could possibly influence profits, is unpublished and expensive to gather. Secondary data may be inexpensive but may also be several years old by the time it is disseminated.

6.3.3.4 Focussing

After the completion of the list with the different criteria, the search for the site starts. The first stage is the choice of a metropole or urban region. The focus will be on labour, taxes, climate, proximity to customers and suppliers and other related factors. Factors such as climate and energy costs are termed macro-locational factors. From this point a more micro-geographic focus will follow, with a list of possible communities. On a micro level, land costs, access to major road links, good schools etc. will form part of the search. These factors become important after the selection of a specific community within the urban region. The search for an exact site will now begin.

A relatively simple way of choosing the site is by assigning weights to each of the characteristics on the "must have" list. The more important the characteristic, the higher the weight. A score for each locational factor is also assigned to each region, with a higher score indicating a better regional attribute. By multiplying

the weight times the region's location score and summing the results, an overall desirability index can be obtained. Once this has been done a specific site can be found. The cost of gathering information concerning each site will limit the number of sites that can be examined in detail, although the financial capability of each firm will determine this.

6.3.3.5 Final decision

The final decision to locate in a chosen spot will normally be reflected in a firm's annual capital budget. A feasibility study, showing that the proposed facility will earn a sufficient rate of return to justify the purchase, construction or rent, will be the determining factor.

A survey conducted to identify the factors that influenced site selection decisions identified the following random factors (Bogart, 1998: 63):

i) Low lease rates,
ii) educated labour force,
iii) access to major highways,
iv) low construction costs,
v) access to primary consumer markets,
vi) good energy/telecommunications,
vii) favourable local government attitude,
viii) low property tax rates,
ix) low crime rate and
x) low corporate and business taxes.

The search for a specific location may be time-consuming and no-one really knows what the future holds. The optimal site can thus only be identified in terms of current information. This at least provides a method for decision-making location which is more structured than pure reliance on feelings or emotion.

6.4 SUMMARY

The attractiveness of a region in terms of investment is affected by the various locational factors. Each type of business will be affected, albeit differently, by a variety of locational factors. The characteristics of each firm will determine the way in which it will be influenced by these factors.

Inertia is very important although it is often not recognised as a locational factor. The initial reasons for establishing in a specific area may still hold true and may be reinforced by the changing economic and social structures. The loss of workers and business contacts may be a great economic risk from which the firm may struggle to recover.

Transportation as a locational factor is very important and different models are used to explain the concept of minimising transport costs. Market-oriented firms which produce final goods that are expensive to transport, normally locate near the market. Input-oriented firms locate near the source of the inputs because the inputs used in production are expensive to transport. The median location principle explains location tendencies of market-oriented firms serving several markets.

Some of the most important locational factors for businesses are transportation costs, access to inputs and access to markets. Other very important factors are production costs, labour costs, amenities, taxes, government incentives and infrastructure, political stability, local business climate, site and energy costs. These factors may vary in terms of importance depending on the type of business. The nature and importance of locational factors will inevitably change as technology and production requirements change.

The location decisions of firms may be influenced by local authorities in the sense that these authorities are responsible for the creation of an urban

environment conducive to economic growth and development. Businesses are in search of opportunities for exploitation, and the more attractive an urban environment in the provision of economic opportunities, the better the chance of businesses locating there. Local authorities are generally in need of increased tax revenues and by attracting businesses to locate, may just address this need. Both local authorities and businesses may thus contribute to improving the growth potential of an urban area. A very important factor in the location decision is the availability of a high quality transportation network. Transportation also strongly influences land-use patterns in urban areas.

In the next chapter, urban transportation, on which households and business alike are largely dependent, will be analysed.

CHAPTER 7

URBAN TRANSPORTATION

7.1 INTRODUCTION

The purpose of this chapter is to describe and explain the difficulty of urban transportation due to the highly concentrated number of people as well as goods and services that are on the move daily. Transportation in an urban area is used to move both people and freight. The desire to pursue an activity at some other location demands transportation. Activities include work, school, shopping and entertainment to mention but a few. Streets, highways and railways are all examples of facilities to transport people and goods to and from their desired destination.

This chapter will focus mainly on one type of travelling *viz.* commuting, i.e. the transportation of people for the exchange of labour services. The reason is that the journey to work is probably the most important of an adult's daily life, and that these trips are concentrated during the morning and afternoon rush hours. This leads to a high level of strain on the capacity of the transportation system and facilities to move people on a daily basis. Trips to school (cars) and other trips (trucks) during peak hours are also included. The size, structure and efficiency of an urban area is influenced by the transportation system in which people and goods are moved.

7.2 MODAL CHOICE

Consumers choose among available modes according to the terms on which the modes are made available and according to their needs and tastes. The public sector's task is to provide the urban transportation system that best serves the community. An important constraint on the public sector is that the public buys transportation services and can register dissatisfaction with one mode by purchasing the services of another.

The activity of commuting to work can be divided into three phases. The first is the suburban collection, which involves getting from the house to the main mode of

commuting. The second phase is the line haul that involves travelling using the main mode of commuting. The third phase is the workplace distribution that involves getting from the line-haul vehicle to the office (Mills & Hamilton, 1994: 285). The suburban collection portion of the commute can be the walk from the door to the car and perhaps a short drive to the main street. If the trip is by bus, residential collection refers to the walk to the bus stop. If the trip is by rail, residential collection may consist of a walk or a car or bus ride to the station where the worker boards the train. The line haul is the drive to the office or working place and the workplace distribution refers to the part of the trip after the line-haul vehicle has been left. Most commonly, this part is made on foot but may entail a bus or taxi ride for some workers. People using train rides as their main form of line haul contribute to congestion only on their way to the train station (suburban collection) and once they depart from the train to their specific place of work (workplace distribution). Both of these phases are of shorter duration and have less impact on the general transportation system.

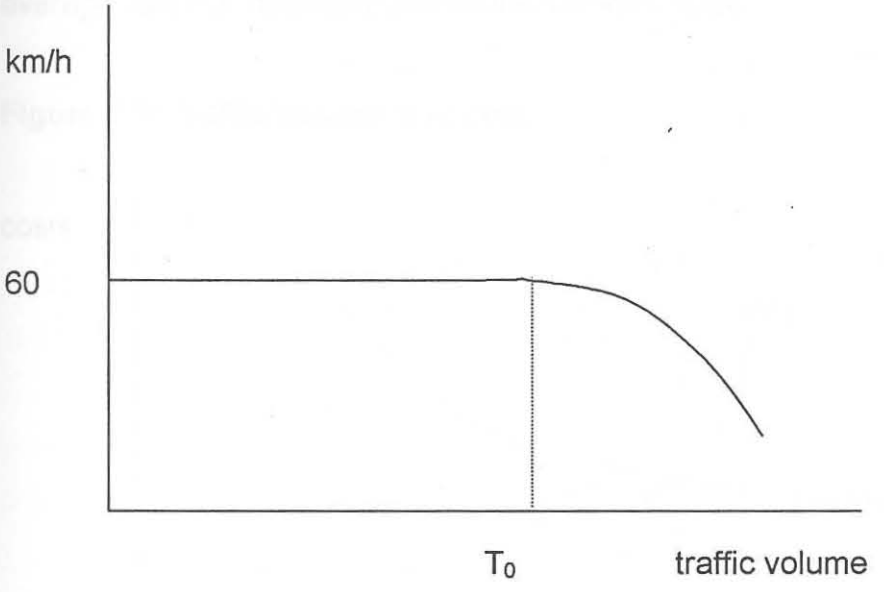
The choice of line-haul vehicle is known as the modal choice although the choice of collection and distribution modes is clearly related and important. The transport mode chosen by a worker depends on the characteristics of all three parts of the trip. Trip characteristics that appear to have the greatest influence on modal choice are the time and money costs of each part of the trip. Certain other modal characteristics such as comfort and privacy may also affect modal choice. In addition, characteristics such as age and income of the worker may also influence such modal choice (Mills & Hamilton, 1994: 285). An important factor is the monetary value that people place on their time. The key issue is the cost of time - especially time spent waiting - which plays an important role in the choice of the mode of commuting.

7.3 CONGESTION

Transportation facilities are built in response to current or projected demands. Sometimes transportation facilities have been built ahead of demand but often the construction of facilities responds to demand forces that already exist. Urban

transportation facilities are important in shaping an urban area and strongly influence land-use patterns and spatial patterns of urban travel. Urban transportation systems and urban land-use and travel demands are interdependent and evolve together over time (McDonald, 1997: 169). It is also important to realise that large-scale transport facilities often become political issues and that many role players are involved. The planned construction of transportation facilities is sometimes influenced by a particular constituency with a vested interest or by budget and policy decisions from national government.

Figure 7.1: Traffic volume and speed



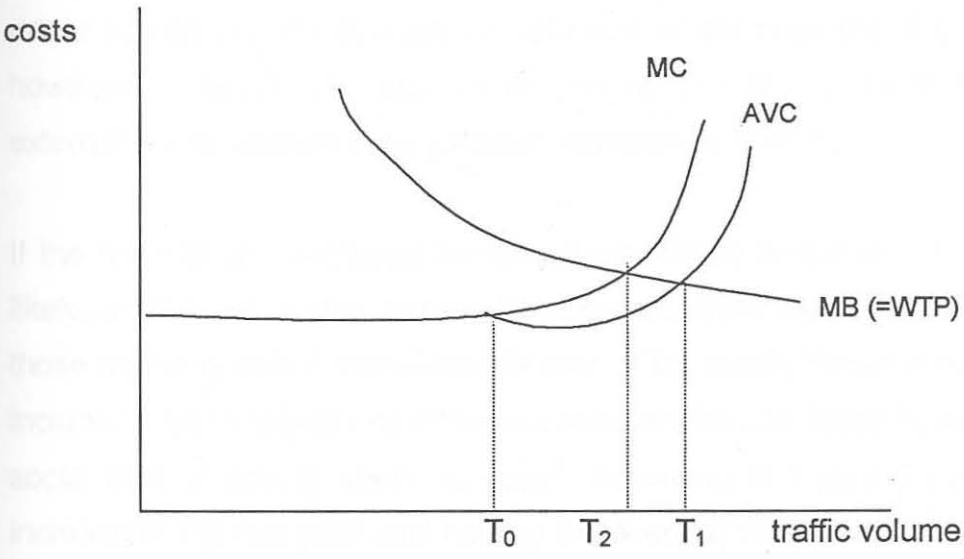
Source: Bogart. 1998.

Congestion starts when the volume of traffic increases and the average speed of vehicles slows down. If the speed limit is 60 kilometres per hour (km/h) and everyone adheres to the speed limit, the traffic below some critical volume will be able to maintain its average speed at 60km/h. At any volume above the critical level, the average speed will be slowed down as cars start to interfere with each other. The relationship between speed and volume can be seen in Figure 7.1. The volume T_0 is known as the "design

capacity" of the road. The average speed at which traffic travels obviously has implications for the total cost of travel.

The time costs are, for example, negatively related to speed because the faster the speed of a car, the sooner the time of arrival. Small (1992: 76) determined that costs are higher when congestion forces the average speed below the speed limit (60km/h). Suppose, for the moment, that the inconvenience caused by the traffic does not depend on volume (although this would be totally unrealistic). Suppose, also, that operating costs depend only on distance traveled and not speed. By allocating a value to travel time, Figure 7.1 can now be transformed into a relation between traffic volume and average variable cost with time as the variable input.

Figure 7.2: Traffic volume and cost



Source: Bogart. 1998.

This is shown in Figure 7.2 where the average variable costs are the sum of the time costs (which vary with volume) and the operating costs (which are assumed not to vary with volume). The marginal cost (MC) of adding another car to the road is simply the addition to total variable cost. The marginal cost and average variable cost (AVC) are

constant up to the design capacity of the road (T_0) because the speed of traffic is constant at all these volumes.

Up to this point, the travel time per car does not vary for these volumes. The demand for travel reflects the marginal benefit (MB) to the traveller expressed as the traveller's willingness to pay (WTP). The marginal benefit curve is downward sloping because people's preference may differ or one person may have fewer alternative travel routes. In equilibrium, the marginal benefit to the last traveller will equal the price of travelling.

A negative externality is shown in Figure 7.2. Each person travelling pays the average variable cost but imposes an additional portion on total cost and thus marginal cost. A difference between private cost and total social cost arises because not all drivers take into account their own contribution to delaying other drivers by reducing the average speed. The travel volume will be T_1 in equilibrium, where the marginal benefit of the last driver just equals the average variable cost or the price the driver should pay. This, however, exceeds the optimum volume of T_2. If the driver took the congestion externality into account the equilibrium volume would be T_2.

If the level of inconvenience increases with higher levels of volume, as seems more likely, another externality arises. Pollution is another externality which upsets not only those on the road but also everyone else. If the level of inconvenience and pollution is included in the analysis, the difference between the cost faced by the driver and the true social cost of driving would increase. According to Figure 7.2 this would mean an increase in the marginal cost holding the average variable cost constant, which would reduce the optimal traffic volume to an even lower level than T_2.

Another private cost should also be considered. Once the road is congested, drivers depart earlier than they would otherwise have, arrive later at their destinations or alter their travel plans altogether. Drivers also impose several social costs. The first is the cost of time they impose on other drivers. Secondly, there is the external cost of motor accidents. This cost has several elements such as the extra traffic delay due to the

accident, lost production resulting from death or injury, property damage and insurance administration. The third social cost is the provision of parking at the end destination. The type of parking and the type of location in terms of land value will determine the extra cost incurred (Bogart, 1997: 324). Other related costs are the public services such as traffic control and costs of courts. Furthermore, noise and air pollution, as well as environmental degradation result from road construction.

7.3.1 Reducing congestion

Traffic congestion leads to negative externalities which should be addressed in some effective manner. The generic term for remedying road congestion is a congestion toll. To implement such a toll is, however, not without a cost. The toll should only be implemented if the benefit of the toll exceeds the costs. The most promising solution would be to force drivers to face the full social costs by imposing a toll equal to the congestion costs being imposed on others. A direct regulation would involve mandating which cars are allowed to use the road at various times of the day. Synchronising traffic lights could reduce waiting time and increase the flow of traffic. A variety of technological improvements may also be proposed as a solution to congestion. Annon (1995) lists satellite navigation, roadside traffic computers, collision avoidance radars, infrared blind-spot sensors, infrared night-vision screens, radar-enhanced cruise controls, programmable traffic signs, etc. as possible solutions which are currently available or will be in due course. Although all of these technologies may reduce congestion, they do so at a cost.

The purpose of a toll is to ensure that roads are used efficiently and is not necessarily intended to raise revenue or reduce the number of trips made by drivers. It is supposed to make a person contemplate a trip by taking into account all the related costs associated with that specific trip. If the government uses the toll revenues to lower other taxes paid by users of the road, everybody benefits from the toll. If the government uses the toll revenue to lower taxes generally or to provide services that residents want more than tax reduction, the benefits exceed the cost of the toll policy.

Only if the government uses the toll revenues wastefully will the toll programme costs exceed the benefits (Mills & Hamilton, 1994: 290). If congestion still takes place after imposing an optimal congestion toll, it can be assumed that the benefits of driving clearly exceed the costs. It is important for a congestion toll to vary with the time of day (since congestion varies with the time of day) and location (since congestion varies from place to place). One of the important roles of an efficient congestion toll is to discourage people from taking non-working trips (shopping) during rush hour. Only if the toll declines during off-peak hours do they properly encourage substitution between peak and off-peak travel times.

A congestion toll could be collected in several ways. The direct way of collecting toll through toll booths may cause additional congestion as traffic slows down to pay the toll amount. The indirect methods of making people face the full cost of commuting also hold some disadvantages. These methods include fuel tax, parking tax and subsidies for public transportation. The main problem with all of these is that they are not necessarily related to the operation of motorvehicles in congested situations.

According to Downs (1992: 69) the level of fuel taxes needed to make a significant reduction in driving is estimated to be very high. Although it may not be true everywhere, he estimated that a doubling of fuel prices would lead to a short-term decrease of only 35 per cent in fuel consumption, the reason being that a fuel tax would provide an incentive to reduce the use of the car at all times and not only in peak hours. A fuel tax may further encourage a shift to cars with better fuel consumption rather than a shift in driving habits and driving times. This view was emphasised by Meyer and Gomez-Ibanez (1981: 145) that the demand for fuel is inelastic. Parking taxes also only affect those who actually stop at that particular location. Although easy to collect, parking taxes do not distinguish between drivers who travel on congested routes and those who travel on uncongested routes.

Various methods of taxing motorists normally fail to cope with current traffic congestion. No distinction is made between locations where congestion costs are high or low; no

discrimination is made between times when congestion costs rise or fall; more fuel tax is paid by heavy-fuel-consuming vehicles than low-fuel-consuming vehicles; factors are completely independent of location, time of the day, or day of the week and the degree of congestion. Alternative indirect methods of charging motorists may be proposed, e.g. a tyre tax as an alternative to fuel tax, and differential licence taxes. These licences can relate to different zones in an urban area for example, an expensive red inner zone and a less expensive blue outer zone that can be purchased for periods from a year to a day. Licence discs would be displayed on the vehicle with an exemption at night and at weekends (Balchin, *et al.*, 1995: 220).

Subsidies for public transportation are a second-best solution to the problem of congestion. This is based on the principle of reducing the cost of alternatives in order to encourage people to switch modes of transportation. However, the subsidy required to have a relatively large impact is fairly high. The convenience of private cars as well as the fact that they are very comfortable may swing the scale away from public transportation. Public transportation makes sense if a person is unable to afford a motorcar and also if the person is travelling to places served by the public transport system. In a monocentric city, almost all business and industrial related destinations will be in the CBD. In decentralised cities, it is uncertain whether all destinations will be efficiently accessible using public transport. Meyer and Gomez-Ibanez (1981) present evidence that one option that combines the efficiency advantages of public transportation with the comfort of the private car is ride sharing or car pooling.

7.3.2 Expanding roads

One possible way to alleviate traffic congestion is by expanding existing roads or building more roads and thus increasing the available consumer surplus to drivers. The supply side is clearly a public-sector responsibility. Streets and highways are normally constructed, maintained and owned by government. However, the expansion or construction of new roads comes at a cost. If these costs exceed the increase in consumer surplus, it is not socially desirable to expand the roads. It should be noted

that different types of roads have different costs and operating volumes. Small (1992: 100) describes the relationship between type of road and cost per kilometre. He argues that there are decreasing returns to scale where various arterial roads are the lowest-cost alternatives, and increasing returns to scale when the volume becomes sufficient to justify expressways.

Three cost aspects should also be taken into account. Firstly, the construction cost of the road will vary depending on the design of the road and the nature of the terrain. Secondly, the acquisition of land on which to build the road will vary according to the location of the road. Lastly, the operating costs, including painting, traffic enforcement and maintenance, should also be considered.

7.4 PARKING

Every person driving in a private vehicle to go about his/her business, must do something with the vehicle upon arrival at his or her destination. Garreau (1991) argues that much of the land use in cities can be understood by the imperative to accommodate all these motor cars. He estimates that less space is required for a typical office worker than for a typical parking space and therefore the major use in an edge city is for parking lots.

A quote from the Assyrian king Sennacherib (Garreau, 1991: 119) suggests that parking has been an important issue since the seventh century B.C.

> *Anyone parking a chariot so as to obstruct the royal road should be put to death with his head impaled on a pole in front of his house.*

Developers have different options in providing parking places for motor cars. One option is to designate a vacant piece of land next to the office block or mall as a parking lot. Although it may be a wasteful use of land, it could be inexpensive, depending on the value of the vacant lot. Another option may be the construction of a multi-storey

parking lot above ground, thereby using the land more extensively and improving the efficiency of land use. This, however is a more expensive form of parking provision. Lastly, excavations may be considered to construct an underground parking lot. This method is an even more efficient use of land because land may now be used for both parking and commercial or residential purposes. This is unfortunately also the most expensive alternative in parking provision.

The consideration to built parking garages is thus an option when the land is too valuable to be left idle or is in low-intensity use. Once the density of economic activity reaches a certain level it will become worth building parking garages. Large fixed costs are involved in constructing parking garages, which implies some measure of increasing returns to scale in the number of storeys in a parking garage, because the fixed costs can be spread over a number of storeys. When it becomes worthwhile to build a parking garage, it will be cost-effective to build a large one relative to the surface parking it is to replace.

One condition that should be kept in mind under these circumstances is that it is necessary for an area to generate enough traffic to justify that many parking spaces. Parking fees can be collected as the land values become more expensive. One quick and easy way to determine the value of land in an area is to look at how tall buildings are, and how parking is managed (Jackson, 1985: 256). Technological advances continue to enhance unmanned parking machines, including parking meters that automatically clamp on tires when they expire and forklifts that can place up to eight cars in stacks and retrieve them in just one minute (Annon, 1996). The idea of using parking prices as a substitute for congestion tolls was discussed earlier. However, in many cases free parking, or parking at less than market rates, form part of an employee's job advantages and therefore provide an incentive to drive to work.

7.5 ENVIRONMENTAL DEGRAGATION

Although congestion is seen as a major negative externality due to the use of motor cars, one externality sometimes overlooked, is the relationship between the use of motor cars and global warming. Motor cars emit a variety of chemicals as a result of combustion of fuel. These chemicals include carbon monoxide (CO), carbon dioxide (CO_2), nitrogen oxides (NO_x) and nitrous oxide (NO_2) of which CO_2 is believed to be the most important in causing the so-called greenhouse effect that leads to a gradual warming of the earth's climate (Bogart, 1998: 331). Existing motor cars have attributes such as performance, fuel availability, expected reliability, and perceived safety. Although alternatively fueled vehicles may restrict the problem of pollution, they all fall short in comparison with petroleum driven fuel in some or all the dimensions. This uncertainty in terms of availability, performance and reliability of a new technology reduces the willingness of households to invest in alternatively fueled cars.

Every person driving in a motor car contributes to all the negative externalities already mentioned. It would therefore make sense to decrease the daily number of cars on the road but still transport everyone to his/her desired destination. This could be realised through the use of mass transit, resulting in less negative externalities and thus more effective and efficient transport.

7.6 MASS TRANSIT

It is important at this juncture to recall the division of commuting into three parts, *viz.* collection, line haul and distribution. Although the benefits of mass transit sometimes outweighs commuting in private motor cars in terms of line haul, increasing collection and distribution time and costs cancel out this advantage. Collection and distribution costs were precisely those to which commuters were most responsive, while being minimal for private motor cars. Collection and distribution costs is basically the transaction costs (opportunity cost) that increases when using mass transit instead of private motor cars.

7.6.1 Intermodal cost comparisons

If a bus system is taken as an alternative to private cars, the same type of road system can be used. By allocating reserved bus lanes and priority access to urban roads the efficiency of the transport system may be increased by a significant amount. This may be viewed as a strong second-best option to congestion tolls. Buses, like cars, emit pollution and require road construction and maintenance costs but they impose additional costs as well. A bus system requires both administrative and operating expenses like drivers, mechanical personnel, etc. The operating costs per passenger decrease with an increase in the number of passengers. Small (1992: 105) estimated that the total social costs of buses are lower than for motor cars, once the volume per bus has increased significantly. This will only be true during peak hours, so the advantage of using buses may be overstated.

A railway system is limited to a fixed path, making the residential collection and the downtown distribution even more problematic than in the case of buses. The railway system does, however, have the advantage of less congestion during the line haul. This type of transport mode will only be competitive once the number of passengers increases substantially. Five benefits related to railway are: Reduced travel time for the commuters that choose rail; reduced congestion on the roads; reduced motor car operating costs due to less congestion; reduced social costs because of a lower need for parking; and reduced bus operating costs. However, rail transit remains economically attractive only where the population densities are extremely high (Haring, 1972: 139). The rail system also relies on feeder buses, taxis and motor cars to bring passengers to suburban railway stations.

7.6.2 Subsidising transport

Two basic reasons can explain subsidies for mass transit. Firstly, mass transit is produced under conditions of increasing returns to scale. Thus, if the price of transit is set equal to marginal cost a deficit remains because marginal cost, is less than average

cost. Two well-known resolutions can be used to overcome this problem. The first is to set price equal to average cost so that the operation may earn a normal rate of return but zero economic profits. The second resolution is the so-called two-part tariff, which is a tax imposed to cover the deficit remaining when marginal cost pricing is used. This form makes it possible for the transit operation to break even. This tax may be obtained from those benefiting most from the transit line and less congestion on roads such as motor car drivers. This may include a tax on fuel to subsidise the mass transit.

The second reason for subsidising mass transit is that unpriced congestion and pollution externalities mean that motor car travel is essentially subsidised. When subsidising mass transit it is important that the combination of fares and services render high value for money because many people may simply refrain from buying the service and use cars instead. Public transportation will only be attractive if it provides frequent, economical and safe service (Mills & Hamilton, 1994: 279).

It is difficult to present strong justifications for subsidising urban transit on economic grounds alone. In general, economic theory offers little direct help in defining policy objectives for urban transportation. Alternative pricing and subsidy policies can be evaluated for their technical feasibility, their probable effects on efficiency, their applicability to urban transportation markets and probable implications for income redistribution. However, it seems that in many cases current proposed urban transit subsidies, when subjected to careful economic evaluation, appear to be internally inconsistent, ill-conceived and often in conflict with other goals of government policy in urban areas (Haring, 1972: 141). For a transit system to operate without a subsidy, it should cover its capital costs from its rush-hour traffic.

7.7 SUMMARY

The purpose of an urban transportation system is to facilitate the exchange of goods and services and the movement of people. The optimum transportation system for an urban area depends on the size and structure of the area. A person's choice of

transport mode depends on income, time and costs of alternative modes. Many people tend to choose motor cars because of their convenience relative to alternative modes.

The use of vehicles generates several negative externalities such as congestion and pollution. Congestion costs are an important element in planning and pricing urban transportation systems. One way to correct the externalities of congestion and pollution is to force drivers to face the full costs of their driving by charging a congestion toll. The optimal toll would vary by time of day and by travel route. Alternatives include fuel tax, parking tax or subsidies to public transit. One way of reducing congestion is the construction of additional roads. This implies major costs and the use of land that may have more efficient uses.

The efficiency of an urban area is influenced by the transportation system and should therefore enhance the urban environment and not constrain economic activity. Congestion, which restricts the flow of traffic, hampers the economic potential of urban areas and needs to be addressed by local authorities. An effective transportation system is one of the most important factors where local authorities may contribute to the improvement of the urban environment, to the benefit of businesses and residents.

The transportation system should ensure the effective transportation of labour services to the urban area on a daily basis. Labour services and the ingenuity of an area's people is vital to the growth potential of an urban area. For any urban area to experience sustainable economic growth, it is important to evaluate urban labour and migration changes in that area. The skills level of people and its migration patterns may have a severe impact on an urban environment. The influence and effect of these important labour-related features on an urban area will be analysed in the next chapter.

CHAPTER 8

URBAN LABOUR AND MIGRATION

8.1 INTRODUCTION

The purpose of this chapter is to discuss the urban labour market where it is assumed that the households and firms can move freely between cities. In the long run, each household will settle in a city that maximises its utility and each firm will locate where it can maximise its economic profit. In this chapter, economic growth is defined as an increase in total employment. This would result in either an increase in demand for labour or an increase in the supply of labour.

The demand for and supply of labour will first be discussed. This will obviously be linked to the migration of labour, and employment as well as unemployment will form part of the discussion. Lastly, the role of crime on the urban economy due to the lack of employment opportunities, as well as migration of labour will be analysed.

8.2 DEMAND FOR LABOUR

The demand for labour in an urban environment is derived from two types of activities. The local sector sells its products to local consumers within the city, eg. bakeries and bookstores. By contrast, the export sector sells its products to consumers outside the city, eg. computer manufacturers. The city's total labour demand curve is thus negatively sloped for two reasons. If wages in the city increase, both exporters and local producers substitute capital for the relatively expensive labour. This is the substitution effect where wage increases cause a decrease in the quantity of labour demanded. A substitution of non-labour inputs (capital, land) for labour takes place. Secondly, as wages increase, production costs increase and hence prices that firms charge will increase. As the price of export products increases, the quantity of exports demanded decreases with resultant lower demand for labour. As the prices of local goods increase, local residents substitute imports for the relatively expensive local

goods, with the same decline in labour demand. This is the output effect where wage increases in the city lead to price increases and output decreases, resulting in a lower quantity of labour demanded (O'Sullivan, 1996: 129).

These two effects determine how rapidly labour demand falls as a result of wage increases. The larger the substitution effect and the larger the output effect, the greater the responsiveness of labour demand to changes in wages. The substitution effect will be influenced if firms can easily substitute non-labour inputs for labour. The substitution effect will then be relatively large. The output effect can be great and will be affected in two ways. The output price will be sensitive to changes in wages if labour costs form a large share of total costs. A small increase in wages will cause a relatively large increase in output prices and hence a substantial decrease in total production. Secondly, if the price elasticity of demand for the output is relatively large, an increase in the output price will cause a relatively large decrease in the total production (O'Sullivan, 1996: 129).

The following factors will cause the demand for labour to change, i.e. either to increase or decrease (O'Sullivan, 1996: 129).

i) Demand for exports. A higher demand for the city's exports increases the export production and more labour will be demanded in the labour intensive areas.

ii) Labour productivity. If labour productivity increases, production costs will decrease, allowing export firms to increase output. If the increase in output is relatively large, the demand for export workers may increase. An increase in labour productivity also allows local producers to undercut the prices of imports, which will increase the demand for local workers.

iii) Business taxes. An increase in business taxes without a corresponding increase in public services will increase production costs. This will lead to a decrease in output and a decline in labour demand. Evidence exists that an increase in business taxes decreases business activity and therefore less labour is needed.

iv) Industrial public services. An increase in the quality of industrial public services without a corresponding increase in taxes, decreases production costs. This will increase output with a resultant increase in the demand for labour. Improvements in local infrastructure increase business activity and therefore more labour is needed.

v) Land-use policies. A city can accommodate existing firms that wish to expand their activities and new firms that want to locate by co-ordinating its land-use and infrastructure policies. In this way a city can ensure an adequate supply of industrial land.

8.3 SUPPLY OF LABOUR

An increase in a city's wages increases the relative attractiveness of that city, inviting the migration of workers from other areas. This affects the supply of labour and is called the migration effect. It is important to stress two assumptions here. The first is that the hourly wage rate per labourer is fixed and thus changes in the wage do not affect the number of work hours per labourer. The second assumption is that the labour force participation rate is not affected by a change in wages. The city's population in the work force will thus not increase if wages increase. An increase in wages will therefore lead to an increased supply of labour because more people move to that city and not because existing workers supply more working hours or additional members join the workforce (O'Sullivan, 1996: 131). An increase in the total employment and the total population, increases the total demand for the majority of goods that lead to higher prices for land, housing and other goods.

The factors that may influence the supply of labour are (O'Sullivan, 1996: 131):

i) Environmental quality. An increase in the quality of the environment (cleaner air, higher water quality) increases the relative attractiveness of the urban area, causing migration to the area.

ii) Residential taxes. An increase in residential taxes without a corresponding change in public services, decreases the relative attractiveness of the area, causing emigration of people.

iii) Residential public services. An increase in the quality of residential public services without a corresponding increase in taxes increases the relative attractiveness of the city, causing immigration of people.

It is important to realise that urban economics looks at urban labour not merely as a factor input but also as a resident who consumes, causes pollution and congestion and sometimes gets into trouble with the law (Hirsch, 1973: 7).

8.3.1 Composition of changes in employment

This section examines the composition of changes in total employment. If new firms open up and existing firms expand, a city may experience an increase in employment. This should, however, be compared against the loss of jobs when firms close down or contraction of activities take place. The net effect of these two events will determine whether an increase or decrease in employment has arisen. The question is whether cities, experiencing employment growth, have relatively large gains in terms of employment when new firms open up or existing firms expand, or small losses when firms close down or shrink activities. On the other hand, do cities that grow slowly or shrink have relatively small gains from new firms or expansions or relatively large losses from closures and contractions?

8.4 FACTORS AFFECTING URBAN POPULATION GROWTH

Births, deaths or migration can affect population growth and a brief reference to the most important factors affecting each will now be discussed. The most significant factors affecting birth rates and fertility rates are (Miller, 1994: 206):

i) Average levels of education and wealth are usually negatively related to birth and fertility rates.
ii) The contribution and importance of children as part of the family labour force.
iii) Urbanisation tends to decrease the family size due to superior access to family planning services and less dependence on children for survival tasks.
iv) The costs of raising and educating children in urban areas are higher because the duration of education is lengthy.
v) Educational and employment opportunities for women keep them from having more children.
vi) The infant mortality rate in urban areas is lower because of access to medical services and therefore fewer children are born to replace those who have died.
vii) A higher average marriage age causes women to have fewer children.
viii) The availability of pension funds reduces the need for more children to support parents during their old age.
ix) Access to and availability of reliable birth control measures decreases birth rates.
x) Religion, tradition and culture may influence the number of children families have.

The rapid population growth rate worldwide is not so much due to an increase in the total birth rate but rather a decline in death rates. The most important factors for this general decrease in death rates are (Miller, 1994: 207):

i) Better nutrition leading to a declining death rate.
ii) A lower infant mortality rate and a longer average life expectancy because improved personal hygiene, sanitation and cleaner water supplies have reduced the frequency of infectious diseases.
iii) Improvement in the provision of medical and public health services.

The movement of people also affects the rate of change of a population. Labour migration can be seen as a source of economic growth and development in urban areas.

The change in the population of an urban area can be expressed as:

Change in population = births – deaths + immigration – emigration

It is important to understand the distinction between gross and net migration. The births minus the deaths are called natural increase in the population, while immigration minus emigration is net migration. Gross migration refers to both the amounts of immigration and emigration. Net migration is a relatively small portion of the gross migration. Although the natural population growth rate varies from place to place, migration flows are the main source of rapid population growth in an urban area (McDonald, 1997: 384). Negative net migration can involve large or small gross migration flows as long as the emigration exceeds the immigration.

The decision to migrate can vary from person to person because costs and benefits normally differ. A person who decides to migrate to another city incurs monetary (including forgone earnings) and psychological (trauma) costs in order to gain a stream of monetary rewards and/or non-monetary gains in the new location. The people who are moving primarily for labour-market reasons should follow the basic monetary human capital model. In this case migration is motivated by gains in earnings and reduced by higher costs of migrating. Since the costs involved in moving are generally associated with distance, migration is more likely over shorter distances. The benefits and costs of moving are influenced by the familiarity that the migrant has with the final destination. Moving to a place where relatives or acquaintances stay will be easier for the migrant. Young people are more likely to move because they have more to gain in the process, as do people with higher qualifications and who have a stronger future orientation towards the future (McDonald, 1997: 385). Table 8.2 gives a brief and simple explanation of four different gross and net migration patterns (Blair, 1995:197).

Table 8.2: Gross and net migration flows

		Emigration	Emigration
		High	**Low**
Immigration	**High**	Low net migration (i.e., footloose population, university, college, military)	High net migration (i.e., area of expanding opportunities)
Immigration	**Low**	Negative net migration (i.e., area of declining opportunities)	Low net migration (i.e., stable job base, few new opportunities)

Another aspect of urban migration is the idea that the urban labour markets are generally in equilibrium. It seems that if the net advantages of migration which open up tend to be closed fairly quickly by shifts in the flow of people. Equilibrium wage rates for identical work may vary from region to region because of amenities and disamenities that people value. According to McDonald (1997: 385) higher wages are normally associated with the size of an urban area, the crime rate, warm sunny days, extremely cold days and the number of cloudy days. Wages are also usually higher in urban areas that have grown more rapidly in the previous decade. The ability to attract the labour force is most important and conventional economic incentives such as income growth, employment growth, reductions in the unemployment rate, high income levels and low unemployment levels still matter a lot.

Capital and labour normally move from urban area to urban area in response to factor price differentials. The rate of growth in labour is thus the natural increase in the labour force plus a fraction that is a function of the difference between the wage in the urban area in question and the average for all other urban areas. Likewise, the growth of capital is the natural increase in capital which is a function of savings and investment within the urban area, plus inter-urban capital movement due to the difference between the rental price of capital in that urban area and the average rental price for all other urban areas (McDonald, 1997: 304). Labour and capital would, however, not respond instantly to such price differentials so that the difference is necessarily eliminated in one year, although it could be eliminated in the long term.

Urban areas with high ratios of labour to capital presumably have low wages and high rental prices for capital. Labour will tend to move away from such areas and capital will migrate to such areas. Depending on the response rate of the two inputs, low wage areas will grow faster than high wage areas due to the movement of capital to these low wage areas. This should lead to the convergence of all wages to the national average except where wage differentials can be ascribed to amenities associated with certain areas.

One factor enhancing migration to urban areas is mainly due to the movement of people from rural to urban areas. This migration pattern is linked to the prospects of opportunities in the urban areas. The search for jobs and a better quality of life are pulling people to the cities. There are also certain push factors into the urban areas due to modern mechanisation in the agricultural sector with resultant decreasing employment. Urban growth is also fuelled by policies that distribute most income and social services to urban areas at the expense of rural areas (Miller, 1994: 231). The perceived economic oasis of economic opportunity for urban migrants is reversed to a poverty trap. This gives rise to crowded slums in central cities or illegal squatter settlements on the outskirts of cities (Hirsch, 1973: 1). Many cities are unable to provide these settlements with adequate drinking water, sanitation, electricity, housing, etc. This is sometimes due to a lack of funds, but also the fear among officials that improved public services will attract even more people from the poor rural areas.

Squatter settlements also provide a sense of community as well as a vital survival safety net for the poor and unemployed. The establishment of these slums in cities causes jobs, businesses and middle- and upper-class people to move away to the suburbs. As a result, violence, drug trafficking and abuse, crime and decay will increase in certain parts of the city. In these areas the poor, the elderly, the unemployed, the homeless, the handicapped and others who cannot afford to leave are trapped in a downward spiral of poverty. In the same city where possible opportunities may improve the lives of some, the quality of living is perceived as deteriorating (Hirsch, 1973: 2).

Table 8.3: Factors influencing labour migration

	Supply push factors (Factors leading to city unemployment)	**Demand pull factors** (Factors leading to city employment)	**Structural constraints**
Influence What influence the: • Supply push • Demand pull • Structural forces	• Technological development • Increase in capital intensity • Downswing in business cycle • Labour legislation • Other (eg. tax) legislation • Globalisation	• Knowledge dissemination • Trade protection • Upswing in business cycle • Outsourcing	• Unfavourable socio-economic environment • Constraining demographic issues • Lack of proper infrastructure • Inadequate education and training • Geographic distance (rural/urban divide) • Cultural distance (disillusionment with economic system)

Source: Adapted from: BEPA. 1999.

Labour migration can be caused by two main factors. These factors are discussed in Table 8.3. There is great upward pressure from the unemployed who are seeking employment in the city but are excluded from it. These supply push factors refer to forces that push people out of jobs in the urban areas. The reason for this resides in certain structural deficiencies that relegate them to unemployment. However, cities also have a strong demand for certain workers. These are the demand pull factors that refer to the forces pulling people into urban areas. This dynamic process consists of certain push, pull and structural factors. The structural constraints refer to the factors that act as a barrier preventing people from becoming employed. These factors refer to the structural imbalances in the socio-economic environment and an obstructive and ineffective institutional dispensation.

Unfortunately, these socio-economic problems created by structural deficiencies, lead to higher levels of unemployment that result in higher levels of crime in cities. In the next section, an economic approach to crime and crime prevention is presented.

8.5 ECONOMICS OF CRIME

The economic approach to crime assumes that both criminals and victims are rational in the sense that they base their choices on the expected benefits and costs of alternatives. A criminal will commit a crime if the expected benefit of the crime exceeds the expected cost. Similarly, potential victims use their resources to prevent crime if the expected benefit of prevention exceeds the expected costs. The analysis of crime is important to urban economics for three reasons (Mills & Hamilton, 1994: 360).

i) Crime is the highest in central cities and metropolitan areas.
ii) Households are sensitive to crime and their location decisions will be affected by high crime rates.
iii) The relatively high crime rates in central cities have contributed towards the suburbanisation of people. Many households have, because of high crime rates in central cities, moved to suburbs to escape central-city crime.

Crime is divided into personal crime and property crime. Personal crime is a situation where the victim is placed in physical danger. The criminal's objective may be to injure the victim (rape, murder, assault) or to steal property, or a show of force is used by the criminal to coerce the victim (robbery). Property crimes are a situation where the criminal is cunning but does not use force. Burglary, purse snatching, pickpocketing, bicycle theft and auto theft are examples of property crime. The victims of crime can vary according to income, place of residence, gender, age and race.

Criminal activity imposes a direct as well as an indirect cost on society as a whole. The physical victims of crime incur the direct costs, be it by way of injuries or property loss. Three types of direct cost from crime can be identified *viz.*, personal losses, property

losses and losses from business crime. The indirect costs of crime are the costs due to the prevention of crime, undertaken by potential victims. This may take the form of expenditure on locks, dogs as well as taxes to support crime prevention by the police, court system, etc. Two types of indirect costs can be identified. The prevention cost is the upgrading of personal security for crime prevention and the second is the cost of the criminal justice system. This will include spending on police, courts and correctional facilities. The opportunity cost of crime prevention is the value of the alternative use of resources, currently wasted on crime prevention (O'Sullivan, 1996: 656).

It is assumed that a rational criminal commits a crime if the expected benefit of the crime exceeds the expected cost of the crime. This is, however, only relevant for economically-motivated crimes like property crimes but not for crimes of violence. The decision to engage in crime, depends on the personal circumstances of each individual as well as the risks such individual is willing to take. The following factors may influence the behaviour of the criminal and the levels of crime in an area (O'Sullivan, 1996: 658).

i) The expected loot: The expected value of the crime is the probability of success (P_s) times the monetary value of the loot.

$$EL = P_s.loot$$

ii) Expected cost: On this side, the possibility exists that a person may be sent to prison for the crime committed. The expected value of the penalty for the crime is the probability of being imprisoned (P_i) times the opportunity cost of time spent in prison.

   a) Probability of imprisonment is determined by the police and court system. The probability of imprisonment (P_i) is the probability of being arrested (P_a) times the probability of being sentenced to prison once arrested (P_p).

$$P_i = P_a P_p$$

b) The opportunity cost of prison time equals the annual opportunity cost times the length of the prison sentence. Another cost in terms of opportunity cost is the loss of freedom.

c) Expected cost is the probability of being imprisoned times the opportunity cost of imprisonment.

iii) Expected benefit: The expected benefit from the crime is the expected loot less the expected cost.

iv) Net return from crime: The alternative to crime is to spend time doing a day's legal work. The net return from crime is the expected benefit of the crime less the money to be earned in a legal job.

This model of a rational criminal provides three reasons why certain people engage in committing crimes. Firstly, some people are relatively skillful in committing crimes and escaping punishment. In this case, the expected loot is relatively larger than the expected cost of crime. Secondly, some people have a relatively low opportunity cost of time spent committing crime and time spent in prison and thus the expected cost of crime is relatively low. An unemployed person would have a lower opportunity cost for example. Lastly, some people have less respect for society and are less averse to committing a crime. These people need a relatively small net return to make it worthwhile to engage in crime (McDonald, 1997: 497).

According to Curie (1993) there are four necessary characteristics for a neighbourhood or open area to attract criminal elements.

i) Criminals do not like clean, well-lit areas or neighbourhoods because cleanliness is perceived as a characteristic of a zero-tolerance area.

ii) Criminals need a legitimate cover for presence on the streets eg. a convenience store, bar, etc.

iii) Drug dealers are attracted to areas or neighbourhoods with many poorly supervised children because these children are easy to recruit as salesmen and lookouts.

iv) Markets require a steady stream of customers and provide an easy means of escape.

Crime can be prevented in urban areas using a number of options, although this may not be isolated to urban areas alone (O'Sullivan, 1996: 661).

i) The target can be hardened. Victims can decrease the expected loot by decreasing the probability of a successful crime by installing locks etc.

ii) The police can increase the expected cost of crime by increasing the probability of arrest by employing more police members.

iii) The criminal justice system can increase the expected cost of crime by increasing the probability of imprisonment through more convictions. A more efficient criminal justice system and effective handling of evidence will help.

iv) The criminal justice system can increase the expected cost of crime by increasing the severity of punishment through lengthening the prison sentences.

v) Increasing the value of legal opportunities in an area by increasing the job skills of potential criminals can increase the opportunity cost of crime.

It is important for cities to address the issue of crime because it may force business out of the city as well as prevent potential investors to the city. Residents in urban areas may also opt for safer areas in other regions because of a high level of criminal activity. These combined factors may have a major destabilising effect on an urban area.

8.6 SUMMARY

The demand for labour in an urban environment can be influenced by the relative price of capital. If labour wages increase relative to the price of capital, the demand for labour will be negatively influenced. The demand for products as well as the

productivity of labour will also affect the demand for labour. If an increased volume of sales in both local and export goods can be achieved, the demand for labour will increase through the employment multiplier.

Births, deaths and migration may affect the population growth. The supply of labour to an urban area is positively linked to a high wage rate, relative to other cities. This is the migration effect and may also be caused by environmental quality and public services to mention but a few factors. Unemployed people will also flock to cities due to the prospect of greater opportunities. The possibility of finding a job in a city is perceived higher than in rural areas thus contributing to an increase in the supply of labour. Births and deaths also determine the population growth of urban areas. Various factors like education, birth control, etc. affect birth rates, while better nutrition, improved medical and health services affect death rates. Certain supply push factors and demand pull factors affecting the labour situation in a urban area, were identified.

Lastly, the fact that the urban population is on the increase leads to a higher rate of unemployment and obviously to higher levels of criminal activities. Criminal activity imposes a direct and indirect cost on society and influences business negatively. Cities have to address the issue of urban crime using a variety of options because of crime's critical destabilising effect on economic activity.

It is important to attract skilled labour to an urban area because of the potential stimulating effect on the urban economy. It is therefore necessary to enhance the urban environment so that businesses employing skilled labour will locate. Knowledge spillovers may occur and result in further job creation for the semi-skilled and unskilled to address the unemployment problem. This could reduce the possibilities of criminal activities and contribute to higher levels of economic growth and development.

In an effort to attract businesses and skilled labour, housing needs to be supplied to these people. Housing is an important and valuable asset for any household. In the

next chapter, urban housing is discussed. Decisions of households to locate in specific urban areas could affect the urban environment and surroundings.

CHAPTER 9

URBAN HOUSING

9.1 INTRODUCTION

The purpose of this chapter is to investigate housing as a commodity in an urban environment. Large parts of land use in urban areas are devoted to the provision of housing. Housing is a unique commodity in that it affects a major portion of any household's annual income. It is also an essential component of living standard, comfort, security and social status. People devote large shares of their income and time to housing activities. Much of energy goes into acquiring, financing, maintaining, insuring and repairing homes.

Housing is thus an important and valuable asset for any household. Housing is one of the largest categories of privately-owned assets as well as one of the most durable. In this chapter, housing will refer to any type of dwelling that can be viewed as public-serviced premises. Services will include *inter alia*, water, sanitation, electricity, roads and sewerage. Housing will therefore not include informal settlements without any form of public services.

9.2 HOUSING AS A COMMODITY

The housing stock can be seen as the fixed capital stock that is accumulated for the purpose of sheltering the population. Housing is both a source of consumption and a means of investment. As a consumer, housing services are enjoyed and as an investor, value is accumulated over time. Housing contains aspects of both private and public goods. The aspect of private consumption is clear, while living in a particular location or neighbourhood (and local government) implies decisions concerning public goods. This combination of attributes makes housing a very special and difficult commodity to analyse. Housing services can be thought of as the services implied by the use of the

housing stock. The services that are derived from the stock have two dimensions. The quantity of housing services yielded by the housing stock is normally related to some measure of the physical size of a unit of stock. The quality of services can be related to the amount of satisfaction derived from a given quantity of services (Hirsch, 1973: 46).

Housing is distinguished by five characteristics, *viz*: heterogeneity, immobility, durability, large expense relative to income and high adjustment costs (Bogart, 1998: 275). Many other goods share one or more of these characteristics but none shares all of them. A brief discussion of each characteristic follows:

i) Heterogeneity

One of the first questions facing a prospective homeowner is whether to purchase or rent a house. Once this decision is made, many other competing factors should be taken into consideration. These factors include cost, space, location, appearance, rooms, access to transportation and social composition of the neighbourhood. One of the most important factors is cost and it may be necessary to compromise on the other desired factors due to limited income. A main problem of heterogeneity of housing is that it is very difficult to compare some houses to others.

ii) Immobility

Once a housing unit is constructed it is almost impossible to move and very expensive to demolish or to replace it with some other housing unit. A large element of irreversibility in the construction of housing brings forward the effect of sunken costs and uncertainty on investment. This fact is important because the homeowner/investor wants assurance and certainty concerning recouping sunken costs.

iii) Durability

Housing can last for a very long period of time and expectations about future market conditions will strongly influence decisions by prospective homeowners. The future value of a housing unit may depend on future market conditions and this will to a certain extent determine the potential to sell the house sometime in

the future. The future quality of the neighbourhood should also be seriously considered due to the durability of housing. A lovely open field across the street, zoned for commercial development, may change today's beautiful view into tomorrow's traffic jam. The future quality of a neighbourhood thus determines whether the value of a property will increase or decrease. As mentioned before, property refers to a piece of land with improvements such as a housing unit.

iv) High expense relative to income

This characteristic is self-explanatory. A person will necessarily be faced with trade-offs in the location decision. All the desired amenities will not be in close range due to some sacrifices because of the major expenditure involved in owning a house. If a house is rented, the same type of problem will arise because the better the location in terms of amenities, the higher the rent.

v) Large adjustment costs

It is expensive for a household to move and therefore households will adjust their housing only if the benefit of doing so is very high. If the difference between their current situation and their desired situation is very large, the incentive to move, irrespective of the financial burden, may be high. Many households may not be in their "ideal" housing situation but are close enough to it to render the costs of adjusting (opportunity cost) undesirable.

It is clear that the magnitude and characteristics of the urban housing problem have altered over the years, but as Donnison (1967: 45) has pointed out:

> *The most urgent and harrowing housing needs have remained much the same over the last two centuries, appearing in the form of overcrowding, sharing, ill-equipped and insanitary housing, and the homelessness.*

Therefore, although the details have changed, the fundamental problems remain the same and seem equally difficult to solve in the short term.

9.3 DEMAND FOR HOUSING

The aggregate demand for housing behaves somewhat differently over the short term compared to the long term. Short-term demand is largely a reflection of income and income expectation and of cost and the availability of financing. Long-term demand for housing is related to the size and age distribution of the population, the magnitude and distribution of income and the relative prices of housing services (Hirsch, 1973: 47). The cost of a particular housing unit is assumed to be of two kinds. Firstly, the price of the housing unit itself and secondly, the accessibility costs associated with the residential location as well as the sites to which the household commonly travels.

The rental price determines whether a household will rather rent or buy a house. People who rent are normally low-income, high-mobility people because of the high transaction costs of purchasing and selling a house relative to moving from one rental unit to another (Bogart, 1998: 290). For example, students with a combination of relatively low income and high mobility are almost certain renters. The most important aspect concerning demand is the elasticity of demand with respect to price and income. The relevant income for housing demand is permanent income rather than the income in any given year. The large cost of moving and the major financial commitment and transaction costs when purchasing a house make it unlikely that a household will adjust its housing consumption as often as its annual income changes.

One of the main difficulties in estimating the demand for housing is that a demand curve shows the relationship between quantity demand and price. In the case of housing the quantity demand is not readily observable due to the multidimensional nature of housing as a commodity. The current demand pattern seems to be for more but smaller residences. Although the majority of housing is demanded for the various attributes which it offers to the occupant, there are some exceptions. Property values have tended to keep abreast of inflation over the long run and ownership has consequently been seen as an attractive investment opportunity (Mills & Hamilton, 1994: 227). Related to this is the potential of earning an income by letting the property. The higher

the potential income from a house the greater its attractiveness as an investment. Local governments do not base their estimates of future housing requirements on effective demand but rather on the concept of "need" which is a social concept completely unrelated to price (Button, 1976: 150).

Additional factors explaining housing demand include employment locations, availability of public services such as schools, the quality of the environment both in physical and social terms and the accessibility to other consumption goods (Hirsch, 1973: 49). The concept of residential location is thus related to the demand for housing in the sense that demand for housing in general may be viewed as a given, although the demand for a specific residential location is very important. Various factors influencing the residential location decisions of households (See also Chapter 6) will now be analysed.

The residential location decisions of households are generally based on the attributes of a house and the characteristics of the neighbourhood. Some factors will have a positive influence while others may have a negative influence on the decision to locate in a specific neighbourhood. The neighbourhood is, after all, an extension of one's own house. Neighbourhood characteristics influence the buying as well as the selling price of a house. This in turn determines the value of the property and thus the potential return on investment. Factors influencing prices and values and ultimately the residential location decision will now be listed (McDonald, 1997: 212):

Generally positive effect:

i) Neighbourhood income, size of houses, quality of houses
ii) Employment location
iii) Quality of local school
iv) Physical environment/proximity to a park
v) Proximity to highway interchange
vi) Distance to public transportation
vii) Existence of zoning or restrictive regulation versus their absence

Generally negative effect:

i) Crime rate in the area
ii) Property tax rate
iii) Air pollution
iv) Airport noise
v) Proximity to contaminated areas
vi) Proximity to power plants
vii) Industrial noise
viii) Traffic noise
ix) Location in a floodplain
x) Distance to employment
xi) Distance to shopping
xii) Distance to airport
xiii) Adjacent to railway

Although this is a lengthy list, not all these factors can always be incorporated in the location decision of a household. Five major characteristics, identified by Segal (1979: 214) normally used when evaluating the attractiveness of a residential location, are the following:

i) Physical characteristics of the neighbourhood such as housing structures.
ii) Socio-economic characteristics such as the characteristics of people living in the neighbourhood.
iii) Public services such as quality of schools, roads and local recreation.
iv) Environmental qualities such as topographical features, landscape and weather.
v) Accessibility of the neighbourhood in terms of the sites to which the household commonly travels.

Some neighbourhoods may provide access to services that households do not currently require but may demand in future. This component of demand for residential locations is known as option demand (Hirsch, 1973: 50). Option demand refers to the demand for

the availability of goods and services whether they are consumed or not. Some households will appear willing to pay for the value of certain unchosen alternatives such as a good university that will not necessarily be used. Neighbourhood differences affect the demand of housing services more than the supply of these services.

9.4 SUPPLY OF HOUSING

The aggregate supply of housing is related to prices and quantities of land and other inputs to the production of housing. In the short run, the supply of housing is essentially the existing standing stock. If the demand for housing increases three supply responses are available. New houses can be built, deterioration of some units may be reduced by renovation and remodelling and some units may be moved from one sub-market (high-income) to another (low-income). A firm will construct a house if its value will exceed the construction costs and therefore the highest supply of houses will be where the difference between the value and construction cost is the greatest (Hirsch, 1973: 47). Another important source of housing, overlooked at times, is the conversion of non-housing property such as a school or warehouse, into housing. Government can encourage these activities, since they are important sources of affordable housing for low-income households. Kelly (1993: 147) also argues in favour of government subsidies for the construction of housing for low-income families, because once these are built, people will improve and customise them. One feature common to all categories of housing is the difficulty of increasing the total physical supply in the short term and supply is thus very inelastic over the short term (Button, 1976: 149).

Another method of maintaining the level of existing stock of housing, is the filtering model of housing. The durability of a housing unit increases the probability that several households will occupy it during its lifetime. This makes it possible to analyse it according to a process known as the filtering model of housing. The filtering model is one in which housing is constructed for high-income households and over its lifetime is passed on to ever lower-income households. This model has some important public policy implications (Mills & Hamilton, 1994: 251).

Firstly, it illustrates why constructing new houses for low-income households is sometimes inefficient. The price of these new houses should be affordable to low-income households. If reducing the durability of housing to reduces costs, resources devoted to constructing these houses are wasted relative to constructing more durable housing. This implies a loss to society as a whole. Secondly, this model can be used to argue that the construction of new housing for high-income households may benefit many others. It is important, however, to note that there are transaction costs involved in converting housing from one market to another and the benefits to low-income households depend on a fairly rapid turnover of housing. If the filtering process operates with a substantial lag, the current low-income households may not receive much benefit from current subsidies to housing construction. Lastly, the location of housing, which will be used in the process of filtering, may be poorly located from the perspective of the lower-income people to whom it is supposed to be filtering.

In some cases, the process of filtering is seen as one where some neighbourhoods may slip in status. However, the process does not have to be one of decline only. If the neighbourhood has some advantages, it may be economically worthwhile for a developer to renovate it. Jackson (1985: 286) argues that neighbourhoods have life cycles just as people do, the exception being that neighbourhoods can be renovated. The popular idea of gentrification is an illustration of the potential for revitalisation in deteriorated areas that have locational advantages.

9.5 HOUSING POLICIES

Because housing markets are important and complicated, the door has opened to government intervention. The role of government can be one of supplying housing, enabling low- and middle-income households to own their own homes or encouraging the upgrading of the quality of housing to the level of low-income households. The main difficulty when formulating a housing policy is the complex interrelationships which exist between the various housing sub-markets (Button, 1976: 156). Public housing projects are expensive and complicated and certain problems can arise in designing and

operating public housing. One of the main problems is the location of the planned new housing project for low-income households. Access to public transportation is essential and this seems to dictate that public housing should be close to where poor people live. This approach, however, has certain drawbacks. The first is the disruption caused by demolition and construction. The second, and probably more important, is the social stigma attached to living in a sub-standard neighbourhood. Since some people would want to avoid that stigma, the housing project could become a home only for those with no other place to go.

Another problem that may occur is that only the construction costs are partially funded by government and operating costs and maintenance are expected to come from the new residents. Shortly after the new houses are built, the maintenance costs are low. However, as the housing ages, maintenance costs increase without a commensurate increase in the ability of the residents to finance repairs. This eventually leads to the deterioration of the neighbourhood. The real problem with public housing is that it does not address the true problem facing poor people living in low-cost housing. The true problem is not so much a housing as an income and employment problem. The question can thus be asked: Why do people advocate policies that focus on housing rather than on job creation and increasing income?

Several answers can be given to this question. Firstly, positive externalities may result from consuming better housing. Secondly, the construction industry may benefit from building these houses, using the assistance of poor people as its argument but not really its goal. Lastly, there may be paternalism on the part of the government and the public - "the poor will just squander money" - and that leads to prescribing to people what they are allowed to do with their public subsidies (Bogart, 1998: 302).

Another form of local government intervention in housing markets is that of rent control. This is the practice of imposing a price ceiling on the rental price of housing. This is usually considered negatively as it may lead to income redistribution and lack of a sufficient supply of "affordable" housing. Existing tenants may benefit from this because

they are already in a housing unit and will now pay less for it. However, they may face higher costs due to the reduction in maintenance by property owners since the latter are unable to charge market-related rents. Property owners may also attempt to convert existing rented units from the price-controlled sector to the uncontrolled sector. This may take the form of converting it for commercial purposes or abandoning it altogether. None of these actions will benefit the low-income tenants.

The abandonment of a property means that the housing rent cannot cover the variable costs meaning that the value of the property, less any demolition costs, is zero. No property taxes are collected from the time the property is abandoned and this puts pressure on the budget of local governments. The abandoning of property may cause serious social problems in that it hurts the appearance of the neighbourhood, is a fire hazard and can attract criminals. Sometimes local governments fail to adjust assessed values downward as rent declines, causing abandonment of property. A way to counter the problem of abandonment is the provision of property tax holidays and incentives to property owners, allowing them ample time to renovate and upgrade their property before the reinstallation of current property taxes.

Zoning ordinances often impose minimum lot sizes and other requirements that affect housing. This implies that some households would choose to live in housing of relatively low quality but the local government will not permit this because of concern for the health and safety of the public and the neighbourhood in general. The more affluent a society, the higher it tends to set minimum standards of housing which are considered acceptable (Button, 1976: 151).

9.6 SUMMARY

Housing is a unique commodity in that it provides both public and private good consumption as well as being an investment. Housing is heterogeneous, durable, immobile, expensive and requires large adjustment costs to alter its consumption. People choose to own or rent a house based on their individual characteristics. A

person renting a house is normally from the low-income group or is very mobile. The demand for housing depends on the price of a house as well as the income of a household. Residential location is related to the demand for housing. The residential location decisions of households are generally based on the attributes of a house and the characteristics of the neighbourhood. Factors influencing prices and values and ultimately residential location are physical characteristics, socio-economic characteristics, public services, environmental quality and accessibility of the neighbourhood.

The aggregate supply of housing is related to prices and quantities of land and other production factors used in the production of housing. Three methods of increasing the supply of houses are the building of new houses, renovation and remodelling of existing housing units and the movement of units from one sub-market to another.

Due to the public nature of housing, government intervenes to some extent in various ways to address problems in the housing market. Government's role may be one of supplying housing, enabling households to own their own homes or encouraging the upgrading of the quality of housing. The deterioration of buildings sometimes occurs with rents falling without downward adjustment of assessed values by local governments, causing abandonment of property. Some households would choose to live in housing of relatively low quality but the local government will not permit this because of minimum housing standards.

The supply of affordable housing is one of the main problems faced by local authorities in urban areas. The supply may, however, be addressed over the long term, although a lack of job creation and thus income will still hamper development if not addressed. From a local authority perspective, job creation should be a higher priority because a person receiving an income without a home, is less of a burden than someone with a home without a job.

The high concentration of people in urban areas results in certain negative externalities. In the next chapter a summary of the main externalities culminating from the previous chapters will be analysed briefly, as will policies to address them. The policies should be directed towards creating an environment conducive to economic growth and development.

CHAPTER 10

FUNCTIONAL ANALYSIS OF URBAN ECONOMICS: A SYNTHESIS

10.1 INTRODUCTION

The aim of this chapter is to analyse the most important aspects of Chapters 4 to 9 to view the problems faced by most urban economies. Thus far, it has been seen that various social and economic factors influence the urban environment and the business core. Problems and externalities arising from a concentration of people consuming, and firms producing, in an urban area, should thus be addressed. Although the emphasis will not only be on addressing problems in the inner city, it is essential to address this issue first and foremost in order to eliminate the possibility of a negative spillover effect on the suburban area. These geographical concentrations of production and consumption activities are a complex structure. The economic benefits of agglomeration economies are somewhat overshadowed by several negative externalities and their associated costs. The vitality of an urban economy depends to a great extent upon the balance between the benefits of spatial concentration and the costs associated therewith.

Urban renewal is an important factor in the process of creating a viable urban environment, conducive to attracting new businesses and stimulating increased economic activity. It is, however, important to consider the economic growth theories, analysed in Chapters 2 and 3, and their relevance to the urban environment. These economic growth theories will be matched against and evaluated in terms of the urban environment, analysed in Chapters 4 to 9. The aspects that should be taken into consideration in the formulation of the goals, strategies and policies to address urban decline as well as for the improvement of business activity in the total urban area, will be analysed. These may, however, differ from area to area, depending on the specific needs of the area.

10.2 URBAN ECONOMICS: A SYNOPSIS OF RECENT TRENDS

10.2.1 Urban decay

Whatever the reason for the existence of cities, economic forces are likely to reinforce the original impetus. However, the same economic factors that stimulate outward growth also create problems such as economic decline, urban decay, pollution, traffic congestion and inadequate housing. These problems arise because the urban area can only adjust slowly to changes in the conditions of supply and demand and as the size of the urban area grows, the external cost of more concentration in this area increases and multiplies (Harvey, 1988: 256). A serious deterioration in the overall economic performance of the central city area in several major cities has been witnessed (Button & Pearce, 1989:141). Every individual city obviously has its own unique features but in broad terms the same problems are experienced across the board. These are (Button & Pearce, 1989:141):

i) High levels of unemployment;
ii) high levels of under-employment;
iii) decline in manufacturing output;
iv) slow productivity growth;
v) rising levels of crime and social disorder;
vi) an out-migration of skilled labour;
vii) low average income levels;
viii) a diminution of the local tax base;
ix) an increased demand for various forms of social services; and
x) a serious deterioration in the quality of the local physical environment.

One possible explanation for these trends may be the shift in productive technology leading to pressure to increase the land-output ratio. Established firms seeking more space and new firms favouring more open and spacious sites have left inner cities, leaving the old, small businesses in inner cities to decay. Official urban policies aimed at reducing congestion and pollution, had a more relaxed approach to rezoning

residential areas, with the potential of higher property taxes on commercially zoned properties. This probably added to the decline and resulted in an imbalance in many urban economies. Any generalisation about the reasons for the economic performance of urban areas is a difficult task. This chapter is concerned neither with offering a detailed description of the range of urban problems nor with their initial causes. There is, however, mounting evidence that improved urban quality of life may draw back scarce resources of qualified labour, stimulate the relocation of employment and produce a more diverse base of economic activity. It is also very important to realise that an urban environment does not exist in a vacuum but is itself affected by activities outside of the immediate area.

10.2.2 Changing urban patterns

Cities have undergone several changes in terms of locational patterns. The central business district (CBD) was the place where people who worked in the businesses lived. As the city expands, however, and especially at an advanced phase of urban growth, new development on the urban fringe may become an increasingly attractive alternative to redeveloping the existing central area (Balchin, *et al.*, 1995: 246). Various factors lead to a significant relocation of businesses and households outside of the traditional CBD area. The businesses and people have spread out across the boundaries of the cities and long-distance commuting is in the order of the day. The expansion has not influenced everyone to the same extent. Businessmen who have to interact on a regular basis with many different people keep their offices in the central city. Low-cost floor space has made it more affordable for small businesses to stay in the central city. Large office complexes that require a large pool of workers cannot move easily. On the other hand, businesses that can take advantage of large land and single level floor space move out eagerly. Families who want more space for their children in open spaced areas also leave for more attractive decentralised residential areas. The movement of these people leads to the movement of retailers and eventually wholesalers to service these people. The traditional CBD, as an economic

and residential whole, is now becoming a relatively specialised segment within a rapidly growing area (Wurtzebach, *et al.*, 1994: 55).

Factors that promote this shift from the CBD to the surrounding suburbs are associated most of all with a decline in the income of central areas and with a tendency for this decline to become cumulative. This trend explains itself through failure to maintain property, a widening gap between neighbourhood tax receipts and expenditures on services, out-migration of high-income residents and urban poverty (Harvey, 1988: 256). Locating in a central urban area causes external diseconomies and where such costs are deemed great, economic activity may become decentralised to the outskirts of the urban area. The widely noted movement to suburbs reflects a desire to avoid diseconomies of urban congestion while retaining the benefits of a large metropolitan area. High population densities create congestion and pollution of air, water, noise, space and other environmental elements. These effects occur as side effects to economic activity. The numerous diseconomies combine to generate psychological and social tension, which add to frustration, crime and expense (Haring, 1972: 38). In the suburbs, communities can protect themselves at least temporarily from the rising density patterns associated with the central city area. Economists dealing with urban problems seek to help meet the needs for orderly land use, open space, city transportation and a cleaner atmosphere.

Urban planners believed that the declining urban population in the CBD would produce several benefits such as (Balchin, *et al.*, 1995: 250):

i) Easing the housing shortage;
ii) improving the residential environment;
iii) fewer commuting problems;
iv) more urban open space;
v) less crime and acts of vandalism;
vi) less need for government subsidy;
vii) less overcrowding; and

viii) improved educational attainment.

Unfortunately, quite the contrary occurred, which obviously caused economic decline. Due to this, an urban plan of revitalisation is necessary if any chance of economic survival for these areas is to be expected.

10.2.3 Need for urban renewal

City authorities and businesses have three options when deciding about the future of their urban environment. They can either decide to follow a *laissez-faire* approach; maintain and upkeep existing structures; or they may opt for an urban renewal plan. Although the cheapest option, the *laissez-faire* approach, will lead to urban decline and decentralisation and eventually total urban decay. The second option of maintaining and upkeeping all existing structures may also be relatively cheap, but will probably not attract new businesses and some existing businesses may even choose to leave for greener pastures in suburban areas.

A deliberate effort at urban renewal and revitalisation driven by city leaders is thus necessary to retain and gain businesses with the purpose of increasing urban economic growth. Although the term urban renewal generally refers to the redevelopment of residences, it may also refer to the development of other problem areas such as industrial redevelopment, upgrading of downtown areas, promotion of university and hospital centres and the creation of the so-called new-towns in town. Urban renewal covers three types of programmes, *viz.* rehabilitation of sub-standard structures to a prescribed minimum standard; conservation in order to upgrade an area by protecting buildings worth preserving; and redevelopment which refers to the demolition, clearance and reconstruction of buildings that have become obsolete (Button, 1985: 152).

In addition, urban renewal is seen as (Grebler, 1965: 13):

> *A deliberate effort to change the urban environment through planned, large-scale adjustment of existing city areas to present and future requirements for urban living and working.*

An aspect that should be kept in mind is the individual structure and the behaviour of the individual property owner. Most buildings can be maintained, provided that the owners are willing to undertake the required maintenance expenditure and that it is economically viable due to active economic activity. It is therefore true to a certain extent that building structures decline in quality because owners permit them to do so. One of the determinants of the market value of a particular property is the quality of the neighbourhood in which it is located (spillover effect). An owner thus obtains the highest return from his/her property if it is undermaintained while others in the area are well maintained. Conversely, a lower return is received if the building is maintained while the rest of the neighbourhood is deteriorating. In this case it will only be beneficial to the property owner to maintain his property if the adjacent properties are also upgraded. If this is not done, further investment will be discouraged and deterioration will spread (Richardson, 1971: 128).

The overall decay in areas containing redundant buildings and where improvement has been neglected, may lead to an even further decline. New investment may also be considered too much of a risk and owners of existing buildings may decide not to keep up essential repair and maintenance work. This may produce a short-term increase in returns but over the longer term buildings may tend to decay even more quickly. Although it could be in the interest of all owners to invest in maintenance, such investments may nevertheless fail to occur. This may be due to the fact that any single investment will probably have little overall impact on property values in general in the area and since they cannot be sure that others will follow, it is likely that no owners will invest (so-called prisoner's dilemma) (Balchin, *et al.*, 1995: 246). In the case of housing, slum formation is the ultimate result. Unrestricted urban growth may cause

urban sprawl and increased congestion with resulting reduced incentives for urban renewal.

A crucial feature of urban renewal is the involvement and participation of local government. A policy for dealing with the problems of urban renewal should be based on four salient features, which are all interrelated (Harvey, 1987: 261):

i) the general aspects of physical decay;
ii) the poverty of its inhabitants;
iii) its economic function of providing relatively affordable housing close to employment opportunities; and
iv) an outward movement of both households (particular those of the skilled) and firms to more attractive areas.

However, governments have been hesitant to prepare renewal plans and where they have drawn up such plans, these have been constrained by financial criteria. Often, the cheapest renewal plan was accepted and implemented regardless of the potential benefits and level of success. Urban renewal plans should stand or fall on the success of their attempts to stimulate the revival of business activity (Mills, 1972: 188).

The decline of urban areas may be eliminated by large amounts of investment by either public or private sector or both. This may have the following beneficial effects (Balchin, *et al.*, 1995: 251). Firstly, a more efficient allocation of resources will result. Less wastage of land will occur because land will be optimally utilised. Some of the decayed residential land will be converted into commercial and industrial land and vice-versa. Unemployment rates will decline and rising income levels and property values will lead to a spillover effect into the surrounding area. Secondly, considerable social benefits will be derived from such an initiative. A healthier and higher paid labour force will result in higher levels of productivity and less deprivation will almost certainly reduce the cost of providing welfare services. A final, very important aspect is the potential redistributive effect of urban renewal. Higher levels of income and increased economic

activity will widen the tax base and these improved levels of revenue will enable local authorities to provide better services. Renewal tends to reduce the demands on medical, police and fire services which are normally higher in the CBD areas than in the surrounding urban areas (Button, 1985: 153). An urban renewal project often serves multiple goals, such as profitability on private or social account, benefits to city tax revenues, the demonstration effect of setting new urban standards in design and long-term income gain for the city population.

These benefits, however, will only be realised with considerable costs incurred. Urban renewal projects are costly and may take several years so that the costs and benefits at the end of the project may differ substantially from those estimated at the outset. The financial costs include, *inter alia*, research; survey and planning costs; administrative expenditure; the cost of acquiring decayed property; demolition costs; the cost of public and private developments and relocation costs. Urban renewal may also decrease land values in some parts of the metropolitan area by transferring activities to the renewal site. In addition to the financial costs, there are social costs to consider. If people are forced to move it may break up existing community ties and the removal of people means the loss of the option of living in poor quality but affordable accommodation which some people may actually prefer (Mills, 1972: 188). By identifying and quantifying the benefits and costs of renewal investment carefully, cost-benefit analyses should be undertaken and renewal projects ranked in order of the greatest net benefit as a guide to decision-making.

The importance of the economic growth theories, explained in Chapters 2 and 3, will now be evaluated in terms of the specific urban features analysed in Chapters 4 to 9, to address urban renewal and the stimulation of business activity within urban areas. This is to determine the relevance of these growth theories in an urban environment in order to generate economic growth and development and enhance quality of life.

10.3 ECONOMIC GROWTH THEORIES

The Harrod-Domar theory states that the level of savings and investment are crucial for economic growth and development. This is especially true for any developing economy, although not necessarily untrue for a developed economy. As it was assumed that urban areas within developing economies might differ in degree of development, the level of savings and investment is thus an important feature for urban growth and development. In the case of urban renewal, increased levels of savings and investment are vitally important. This can be seen as the first stage of urban renewal and will serve as a catalyst for further urban improvements and renewed business activity. To attract new businesses and highly-skilled people, amenities should be improved and increased levels of available savings could support high levels of investment.

Developing and renewing an urban environment will also need other forms of intervention. Solow accentuates the presence of three factors, *viz.* capital, labour and knowledge or efficiency of labour, in order to generate economic growth and development. Knowledge is seen as exogenous and any increase in economic growth that cannot be associated with the stock of capital and labour is attributed to the so-called Solow residual. Although Solow could thus not explain the factor generating a major portion of growth, he laid the foundation, emphasising the importance of knowledge as a contributing factor to economic growth. Although the importance of capital and labour in generating growth and development in a developing country are not negated, the knowledge factor is crucial for economic growth and development due to its endogenous nature. Solow paved the way for Romer's endogenous growth theory.

Romer developed his endogenous growth model by introducing four variables, *viz.* labour, capital, technology and output. The two sectors used in his model explain a goods-producing sector where output is produced and a R&D sector to enhance the stock of knowledge. The first sector primarily uses labour and capital to produce output but may be subject to diminishing returns in the long run. The second sector

emphasises the importance of enhancing R&D to generate knowledge, which will ensure increasing returns to scale. Both these sectors are necessary for growth and development within developing and developed economies.

It is interesting that the growth theories of Harrod-Domar, Solow and Romer can all be adapted for economic growth and development needs within an urban environment. It is important to realise that although the level of development may vary between urban areas, the principle of all three theories can be applied to urban areas. Seeing that an urban area is the powerhouse of an economy, savings and investment (Harrod-Domar), capital, labour and knowledge or efficiency of labour (Solow) or labour, capital, technology and output (Romer) are best generated within urban areas. Some variables will be more important for developing economies than for developed economies, but none of these variables can be fully ignored, irrespective of the level of development. The existence of agglomeration economies is fundamental to the economic explanation of urban economic growth.

Agglomeration economies refer to the advantages of spatial concentration because economic activities are located in one place, such as the urban environment. A distinction within agglomeration economies is between localisation (when firms benefit from being close to other related firms) and urbanisation (when firms benefit from being located in a large city, even though the firms may be unrelated). Both types can be static or dynamic. Referring back to equation 4.1 [Q = A(z,t)F(K,L)] in Chapter 4, z is a collection of factors that create agglomeration economies, t the level of technology and F(K,L) the function of capital and labour. Static agglomeration economies imply that a larger urban area may have a better and cheaper form of air transport (the z factor), which will create a once-off increase in A(z,t) and thus a once-off decrease in the cost of a particular industry. Dynamic agglomeration economies imply that the level of the agglomerative factor is associated with a continuous increase in the output of a particular industry. More inventive innovators will be available in a large urban area that will create this continuous flow of technological change which exceeds that of smaller areas. The size of the urban area (the z factor) causes technology (the t factor) to

increase continuously with a positive effect on economic growth. This technological change means that a firm applying new technology can produce more output with a given amount of capital and labour. Technological progress is therefore seen as internal to this particular firm. At the centre of dynamic agglomeration economies is the production and use of knowledge. From a static point of view, agglomeration economies can stem from labour specialisation, for example. In a dynamic sense, however, continued reductions in costs is necessary and the rate of innovation will increase if more highly-trained people engage in R&D, causing a greater rate of new product development, improvement of existing products and improvement of production methods. This will be generated in urban areas more so than in non-urban areas. Knowledge spillovers are more likely to occur if innovators are in close proximity, and a diversity of industries may be more stimulating to the generation of new ideas than the size of an individual industry.

Local urban authorities should use these theories and variables as a basis for creating an urban environment conducive to economic growth and development and thus to enhancing quality of life. To create such an environment, authorities need to develop and implement effective and efficient urban goals, strategies and polices. Although the development of these urban goals, strategies and policies is important, a framework in which these can be developed and implemented is still needed. The Economic System Approach (ESA) is used as a framework because of its complementary vision in terms of a people-centred and endogenous approach. The local authorities consist of people, and the ESA provides an institutional and organisational framework within which these people's capabilities can be enhanced to empower them for this most important job. Chapter 11 will again refer to the ESA and its contribution to creating such an environment and enabling the economic agents.

10.4 SUMMARY

The same economic factors that stimulate increased growth in urban areas also create problems such as economic decline, urban decay, pollution, traffic congestion, crime and inadequate housing. Cities have undergone several changes and the CBD has

changed as a place of work and residence to a place where urban decay increasingly occurs. As cities expand, new development on the urban fringe becomes an increasingly attractive alternative to redeveloping the existing central area. The extensive movement to suburbs reflects a desire to avoid diseconomies of high population densities that create congestion and pollution of air, water, noise, space and other environmental elements. A deliberate effort at urban renewal and revitalisation driven by city leaders is thus necessary to gain and retain businesses with the goal of increased urban economic growth.

The revitalisation and renewal of an urban area is important and the economic growth theories, which are complementary to the notion of agglomeration economies, may be introduced to address these issues. Although all variables explained by Harrd-Domar, Solow and Romer contribute to urban economic growth and development, knowledge is the single, most important, all-embracing factor for the stimulation of increasing economic returns. This endogenous factor should deliberately be stimulated within urban areas due to its potential continuous impact on urban economic growth and development.

Local authorities should therefore engage in a planning exercise to develop and implement urban goals, strategies and policies to address urban problems. The purpose of the next chapter is to give guidance towards the development of such goals, strategies and policies.

CHAPTER 11

POLICY FRAMEWORK FOR URBAN DEVELOPMENT

11.1 INTRODUCTION

The purpose of this chapter is to describe the various goals, strategies and policies for urban economies. The decisions made by the urban authorities will inevitably affect the inhabitants of a specific area. This may be a household living in the area, producers producing goods and delivering services, as well as the unemployed in the urban area. These decisions are generally made on the basis of rational decision-making with a strong self-interest in the area after consideration of the costs and benefits. It is thus important for local governments in urban areas to set the goals, develop the correct strategies and implement complementary policies.

The majority of local urban authorities will normally try to achieve sustainable economic growth and development within their urban environment. There is generally an agreement regarding the broad outlines of how the economy should operate, but there may be some disagreement concerning specific details and policies. Economics is sometimes seen as the science of values, with choices being the observable reflection of values.

11.2 GOALS OF URBAN ECONOMIC DEVELOPMENT

The goals of urban economic development can generally be directed towards an expansion of the tax base and the creation of jobs (McDonald, 1997: 404). However, macro-economic policy describes the importance of economic aggregates such as economic growth, employment, balance of payments, price stability and equity. These five macro-economic aggregates influence the welfare of the population. The attainment of target levels serves the interests of everyone and is thus an important goal in an urban environment too.

Economic growth as a goal is very important for any urban area and although it indicates the level of production it is more correct to regard growth as the expansion of productive capacity. The goal of a growth-inducing policy should be to obtain optimum rather than maximum growth. Optimum growth implies that the optimum balance between present and future consumption is established. Sometimes government attempts to perform the functions of investment and production, which often turns out to be inefficient. Government is not primarily geared towards these tasks and should best facilitate these functions, then leave them to the entrepreneur who strives for profits and faces the risk of failure, both of which are incentives for efficiency. The local authority would therefore be interested in attracting economic activity because these added tax revenues expand the local authorities' scope to improve the provision of services and possibly enhance their political stature.

The goal of employment is understood to imply that the population of working age is employed, or it could refer to the absence of unemployment. In addition to the direct benefit of employment, the increase in employment, output and income may have a multiplier effect on the local economy. The main goal would be to address structural unemployment, which is characterised by the co-existence of vacancies and unemployment. The unemployed cannot fill the posts due either to a lack of mobility or inappropriate or no training. The remedy may thus be to improve the mobility of labour through accessible and reliable public transport, or to provide training to suit the requirements of the vacancies. However, both remedies are time-consuming and costly. About the best thing that can be done for poor people in an urban environment is to increase overall employment.

The goal of attaining price stability implies the maintenance of price stability, or the combating of inflation. A sustained increase in prices should not be confused with a once-off increase in prices such as municipal rates. Consumer prices are subject to taxes levied and subsidies offered by local authorities and therefore serve to increase (taxes) or decrease (subsidies) the price consumers pay for commodities or services. The inflation rate is thus subject to policy decisions about taxes and subsidies and

affects the disposable income and ultimately the welfare of the population. Policies should thus be formulated to combat inflation.

The goal of balance of payments stability implies that consistent and large deficits or surpluses on the balance of payments should be avoided. This stability does not require that a deficit or surplus never arise, but that these should, however, be moderate and not chronic. It is important for a growing urban area to experience a net inflow of funds (surplus) to supplement existing resources to increase productive capacity.

One of the basic goals for any economic policy should be to strive for equity in the distribution of income. It should be the goal to move toward a Pareto-optimal allocation of resources i.e. to increase the welfare of someone without reducing the welfare of anyone else.

In any urban environment the attainment of these macro economic goals is vitally important. The agents responsible for reaching these goals, *viz.* the local authority, business chambers and labour unions, should thus be of a certain calibre and possess certain qualities. The quality of management of the responsible agents should be infallible in order to reach these goals. Management should follow a transparent policy approach, which is also accountable and consistent in policy implementation. All data systems need to be updated and the creation of joint business forums between the responsible agents may improve efficiency of communication. All economic, social and environmental elements should be integrated and private/public partnerships promoted. Failure to develop and set in place a well-structured marketing plan, will most certainly lessen the chance of realising ultimate success. The city needs to be positioned in terms of other cities and differentiated from other cities. Without a marketing plan, the city will just be the same as any other city with no future vision.

Although the attainment of these goals is vital, certain conditions should be sustained to increase the possibility of achieving success. The Economic System Approach (ESA) may provide the vehicle for addressing some of the issues in reaching success.

11.3 URBAN DEVELOPMENT: A THEORETICAL FRAMEWORK

11.3.1 The Economic System Approach*

The Economic System Approach (ESA) as a theoretical framework highlights the importance of investment in human ability to participate in economic growth and development. This is also in line with the reasoning of Solow and Romer and again emphasises the importance in human capital investment. The latter is of great importance as the demand for labour is related to the required level of production and people thus act as catalysts for economic activity. This view as to what stimulates economic growth has only recently been acknowledged by the introduction of endogenous growth models by Romer (Todaro, 1997: 90), and the work of the Institute of Developing Economies (IDE), on what is known as the ESA (Yanagihara & Sambommatsu, 1997). By contrast to the conventional neo-classical approach, the ESA focusses on the strengthening of organisational capabilities. It views the market not only as a pure mechanical process but also adds to the importance of inter-relationships among agents operating in the market. Markets are therefore shaped and reshaped by the interaction amongst these market participants. Furthermore, factor-endowment is not perfectly malleable but exists in distinctive forms and contexts which are embodied in, mediated and co-ordinated by expertise acquired through learning. This learning process occurs by experience within specific organisational setups and arrangements between firms (Yanagihara, 1997: 11).

* Printed by permission of the authors

The radicalism of this process is accentuated by Sen (1988: 47, 48):

> *A major failing of traditional development economics has been its tendency to concentrate on the supply of goods rather than on ownership and entitlement. The process of economic development can be seen as a process of expanding the capabilities of people and the expansion of entitlements.*

This view of Sen is proliferated by the ESA, which draws attention to the technological and managerial capabilities of economic agents (subjects/decision-makers), while markets refer to the relational arrangements among them. Decision-making and action by subjects to establish and change the interrelationships between them, create and develop markets. The ESA revolves around building the productive capacity of subjects by focussing on their personal capacities (education, training and health), and developing the infrastructure within which they operate. This is done to enhance the processes of production and employment in such a way that the subjects consider themselves participants in the process and not mere recipients or spectators. The infrastructure referred to comprises an institutional, physical and social framework, surrounded by the natural environment. These, the building blocks of the process must be of a certain character and quality. They need to be revised and adapted continuously to ensure sustained growth and development. The subjects, who drive the process and cause the changes to occur, must also possess certain capabilities. The productive capacities of the subjects and a smooth-running, production-enhancing process (dynamic relationships) within a supporting institutional, physical, social and natural environment have to be developed. The private subjects are the active players, while the government promotes, supports and deals with failures or breakdowns in the system and the capacity-generating process. Economic growth and development is therefore a joint process driven by all these subjects (Yanagihara, 1997: 8-13).

The ESA facilitates the integration of a multitude of processes and the diverse nature of human behaviour. It is descriptive, and focusses on people and their capabilities in the

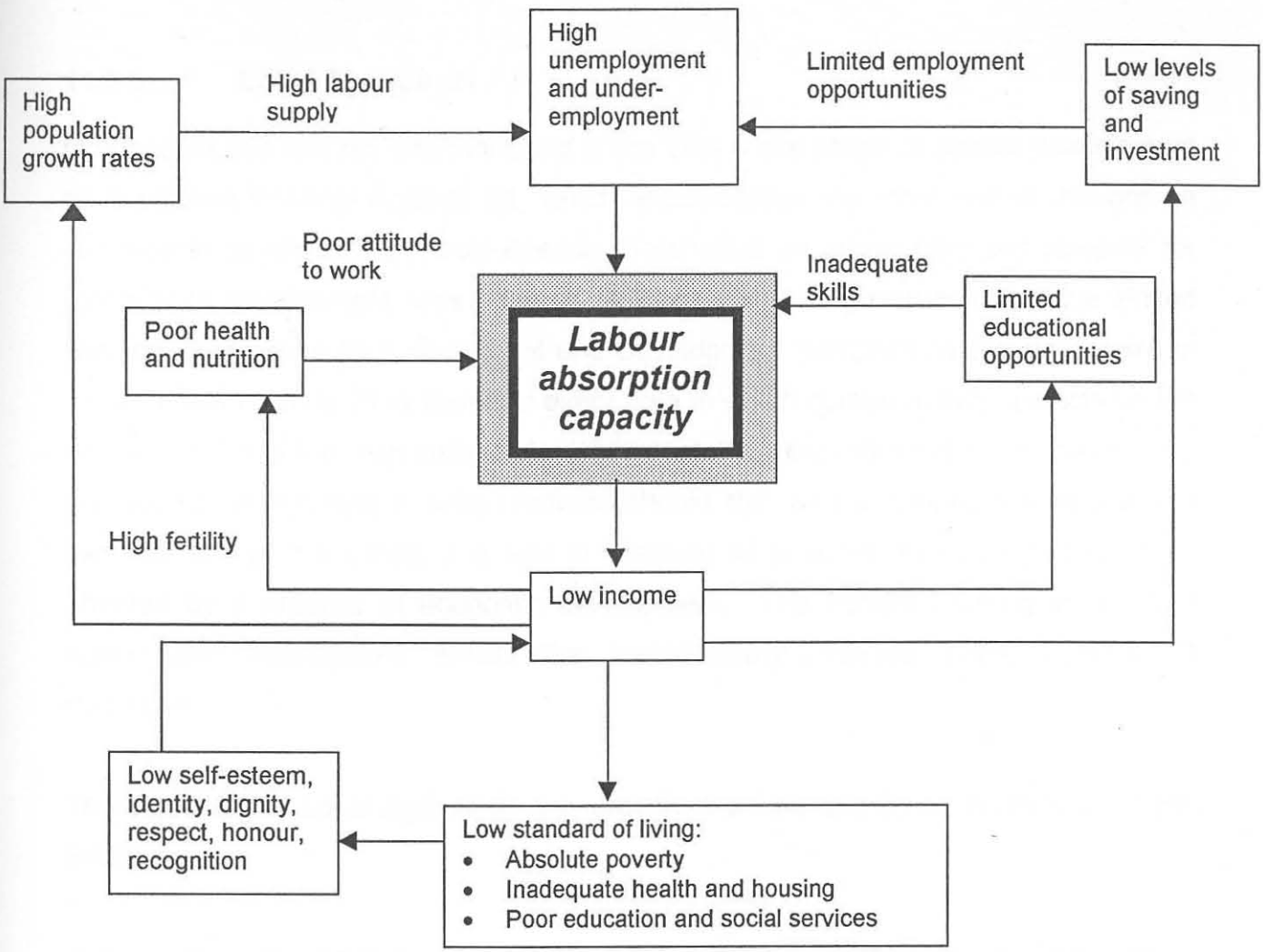
interests of progress, rather than on techniques and models. The ESA recognises that the structure of society is complex - a fact which development theory, policy and practice must take into account. It captures the diversity of the participants by postulating that markets are an integral part of the diverse economic and development process. Society and the economy are determined by relationships that can vary in all possible ways, allowing each society its unique features (De Wet, Harmse & Blignaut, 1997: 365). By recognising these complexities and diversities, it is possible to create an environment conducive to development. Markets are therefore not neutral. The government must provide the institutional, legal and policy frameworks for subject-driven development. There is little room for clear-cut, formal, and rigorous policies (fine-tuning and the like). An application of the ESA constitutes a decisive paradigm shift from past practices. The ESA moved away from the mechanistic and deterministic conception of economic growth and development (Yanagihara, 1997: 16-18). The ESA therefore focusses on the process of human development by means of capacity building, and the strengthening of relational arrangements among subjects due to investment rather than the act of investment itself. Human and infrastructural development as well as capacity building implies an improvement and upgrading of the socio-economic environment of a country.

The question which the ESA poses is how the capacity of, and relationship between, economic agents can be strengthened and developed and their entitlement expanded. The development of an institutional environment as part of an infrastructural development programme can promote, and has indeed promoted, the process of building capacities and relationships, and enhances economic growth and development. Infrastructural development comprises both the physical infrastructure (eg. the sustainable use and development of natural resources and man-made capital) and a social infrastructure (eg. health, housing, financing and other institutions rendering services) (De Wet, Harmse & Blignaut, 1997: 366). Modern endogenous growth models accept that investment in private and human capital encourages external economies and productivity improvements, both of which offset the natural tendency towards diminishing returns. The implication is that investment in human capital could result in returns to scale and therefore economic growth and employment (Yosida, 1998: 357; Todaro, 1997: 92).

While the new growth theories stress the importance of the link between human development and growth, the United Nations equates human development with the improvement of the socio-economic environment (United Nations, 1996: 11-28). Furthermore, an improvement in the socio-economic environment improves productivity, which in turn promotes growth and employment (United Nations, 1996: 75; 86). The following schematic presentation reflects the linkages between the socio-economic environment and labour absorption which are derived from the required level of production. Note that the concept *labour absorption* in this study represents the capability of the economy to accommodate or employ new entrants into the labour market every year.

Figure 11.1 shows that the low labour absorption capacity of the economy is a multi-faceted problem with a large degree of interdependence between both the supply and demand for labour, the socio-economic environment and the efficiency of the real sector of the economy. On the one hand, unemployment is fuelled by high rates of population growth which, in turn, are affected by low levels of income. The low level of labour absorption, low self-esteem and a low standard of living affects unemployment. These factors not only depict but also influence the nature of the supply of labour. On the other hand, unemployment is fuelled by the inadequate demand for labour due to the low rate of economic growth, which is the result of, *inter alia*, low levels of saving and investment. The latter is the result of low levels of income which also contribute to limited educational opportunities, inadequate skills and a further dampening of the labour absorption capacity of the economy (Todaro, 1985: 88-91).

Figure 11.1: Relationship between employment, growth and the socio-economic environment



Source: Adapted from: Todaro's model of underdevelopment (Todaro, 1985: 89).

These demand side factors have a serious quantitative impact on the number of people that can be absorbed by the economy not only in the short term, but also in the long term, since neither human nor industrial capacity is increased. The factors influencing the supply and demand for labour, however, do not operate in a vacuum, but are interactive. This is indicated by the fact that low income also contributes to poor health and nutrition.

11.3.2 Local Agenda 21

One aspect that has not been included in the ESA is the notion of spatial development as illustrated in Local Agenda 21, which encompasses the most recent thought on sustainable development. Local Agenda 21, which is an action plan and blueprint for sustainable development, was adopted by more than 178 governments at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992. Local Agenda 21 is aimed at every area in which human activity impacts on the environment and the responsibility for implementation rests with the government. Any process of development or urban renewal should start with a comprehensive planning exercise and in this sense, it is vital to integrate all possible elements that could be affected by a process of economic development. The current thinking in terms of sustainable development entails the internationally-endorsed Local Agenda 21 document.

The objectives of Local Agenda 21 are, broadly, the following (Local Agenda 21, 1998: 6-16):

i) Fostering international co-operation to accelerate sustainable development in developing countries through:
   - promoting sustainable development through multilateral international trade;
   - making trade and the environment mutually supportive;
   - the provision of adequate financial support to developing countries; and
   - encouragement of both domestic and international economic policies conducive to sustainable development.

ii) Combating poverty as a priority by:

- enabling poor communities to achieve a sustainable standard of living.

iii) Changing unsustainable consumption patterns by:

- bringing about a more sustainable pattern of consumption; and
- developing and implementing policies to encourage sustainable production and consumption.

iv) Addressing demographic dynamics by:

- informing people about the negative link between demographic trends and sustainable development;
- integrating policies for environmental, development and demographic trends; and
- introducing population programmes, natural resource management and development programmes directed towards improving quality of life, ensuring sustainable use of natural resources and enhancing environmental quality.

v) The protection of human health conditions by:

- implementing a primary health care system;
- control and prevention of diseases;
- protection of vulnerable people;
- meeting urban health needs to improve their contribution to economic and social development; and
- minimising environmental hazards and pollution.

vi) Improving and promoting sustainable human settlement by:

- providing adequate shelter for the deprived urban and rural poor;
- ensuring sustainable management of all urban settlements;
- promoting sustainable land-use planning and management;
- providing adequate environmental infrastructure for water, sanitation, drainage and solid-waste management;

- providing more energy-efficient technology and transport systems in human settlements;
- ensuring effective planning and management in disaster-prone areas;
- promoting a sustainable construction industry while avoiding harmful side-effects on human health; and
- promoting human resource development and capacity building by enhancing the personal and institutional capacity.

vii) Integrating decision-making concerning development and environmental matters by:

- combining policy, planning and management of development and environmental issues;
- implementing appropriate legal and regulatory policies, instruments and enforcement mechanisms;
- including environmental costs in production processes to reflect relative scarcity and total value of resources; and
- expanding national economic accounts in order to integrate environment and social dimensions.

The idea is to reverse current policies that increase poverty, hunger, sickness, illiteracy and degradation of the ecosystem. The main objective should thus be directed towards the achievement of sustainable development, which requires the integration of the economic, social and environmental elements. Now is an appropriate time to explore the various strategies and policies for achieving urban economic growth and development.

11.4 STRATEGIES AND POLICIES FOR URBAN DEVELOPMENT

11.4.1 Urban strategies

A strategy is a plan for reaching a specific goal and can be classified, in an urban sense, as business attraction, business retention or local business growth (McDonald, 1997: 414). A set of activities is used to support different strategies. A local urban authority may pursue three kinds of economic development strategies *viz.*: (a) do nothing, (b) try to draw firms from other local economies and (c) engage in efforts to assist existing firms in the local economy to grow and expand and attract new businesses. No local authority can follow a *laissez-faire* approach in such a dynamic environment and different strategies to attract new business enterprises towards the local economy may lead only to moderate success. Instead of focussing on attracting new business enterprises to the local economy, the most productive strategy may well be to concentrate on existing local enterprises that are actually located within the local economy's boundaries and are not planning to move away. Effort is still devoted to business attraction and business retention, which obviously remains a high priority, but the focus would shift to existing firms. This would, if successfully implemented, inevitably lead to the attraction of new firms to the local economy. It seems that an industry in an urban economy will grow more rapidly if it produces a product that is in demand, is competitive, is already of some size in the urban area, is located in a larger urban area and is surrounded by a diverse collection of industries (McDonald, 1997: 339).

A second way of classifying economic development strategies is by means of drawing a distinction between a sectoral and an area strategy. The aim of a sectoral strategy is to identify industries or groups of industries that can be promoted to achieve set goals. Policies are then designed to support and enhance the growth of these target industries. An area strategy focusses on a specific geographical area on the basis of needs of its residents. New policies are now designed to improve the economic prospects of these residents in specific areas that need special economic attention.

It is important to build the capacity of local authorities to enable them to take responsibility within their areas of jurisdiction. Urban areas are the productive heart of the national economy and home to the majority of its inhabitants. Urban areas are therefore vitally important in alleviating poverty, creating a more equitable society and enhancing international competitiveness.

11.4.2 Renewal options

A major shift of emphasis in government policy is necessary in order to address the process of revitalisation in urban areas. Options to consider are the following (Balchin, *et al.*, 1995: 251):

i) Filtration

This is based on the out-migration of households and employment followed by the clearance and redevelopment of vacated sites. It is potentially the most system-oriented of the approaches. A filtering process which increases the supply of low-cost housing may occur, but there may come a stage at which the pressure of demand from low-income groups places considerable pressure on this stock. As a result, overcrowding becomes a problem, rents soar, housing requirements are adapted to temporary needs and the pace of housing renewal basically comes to a halt. The reason is that property owners have no problem finding tenants, and owners thus they have little incentive to improve and maintain buildings in an increasingly decaying environment. The filtering process may delay the process of redevelopment substantially and the situation of accumulative decay may eventually spill over into neighbouring areas.

ii) Social planning

This is traditionally regarded as being less important and secondary to physical and economic planning. Social planning focusses more on people than on urban space or property and should therefore first be analysed to determine the cause of the deprivation.

iii) The boot-strap strategy

This involves the rehabilitation mainly of housing and should not imply the movement of occupants. Important factors to take into consideration are the interest rate, the expected life span of the rehabilitated property and the difference in the running costs between new and rehabilitated properties.

iv) Replacement

If a redevelopment scheme is selected, many social problems such as dumping grounds or informal housing may arise, especially if redevelopment does not occur immediately after clearance. It is therefore essential that, not only for economic reasons, schemes be carefully selected, priorities determined and work sensitively programmed.

v) Guiding urban growth through investment

This method combines the replacement strategy with market forces. Areas are ranked initially according to their renewal potential and the related infrastructure will be improved, whereafter private investment is attracted. These are the so-called new towns in town or enterprise zones. A mismatch, which should be guarded against, sometimes occurs between the characteristics of the inner city and the investment criteria of investors and occupiers. Inner cities have a high concentration of unskilled workers, derelict physical infrastructure, fragmented property interest and an uncertain economic base. Investors require a stream of income, a rental rate to hedge against inflation, a long leasehold, little onerous management involvement and a property in a satisfactory environment. These are usually not available in inner cities and should be provided because they will certainly be available in the suburban areas.

vi) A local government strategy

Local authorities should be increasingly open to a bottom-up approach rather than a top-down approach, as a solution to the problems of inner cities. In this case a policy of positive discrimination in favour of local firms by awarding contracts to ensure that the local multiplier is not reduced by leakages out of the area, may be applied.

vii) A co-ordinated strategy

A co-ordinated inner-city policy is necessary to hasten the pace of urban regeneration. Factors that are important are a comprehensive and ambitious vision for the selected area, full and effective partnerships between public and private sectors, participation of the local community and efficient arrangements for implementation and delivery.

11.4.3 Policy-planning package

The role of the local urban authority should be to develop a policy package to promote and facilitate rather than control economic growth. The development of leadership is vital and must encompass a commitment to credibility, accountability and consistency in policy implementation. The leadership should create opportunities rather than react to problems. The focus must be on creativity, with a well-defined domestic and international vision for the urban area's future. An urban local authority should identify and expand its area's comparative advantage and enhance its infrastructure, capital assets and human resources. This identification and expansion should be based on well-informed decisions and directed towards the implementation of a realistic action plan. Service delivery should be of high quality and standard, and residents should be seen as customers. A progress evaluation programme should be in place to ensure continuous objective evaluation. Any adjustments to the action plan could then be implemented immediately with the minimum effort. Success should be measured in terms of results rather than inputs.

The choice of a policy package relates directly to the goals and objectives as well as the economic development strategy of the local authority. The goals, strategic priorities, policies and policy objectives and possible actions could be adapted and customised for the unique needs of each urban area. A framework for the enhancement of the city image, within which the strategies and policies could be implemented, is presented in Table A1 as part of Annexure A. According to this framework, local authorities should

divide the urban area into six different identities to ensure a holistic approach. These identities would describe the social/demographic, natural, geographic, cultural, urban and infrastructural identity. This description would have to be based on various urban levels, *viz.* the metropolitan, city, district, precinct, neighbourhood and street-block level.

With this description completed, several options in terms of an urban sectoral policy-planning package may be considered. If the goals and objectives are taken into consideration, the policies are therefore the individual actions or elements that support the strategy. An overlap of sectors may also occur, emphasising the importance of a holistic approach by local authorities. The various sectors should thus not be seen in isolation, and planning should be an integrated process. In this way a synergy between urban sectors may be established to create spin-offs. Each of the nine main economic sectors will be discussed briefly in terms of goals for the urban environment. A condensed table with specific references to goals, strategic priorities, policies and policy objectives, and possible actions will be presented in Table A2 as part of Annexure A.

The agricultural, fishing and forestry sector is classified according to the Standard Industrial Classification (SIC) of Economic Activities by the code number 1 000. In terms of urban policies the greater emphasis would be on urban agriculture rather than forestry or fishing-related activities. The main challenge to urban authorities would be to develop the urban periphery in such a way as to prevent excessive dependence on urban structures. If services between the periphery and urban core differ substantially, a pull-effect towards the urban core would occur with a concomitant negative spill over and increased degradation of the urban periphery.

The mining sector, according to the SIC of Economic Activities, is classified as industrial code number 2 000. In terms of urban policies, mining activities normally do not form part of an urban environment, although there are exceptions. In such a case, urban authorities would be faced with the same challenge as in the case of the previous sector, i.e. to develop the urban periphery in such a way as to prevent excessive dependence on urban structures. If services between the periphery and urban core

differ substantially, the same negative spill over and increased degradation of the urban periphery will take place.

The manufacturing sector is classified according to the SIC of Economic Activities by the code number 3 000. The goal of local authorities would be to focus on the comparative advantage of its urban environment. This would lead to increased specialisation with the result of attracting highly skilled individuals to the city, with increased agglomeration economies. Local flagship projects normally generate confidence and attract private-sector investment. The intention of local authorities should be for immediate action and visible results.

The electricity, gas and water sector is classified according to the SIC of Economic Activities as code number 4 000. The challenge to local authorities would be to make electricity and water accessible to all residents within the urban area, with the emphasis on high-quality service delivery.

The construction sector, according to the SIC of Economic Activities, is classified as industrial code number 5 000. In terms of construction, local authorities should concentrate their efforts on effectiveness and minimum wastage of resources. The construction of roads, sewage, water facilities, etc., should also be integrated with ecological land-use planning. It is important to classify areas of environmental importance to define a hierarchy of important areas where different levels of requirements for development are applicable. The more valuable an area with regard to environmental resources, the stricter the development requirements. The areas should be classified according to the following zones: standard zones; low sensitivity zones; medium sensitivity zones; high sensitivity zones; and special sensitivity zones.

The trade (retail and wholesale) sector is classified according to the SIC of Economic Activities by the code number 6 000. Local authorities should ensure a viable trade environment with political stability, and consistency of policy implementation to establish credibility amongst business people. Businesses should not be constrained by unnecessary and excessive local regulations. The revival of business activity will ensure increased tax revenues to the local authority.

The transport, storage and communications sector is classified according to the SIC of Economic Activities by the code number 7 000. An efficient and accessible transport system to all would most likely be the main goal of a local authority. Given the fact that the majority of residents may not own private vehicles, the provision of a reliable public transportation system may be a necessity. Planning of new neighbourhoods should also be integrated, with accessibility to public transport in mind. The efficiency of an urban area and its labour is closely related to the effectiveness of its transportation system.

The financial, real estate and business-services is classified according to the SIC of Economic Activities by the code number 8 000. Here it is of the utmost importance that the local authority evaluate the existence of the economic energy within its urban area. The strengthening and promotion of existing clusters may attract much-needed domestic and foreign investment. This may further exploit economic growth opportunities and stimulate economic development.

The government, non-governmental organisations, community and social-services sector is classified according to the SIC of Economic Activities by the code number 9000. Local authorities are the everyday face of the public sector and this is where policy meets the people. Developing and improving urban policies on every sector to generate economic growth and achieve sustainable economic development is a prerequisite for increasing quality of life for all residents. Local authorities should first of all determine the status quo within each sector, whereafter the desired outcome in each sector should be determined, which would give rise to a management system. The way to achieve the desired outcome will be reflected in the implementation and operational system and lastly, a system of monitoring should be in place to evaluate the actual outcome.

Although not part of the official nine economic sectors, reference to the environment, tourism and informal sectors are also included in Annexure A. The strategic priorities,

policies and policy objectives and possible actions outlined above can be adjusted in terms of each type of urban area and local government structure. It is, however, important to identify and target industries to make effective use of limited available local resources. A basic strategy of balanced growth to create jobs for lower-income people as well as for the provision for greater public participation can be followed in the formulation of specific policies. This may also include both sectoral and area-development strategies.

A point of concern in targeting industries, is that once they are selected, they influence decisions about policy. Forecasts for individual industries may also be subject to large errors. Furthermore, policymakers may neglect the more basic conditions for general economic growth and development if focussing on selected industries only. With this in mind, the identification and targeting of industries may still be an important starting point for urban economic renewal.

A very important issue in urban economic development is that incentives have become part of the game of urban politics. The problem is that firms do not necessarily keep their promises to retain and/or create new jobs when accepting some kind of assistance from the local authorities. To reduce the risk of this happening, it should be required of those firms that they make commitments about jobs. Should they default, benefits will be forfeited. Local authorities can implement strong performance requirements and close monitoring of performance to ensure compliance.

If efficient and effective general policies to revitalise an urban area can be introduced by the public sector, thereby restoring confidence, the private sector will once again start to invest. Urban renewal should be measured by the success of its attempts to stimulate the revival of business activity. A collapse of one part of the urban system will inevitably have consequences for other parts of the system. All stakeholders within an urban environment will potentially benefit from a regeneration of urban centres. Economic specialisation is a vital part of urban development and remains essential to the survival and growth of urban areas. It is essential that urban authorities identify their area's

comparative advantage to ensure a successful response to increased economic competition. The challenge facing an urban area is whether it has a comparative advantage in some good or service that has the potential to become intensely competitive both nationally and internationally.

Globalisation can offer expanded opportunities for trade in wider markets and provide access to a wealth of expertise, services and technology. Every urban area or region, over time, tends to proceed towards comparative advantage in its more specialised goods and services. Local production initially relies heavily on basic factors such as natural resources and unskilled or semi-skilled labour. Over time, however, more specialised factors like modern technology and highly-skilled labour come to form the backbone of local production. The former type of production is based on *natural* comparative advantage and the latter form of production is based on *created* comparative advantage. The dimensions of comparative advantage are depth (quality of an area's environment and ingenuity of its people); diversity of its economy; and scale of activities. It is important to expand the capacity of the formal urban economy and simultaneously address the underdeveloped informal sector of the economy. This should be based on a realistic appreciation of its strengths and weaknesses.

Policies should be directed towards realisation whilst meeting the following criteria:

i) Efficiency - the creation of improved conditions for, *inter alia*, efficient production, residential and industrial location, provision of social services, increased rate of employment and high productivity.

ii) Distribution - the fostering of equal opportunities in terms of jobs, services, housing and recreation as well as freedom of choice among offered alternatives.

iii) Access - the provision of effective access between dwellings and jobs, services, recreation areas, regardless of modes of transportation.

iv) Environment - the institution of an ecological basis for planning, conservation of natural resources and the protection of cultural values.

v) Adaptability - increasing the range of long-term success developments by adapting short-term allocation and ensuring the flexibility of development options.

Policies in general should be developed in such a way that they stimulate business activity and job creation, reduce poverty and thus improve quality of life.

11.5 EVALUATION INDEX FOR MEASURING POLICY SUCCESS

In an effort to measure the policy success, a quality of life index was developed and will be elaborated upon in Annexure B. The objective of developing this index will be to measure the level of welfare or quality of life on various levels. The basic philosophy underlying this framework is that various economic factors need to be measured to enable a country or urban area to identify, address and correct inferior aspects, with the ultimate goal of improving the quality of life and enhancing business activity. Increasingly, it is suggested that if national welfare or quality of life could be improved, economic growth and development would be enhanced.

The relative importance of agglomeration economies in explaining the concentration of economic activity in metropolitan areas had been emphasised. While the benefits and externalities that arises due to agglomeration economies are well defined and well known, they have not been adequately measured. This index will be applicable on a national economy in measuring national welfare or quality of life over time. In this sense, it will be possible to measure and compare the quality of life of different cities and countries and provide insight as to where problem areas may exist and how to correct them. It will thus provide a tool to measure policy success in terms of economic, social and environmental issues, amongst other.

The basic idea of this quality of life index is that sustainable urban development requires the urban environment to be improved as a factor contributing to the quality of life. National or urban welfare is thus encompassing by quality of life. The idea is to develop a time series of a single index that may be used as an instrument to measure quality of life over time. This means that if the values of the quality of life index increases over time, an improvement has taken place in the general quality of life of the inhabitants of

that specific area. A decreasing quality of life index would obviously means the opposite. From the individual items of the index it would be possible to indicate which variables were mainly responsible for the changes in the quality of life index. This would provide a tool to policy-makers to identify those variables responsible for a decreasing quality of life and thus a chance to correct or eliminate policies contributing to that decrease. Furthermore, the possible changes in national quality of life may be measured and compared to the quality of life of various urban areas over time.

11.6 SUMMARY

Although different definitions can be used for an urban area, this study is ultimately concerned with the fact that a concentration of people and economic activity occur in an urban area. The main interest of this area is an improvement in the economic growth rate and hence economic development. This improvement is not only an improvement relative to other competing areas, but also an improvement in absolute terms.

The Economic System Approach (ESA) highlights the importance of investment in human ability to participate in economic growth and development. This is also in accordance with the endogenous growth theory of Romer. The ESA revolves around building the productive capacity of subjects by focussing on their personal capacities (education, training and health), and developing the infrastructure within which they operate. The infrastructure referred to comprises an institutional, physical and social framework surrounded by the natural environment. These, the building blocks of the process must be of a certain character and quality. They need to be revised and adapted continuously to ensure sustained growth and development. The subjects who drive the process and cause the changes to occur, must also possess certain capabilities.

The private subjects are the active players, while the government promotes, supports and deals with failures or breakdowns in the system and the capacity-generating process. Economic growth and development is therefore a joint process driven by these subjects. Modern endogenous growth models accept that investment in private and human capital encourages external economies and productivity improvements, both of which offset the

natural tendency towards diminishing returns. The implication thereof is that investment in human capital could result in returns to scale and therefore economic growth and employment.

The main objective of Local Agenda 21 is the achievement of sustainable development, which requires the integration of the economic, social and environmental elements. Policies should be developed with the general notion of Local Agenda 21 as a strong feature. If efficient and effective general policies to revitalise an urban area can be introduced, thereby restoring confidence, the private sector may rethink investment in those areas. Urban renewal should be measured by the success of its attempts to stimulate the revival of business activity with increased prospects of higher economic returns.

The basic goals of any economic policy - efficient use of resources and equity in the distribution of income - is vitally important. The efficient application of resources occurs when some people gain some economic welfare without a reduction in someone else's welfare. Due to the existence of externalities this is a very difficult goal to attain. Equity in the distribution of income assumes that the society agrees on the nature of the goal. Different views on the achievement of this goal often lead to a difference in policy recommendations. Job growth that offers employment to the unemployed and underemployed provides benefits both for efficiency and equity.

The choice of goals leads to the selection of strategies to support the economic growth and development plan. These strategies lead to the choice of various complementary policies. Policies can be categorised according to the underlying factor in economic growth which they enhances. The sources of urban economic growth should be given intense attention to determine the comparative advantage of a specific area. The selection of target industries that respond well to policy initiatives may be a way to address the problem of economic growth and development in an urban area.

In the next chapter, a comprehensive summary and final conclusion of the study will be provided.

PART E

SUMMARY AND CONCLUSION

SUMMARY AND CONCLUSION

In part E, the summary and final conclusion of the study will be presented, whereafter references and two annexures will follow.

CHAPTER 12

SUMMARY AND FINAL CONCLUSION

12.1 COMPREHENSIVE SUMMARY

The main aim of this study is to provide a theoretical basis for urban economic policy-makers to develop goals, strategies and polices to improve the quality of life within urban areas. The various aspects that policy-makers should take into consideration will consequently be analysed as a comprehensive summary of each chapter.

The problem statement in Chapter 1 indicated that an urban environment is, generally speaking, the economic powerhouse of a country. The problem is thus to develop and implement urban economic goals, strategies and policies to enhance the quality of life within urban areas. The policies therefore need to be directed towards increased economic growth and development to stimulate urban economic business activity. Economic growth theories provide an extensive theoretical base on which these goals, strategies and policies could be based.

In Chapter 2, the growth theories of Harrod-Domar, Solow and Romer were analysed to provide a theoretical base to policy-makers within urban areas. Harrod-Domar expresses the importance of increased levels of savings and investment to generate economic growth and development. These factors are vitally important for urban areas within developing economies, although less applicable in developed economies. This is not to ignore the importance of these factors in developed economies, but rather to show an increased degree of importance in the case of developing urban economies. Solow's theory shows the importance of labour, capital and knowledge or the effectiveness of labour in generating economic growth. Although all these factors are extremely important to both developing and developed urban economies, he is unable to explain fully the factor of knowledge. Solow indicates that knowledge is an exogenous factor. This has become known as the Solow residual. This, however, paves the way for Romer to explore the factors generating economic growth. Labour,

capital, technology and output all contribute to economic growth, although technology or knowledge is now endogenised, which provides an answer to the Solow residual. The importance of investment in human capital and the R&D sector where additions to the stock of knowledge are made, is emphasised by Romer. Urban areas are generally best suited to enhancing the R&D sector and investment in human capital. Although this provides a theoretical base for urban economic growth and development, the implementation of the Economic System Approach (ESA) provides an institutional and organisational framework.

The ESA is mainly concerned with an analysis of technological and organisational or institutional innovations. A comparative assessment between the ESA and the conventional neo-classical approach to economic growth and development reveals a marked difference. According to this comparative analysis, the neo-classic approach emphasises the role of economic functions that are deterministic and universal by nature. The approach can therefore be prescriptive and leads to a narrowly-defined development path using abstraction and assumptions, based on a segregation of processes. The ESA, on the other hand, focusses on economic relationships which acknowledge the dynamic nature of the real world. Theory and policy should therefore be accommodating, with enough room for openness, based on the integration of processes.

The more analytical neo-classical approach regards people as objects (recipients or spectators) where policy-making and economic determinism are extremely important in achieving the "prescribed" results. The ESA, on the other hand, is descriptive and concentrates on people and their capabilities in order to achieve progress. Furthermore, due to the neo-classical approach viewing markets as homogenous in nature, markets act neutrally according to a specific order. The diversity of the participants is however, acknowledged by the ESA and markets are regarded as an integral part of the diverse economic process. People and infrastructure will influence market quality, volume, scope and nature. The ESA constitutes a decisive paradigm shift and postulates that people and dynamic relationships are essential to economic

growth and development. Urban areas are interdisciplinary and interactive. As the neo-classical approach is linear, it will therefore not contribute as much as the ESA.

Economic growth and development, according to the ESA, is a joint process driven by economic subjects. As for the infrastructural framework, the economic process is also embedded in an institutional, physical and social framework surrounded by the natural environment. These are the building blocks of the process and should be of high quality; needing constant revision and adaptation to ensure sustained growth and development. However, the subjects responsible for driving the process, also need to possess certain capabilities. It is therefore important that the productive capacities of the economic subjects and a production-enhancing process be developed within a supportive domain. The role of government is one of promoting and supporting and furthermore deals with any failures or breakdowns in the system and the capacity-generating process. The government should also define and establish institutional environments that set the rules for private economic agents, thus affecting the design and working of institutional arrangements. The main concern of technological and organisational or institutional innovations should therefore be addressed and the urban environment is best positioned to undertake this task. According to the economic growth theories, increasing the stock of knowledge is an important factor and urban areas are well positioned to do just this.

Chapter 3 states that technological progress is the engine of economic growth and development and it is thus to the benefit of any economy to promote research and development (R&D) and hence generate knowledge and innovation. The urban environment is best positioned to answer this challenge, where the major energy is generated to engage in R&D activities. Compared to all other factors contributing to growth and development, knowledge is the only factor of production that is not subject to diminishing returns.

There are various views on how to acquire knowledge, although one method on which most agree is intentional R&D activities by public and/or private firms. Due to the

importance of R&D in generating knowledge and innovation, it is vital to urban policy-makers to invest in education and training to stimulate economic growth. Policy-makers should also take cognisance of the fact that incentives are important because without incentives little effort would go into research, and fewer new ideas would be created. It is thus important to explore the potential benefits of urban areas, which may contribute towards improved innovation and R&D. Certain factors contribute to and enhance the fact that urban areas are well positioned to generate economic opportunities and were consequently analysed in Chapters 4 to 9.

In Chapter 4 the notion of agglomeration economics explains that general cost reductions occur due to spatial concentration of economic activity in urban areas. Agglomeration economics are explained further by localisation and urbanisation economies of scale. Localisation economies introduce the advantages of labour pooling, access to specialised labour skills and employment opportunities. In addition, the greater ease of communication made possible by proximity to competitors, suppliers and customers and the benefit that stems from economies of scale in intermediate inputs, enables the urban environment to pass along innovations more rapidly.

Urbanisation economies of scale provide the advantages of access to a larger market as well as to a wide variety of specialised services and greater potential for cross-industry spillovers of knowledge and technology. From this chapter it could be seen that urban areas are conducive to opportunities for economic growth and development. Unfortunately, certain factors could also hamper economic growth opportunities in urban areas and need to be addressed by local authorities. Optimal usage of resources in urban areas is vitally important, land being one such factor that needs to be addressed with due care and caution.

Land is in fixed supply and therefore the best and highest use of land should be the ultimate goal in order to restrict the waste and misallocation of this vital resource in urban areas. In Chapter 5, due to the fixed nature of land, urban policy-makers are urged to adopt a long-term vision in terms of allocation of land for various uses. An

efficient distribution of land use contributes to local economic growth and development prospects. Land-use patterns are changing in response to urban growth, with zoning being the most popular policy tool used to regulate the use of land.

Since local government receives revenue from residential taxes, business taxes, etc., the more residents and businesses in an area, the greater the prospects for a higher level of revenue. This may lead to uncontrolled or weakly controlled urban growth without regard for the impact on the infrastructure and environment. In the long run this factor may motivate residents and businesses to move away, decreasing the tax base and reducing tax income. This may cause further environmental and social decay because governments are forced to cut the quantity and quality of services or raise the tax rates.

A comprehensive, urban ecological land-use plan in which all major variables are considered and integrated to anticipate present and future needs and problems and to propose solutions, is urged. A blend of economics and the ecology is vital to control the nature and speed of urban and suburban growth. In this way environmental degradation, pollution and social decay can be addressed and minimised. A very important factor to keep in mind is that zoning is an instrument used by local governments to anticipate conflicts in land use and to plan accordingly in the interest of the local community.

Complementary to well-developed land-use policies, is the ability of an urban area to attract businesses and skilled workers. In Chapter 6 the attractiveness of an urban area in terms of investment and place of residence is affected by various locational factors. Each type of business and individual will be affected, albeit differently, by a variety of locational factors. In terms of policy considerations, amenities, taxes, government incentives and infrastructure, political stability, local business climate, site and energy costs are important in addressing the improvement of the economic attractiveness of an urban area.

Policy-makers should also be constantly aware that the nature and importance of locational factors will inevitably change as technology and new production requirements change. The loss of workers and businesses may be a great economic risk if the attractiveness of an urban area is ignored, and the local government may struggle to recover from this neglect.

One very important factor in enhancing the attractiveness of an urban area is a well-planned and designed transportation system. Chapter 7 analysed the importance of an urban transportation system to facilitate the exchange of goods and services and the movement of people. The optimum transportation system for an urban area depends on the size and structure of the area. For policy purposes, it is important to assess the urban population issues of an urban area. The individual's choice of transport mode depends on income, time and costs of alternative modes and local government should be sensitive to these factors.

Providing and upgrading the transportation system implies major costs and the use of land that may have more efficient uses. Transportation strongly influences land-use patterns in urban areas and long-term planning is thus essential. The efficiency of an urban area is greatly influenced by the transportation system and should therefore enhance the urban environment and not constrain economic activity. It is, however, also important to take cognisance of and evaluate the labour and migration changes in an area because of the impact and potential change in demand on the transportation system.

To ensure sustainable economic growth, the influence and effect of some important labour and migration features of an urban area were explored in Chapter 8. The quality of people and migration patterns may have a severe impact on an urban environment. An increased demand for products from a specific urban area will consequently affect the demand for labour. If an increased volume of sales can be achieved, the demand for labour will most certainly increase. The supply of labour to an urban area is positively linked to a high wage rate, quality of amenities, environmental quality and public

services, to mention but a few. An improved business climate could thus attract skilled labour to an urban area. Unfortunately, unemployed people also flock to cities in response to prospects of improved opportunities. The possibility of finding a job in a city is perceived as being higher than in rural areas, and therefore contributes to the increase in the supply of labour. This fact leads to increased numbers of unemployed people and, obviously, higher levels of criminal activity, which imposes a direct and indirect cost on society and influences business negatively. Policy-makers have to address the issue of urban crime urgently because of its critical destabilising nature on economic activity. This is most certainly one of the major challenges to policy-makers in urban areas. The structural constraints mentioned in the chapter, if addressed properly, may alleviate some urban labour problems. The changing labour and migration patterns of an urban environment also pose a challenge to deliver minimum service standards in residential areas. Housing is a basic necessity to any individual and decisions of households in terms of location effect the urban environment and surroundings.

In Chapter 9 factors influencing housing and ultimately the residential location were analysed. These factors include physical and socio-economic characteristics, public services, environmental quality and accessibility of the neighbourhood, all of which may be influenced by local government. With efficient policies to enhance the living conditions of communities, government may contribute both to their social responsibility and quality of life of the inhabitants of an urban area.

Due to the relatively public nature of housing, government needs to intervene to address problems in the housing market. Government's role may be one of supplying housing, enabling households to own their own homes, or encouraging the upgrading and the quality of housing. Policy-makers may consider the downward adjustment of assessed values of the deteriorating housing stock to prevent the abandonment of properties and consequent negative impact on housing and living conditions. Zoning ordinances imposing minimum lot sizes and other requirements that affect housing should also be revisited from time to time to establish a well-defined balance.

Excessively high standards for residential development drive up housing costs and force low-income households to locate far from job centres. This implies that some households would choose to live in housing of relatively low quality but the local government will not permit this because of concern for the health and safety of the public and the neighbourhood in general.

The real problem with public housing is that it does not address the true problem facing poor people living in low-cost housing. The true problem is not so much a housing as an income problem. Policies should thus not only be directed towards the provision of housing, but rather towards increasing incomes and thus job creation.

It is thus important for local authorities to engage in active planning to address current and potential concerns within their urban area. Both positive and negative externalities are experienced due to the spatial concentration of people and economic activities in urban areas.

The purpose of Chapter 10 was to recap and analyse the important urban features explained in Chapters 4 to 9 and to evaluate these chapters according to the economic growth theories discussed in Chapters 2 and 3. The various factors influencing the urban environment due to a concentration of people and economic activity occuring in an urban area, were explored. The main interest regarding an urban area is an improvement in the economic growth rate and hence economic development. The concentration of people and economic activity creates vast economic opportunities for households and businesses. These opportunities all contribute to the creation of an environment conducive to an enhanced quality of life.

However, the negative externalities experienced in urban areas call upon the local government to engage actively in addressing problems, for the betterment of all residents. The same economic factors that stimulate increased growth in urban areas also create problems such as economic decline, urban decay, pollution, traffic congestion, crime and inadequate housing. The fact that businesses leave the city

centre for decentralised areas implies that a deliberate effort at urban renewal and revitalisation driven by city leaders is necessary to gain and retain businesses. In the case of urban renewal, increased levels of savings and investment (Harrod-Domar) are vitally important. This can be seen as the first stage of urban renewal and will serve as a catalyst for further urban improvement and renewed business activity. Any urban area will strive towards sustainable economic growth and development. This emphasises the importance of enhancing R&D, which would contribute to the generation of knowledge and ultimately ensure increasing returns to scale (Solow and Romer).

The application of all three economic growth theories is thus possible within urban areas. An urban area can be seen as the powerhouse of an economy, thus savings and investment (Harrod-Domar); capital, labour and knowledge or efficiency of labour (Solow); or labour, capital, technology and output (Romer) are best generated within urban areas. The degree of importance of these variables, however, could differ depending on the level of economic development. The existence of agglomeration economies is pivotal in the economic explanation of urban economic growth.

Static agglomeration (localisation) economies will create a once-off decrease in the cost of a particular industry. Dynamic agglomeration (urbanisation) economies are associated with a continuous increase in the output of a particular industry. At the centre of dynamic agglomeration economies lies the production and use of knowledge. More inventive innovators will create a continuous flow of technological change, which means that a firm applying new technology can produce more output with a given amount of capital and labour. This process of technological progress is seen as an internal or endogenous improvement.

From a static point of view, urban economic growth can rather be associated with increased levels of savings and investment (Harrod-Domar). In a dynamic sense, however, the rate of innovation will increase with more people engaged in R&D and investment in human capital (Solow & Romer). Close proximity, present in urban areas,

will stimulate knowledge and innovation spillovers and thus contribute to endogenous and dynamic urban economic growth. Local urban authorities should be aware of these factors before developing and implementing urban economic goals, strategies and policies.

In Chapter 11, the importance to the local urban authority of economic growth, employment, balance of payments, price stability and equity as general economic goals, was shown. To provide a framework for local urban authorities, the ESA was again emphasised, with its focus on a people-centred vision and the enhancement of the capabilities of economic agents. This served to accentuate the importance of R&D and human capital investment and to link this to the economic growth theories supporting just such an approach. Local urban authorities will also have to address the sustainability of their strategies and policies. The achievement of sustainable development necessitates the inclusion of Local Agenda 21, which requires the integration of economic, social and environmental elements.

An urban policy framework on which local urban authorities can base their policies was then developed. This will empower them and also enable them to customise policies to their own unique needs and preferences. This urban policy framework is presented in Annexure A, although the economic sentiments behind this framework were analysed in Chapter 11. The nine economic sectors are used as a basis for this urban policy framework. To enhance the city image, the urban area is first divided into six different identities comprising the social/demographic, natural, geographic, cultural, urban and infrastructure elements. This is described according to the various urban scales, *viz.* the metropolitan, city, district, precinct, neighbourhood and street block levels. The urban policy-planning package then follows in terms of the nine economic sectors, providing several options for local urban authorities. This policy-planning package is directed towards the creation of an environment conducive to improved quality of life and local authorities should therefore engage in a planning exercise to develop and implement urban goals, strategies and policies to this end. The selection of target industries that respond well to policy initiatives may be a platform from which to address

increased business activity. This is to ensure that an efficient application of time and money occurs without wasting valuable resources. The existence of negative externalities increases the difficulty of developing and implementing these goals, strategies and policies. This urban policy-planning package, when applied, should restore confidence and stimulate the revival of business activity with increased prospects of higher economic returns and improved quality of life.

12.2 CONCLUSION

Urban areas remain the engines of economic growth and development in the national economy. Efficient and effective strategies and policies enhancing economic growth and development are prerequisites for achieving the goals of expansion of the tax base and the creation of jobs. Local governments, however, sometimes lack the capacity and competence to manage this economic growth necessary for creating a promising future for the growing urban population. Progress in technology as well as knowledge and innovation must play a decisive role if success is to be realised.

If local governments want to exploit the benefits of agglomeration economies, they should provide an efficient and attractive place to do business. They need to invest in infrastructure if they are to provide the basic services necessary for economic growth and development. A new kind of local government entrepreneurship or leadership is required with its focus on the efficient provision of the services for which it is responsible, and the easing of excessive regulation and control. A key factor is to establish a structure to ensure that local growth and development strategies and investment plans are based on sound information. A local government can only judge the appropriateness of policies if it has reliable information concerning its economy. This can save valuable time and money if decisions regarding the elimination of growth-hampering policies or the implementation of growth-enhancing policies are to be made.

Good governance implies inclusion and representation of all stakeholders in an urban society, as well as accountability, integrity and transparency in local government actions. Capable urban management requires a capacity to fulfil public responsibilities

with knowledge, skills, resources and procedures that draw on partnerships. If local government provides the public the chance to participate and express their views, and encourages them to monitor their work, an effective system of governance creates a willingness to obey laws and pay taxes. However, encouraging participation requires that government have in place regulatory structures that minimise transaction costs and barriers to entry.

The formation and increasing size of slums among the urban population is a reflection of, *inter alia*, policy and institutional failure in the allocation of land use, housing and infrastructure systems. Policy weaknesses may have major ramifications for households and businesses alike and can disrupt most perceived benefits to urbanisation. The role of local government should be refocussed to facilitate markets, promote economic and social stability and to ensure equity.

The rewards for successful growth and development strategies and policies and the penalties for failure, are likely to be greater and will be experienced more quickly than in the past. Local governments creating an urban environment conducive to the accumulation of social and human capital may attract more foreign investment and more skilled migrant workers. The consequences of delays and half-hearted attempts at reform, giving little thought to long-term credibility, will profoundly affects urban economic growth and development.

It is vital for local government to realise that their people remain the everyday face of the public sector. This is the level at which essential public services are delivered to individuals and businesses and where policy meets the people. Although urban areas have varying potential and life cycles, efficient strategies and complementary policies, linked with community involvement, private-sector commitment and accountable local government, can make a great difference to the character of urban areas and their contribution to economic growth and development. A framework for the enhancement of the urban and city image as well as reference to strategic priorities, policies, policy objectives and possible actions, will be presented in Annexure A. This framework aims to guide policy-makers in improving overall quality of life, addressing factors such as

business environment, residential amenities, environmental impact as well as the socio-economic milieu, etc.

If urban areas are to promote the welfare of their residents they must provide a livable environment, ensuring a decent quality of life and equitable opportunity for all residents. Building a livable urban environment requires consistent incentive systems that foster productive and competitive firms of all sizes. In an era of globalisation, a city must be competitive both domestically and internationally. The exploitation of global opportunities also reinforces certain advantages of proximity in urban areas.

An assumed responsibility, willingness and decisive effort to address urban problems should not be negotiable by any future-oriented urban government. Initiative and commitment by urban governments to create jobs, promote wealth, permanently protecting the urban environment and natural resources, guaranteeing commuter-friendly mobility, creating appropriate residential space for all inhabitants and finally, a decisive act to eliminate criminal activities, would ultimately offer high returns to all. The scale of urbanisation, if addressed properly, offers significant opportunities for urban governments to improve the quality of life for all their citizens. In an effort to determine the effectiveness of policies, a tool was developed to assist authorities. This tool, *viz.* a quality of life index, was developed to measure the success of policies developed and implemented by local authorities, and is explained and discussed in Annexure B.

Most urban areas are subject to similar influences and are confronted with similar problems. However, there will be no easy, single, all-embracing solution to overcome these difficulties. Depending on the economic, social and cultural background, different solutions, adapted to each respective situation, are called for. The use of opportunities which present themselves, the exploitation of an area's economic potential whilst simultaneously mastering social conflict and ecological challenges, in a sustainable manner, is one of the major tasks awaiting local urban governments. Whether this economic potential is realised, depends fundamentally on the quality of urban management and the policies affecting it.

REFERENCES

Abramowitz, M. 1956. Resource and Output Trends in the United States since 1870. *American Economic Review*, 46(2):5-23.

Annon. 1995. *Fortune*, 20 February, 1995. "Cars that beat traffic". p. 64-72.

Annon. 1996. *The Economist*, 13 April, 1996. "Yes, parking". p. 63.

Balchin, P.N., Bull, G.H. & Kieve, J.L. 1995. *Urban Land Economics and Public Policy*. London: Macmillan.

BEPA. 1999. *The potential for improving the labour absorption capacity of SMMEs through the institutionalisation of the informal sector*. BEPA Economic Paper No 30. Petoria: University of Pretoria.

Blignaut, J.N. 1997. *Economic System Approach: A South African Application*. Congress of Political Economists, Conference Proceedings. University of Lodz. Lodz: Lodz University Press.

Blair, J.P. 1995. *Local Economic Development*: Analysis and Practice. California: SAGE.

Bogart, W.T. 1998. *The Economics of Cities and Suburbs*. New Jersey: Prentice-Hall.

Borts, G. & Stein, J. 1964. *Economic Growth in a Free Market*. New York: Columbia University Press.

Brown, W.S. 1988. *Macroeconomics*. USA: Prentice-Hall.

Brue, S.L. 1994. *The Evolution of Economic Thought*. Fifth edition. Fort Worth: The Dryden Press.

Button, K.J. 1976. *Urban Economics: Theory and Policy*. London: Macmillan.

Button, K.J. 1985. *Urban Economics: Theory and Policy*. London: Macmillan.

Button, K.J. & Pearce, D.W. 1989. Improving the Urban Environment: How to Adjust National and Local Government Policy for Sustainable Urban Growth. In: Diamond, D., McLoughlin, J. & Massam, B. (eds.). *Progress in Planning*. 32(3):139 - 184. Oxford: Pergamon Press.

Clark, N. & Juma, C. 1988. Evolutionary Theories in Economic Thought. In: Dosi, G., Freeman, C., Nelson, R., Silverberg, G. & Soete, L. (eds.). *Technical Change and Economic Theory*. London: Pinter publishers.

Curie, E. 1993. *Reckoning: Drugs, the Cities, and the American Future*. San Francisco: Hill & Wang.

Daly, H.E. 1996. *Beyond Growth. The Economics of Sustainable Economics*. Boston: Beacon Press.

De Wet, G.L., Harmse, C. & Blignaut, J.N. 1997. Economic System Approach Applied to South Africa. In: Yanagihara, T. & Sambommatsu, S. (eds.). *East Asian Development Experience: Economic System Approach and its Applicability*. Tokoy: Institute of Developing Economies.

Donnison, D. 1967. *The Government of Housing*. Harmondsworth: Penquin.

Dosi, G. 1988. The Nature of the Innovative Process. In: Dosi, G., Freeman, C., Nelson, R., Silverberg, G. & Soete, L. (eds.). *Technical Change and Economic Theory*. London: Pinter publishers.

Downs, A. 1992. *Stuck in Traffic: Coping with Peak-Hour Traffic Congestion.* Washington: Brookings Institution, Lincoln Institute of Land Policy.

Fagerberg, J. 1994. Technology and International Differences in Growth Rates. *Journal of Economic Literature*, XXXII, September:1147-1175.

Galbraith, J.K. 1956. *American Capitalism.* Boston: Houghton Mifflin.

Garreau, J. 1991. *Edge City: Life on the New Frontier.* New York: Doubleday.

Gilman, R. 1992. *Design for Sustainable Economics.* www.sane.org.za.

Grebler, L. 1965. *Urban Renewal in European Countries: Its Emergence and Potentials.* Pennsylvania: Pennsylvania University Press.

Hanson, R.L and Berkman, M.B. 1991. Gauging the Rainmakers: Towards a Meteorology of State Legislative Climates. *Economic Development Quarterly* 5(3):213-228.

Haring, J.E. 1972. *Urban and Regional Economics: Perspectives for Public Action.* Boston: Houghton Mifflin Company.

Harvey, J. 1987. *Urban Land Economics: The Economics of Real Property.* London: Macmillan.

Harvey, J. 1988. *Urban Land Economics: The Economics of Real Property.* London: Macmillan.

Hirsch, W.Z. 1973. *Urban Economic Analysis.* New York: McGraw-Hill.

Jackson, K.T. 1985. *Crabgrass Frontier: The Suburbanization of the United States.* New York: Oxford University Press.

Jones, C.I. 1998. Introduction to Economic Growth. New York: Norton.

Kay, N. 1988. The R&D function: Corporate Strategy and Structure. In: Dosi, G., Freeman, C., Nelson, R., Silverberg, G. & Soete, L. (eds.). *Technical Change and Economic Theory*. London: Pinter publishers.

Kelly, B.M. 1993. *Expanding the American Dream: Building and Rebuilding Levittown*. Albany, New York: SUNY Press.

Local Agenda 21. 1998. *An Agenda for Sustainable Development into the 21st century*. Department of Environmental Affairs and Tourism. Directorate Sustainable Development.

Lucas, R.E. Jr. 1988. On the Mechanics of Economic Development. *Journal of Monetary Economics*, 22 July:3-42.

Malerba, F., & Orsenigo, L. 1997. Schumpeterian patterns of innovation. In: Archibugi, D., & Michie, J. (eds.). *Technology, Globalisation and Economic Performance*. Cambridge: Cambridge University Press.

McDonald, J.F. 1997. *Fundamentals of Urban Economics*. New Jersey: Prentice Hall.

Meier, G.M. 1995. *Leading issues in Economic Development*. Sixth edition. New York: Oxford.

Metcalfe, J.S. 1988. The Diffusion of Innovation. In: Dosi, G., Freeman, C., Nelson, R., Silverberg, G. & Soete, L. (eds.). *Technical Change and Economic Theory*. London: Pinter publishers.

Meyer, J. & Gomez-Ibanez, J. 1981. *Autos, Transit and Cities*. Cambridge, MA: Harvard University Press.

Miller, G.T. Jr. 1994. *Living in the Environment.* Eight edition. California: Wadsworth.

Mills, E.S. 1972. *Urban Economics.* Illinois: Scott, Foresman & Co.

Mills, E. 1992. Sectoral clustering and metropolitan development. In: Mills, E. & McDonald, J. (eds.). *Sources of metropolitan growth.* New Jersey: Rutgers University Press.

Mills, E.S. & Hamilton, B.W. 1984. *Urban Economics.* Third edition. Illinois: Scott, Foresman.

Mills, E.S. & Hamilton, B.W. 1994. *Urban Economics.* Fifth edition. New York: HarperCollins.

Noyelle, T. & Stanback Jr, T. 1983. *The economic transformation of American cities.* New Jersey: Rowan & Allanheld.

O'Sullivan, A. 1996. *Urban Economics.* Third edition. Boston: Irwin.

Pearce, D.W. & Turner, R.K. 1991. *Economics of Natural Resources and the Environment.* Baltimore: The John Hopkins University Press.

Richardson, H.W. 1971. *Urban economics.* Middlesex: Penguin Books.

Romer, D. 1996. *Advanced Macroeconomics.* New York: McGraw-Hill.

Romer, P. M. 1994. *The Origins of Endogenous Growth. Journal of Economic Perspectives*, 8(1):3-22.

Rosegger, G. 1996. *The Economics of Production and Innovation, An Industrial Perspective.* Third edition. London: Butterworth-Heinemann.

Schmenner, R. 1982. *Making Business Location Decisions*. Englewood Cliffs, New Jersey: Prentice Hall.

Schoeman, N.J. & Blignaut, J.N. 1998. Socio-economic environment and labour absorption in South Africa. *The South African Journal of Economics*, 66(3):299-318.

Schoeman, N.J., Blignaut, J.N. & Jordaan, A.C. 1999. Development in South Africa in the new Millennium: A Conceptual Framework. Paper delivered at the Development of Southern Africa Conference. Johannesburg, 7-8 April 1999.

Schumpeter, J.A. 1934. *The Theory of Economic Development*. Cambridge, Massachusetts. Harvard University Press.

Schumpeter, J.A. 1942. *Capitalism, Socialism and Democracy*. New York: Harper & Brothers.

Schumpeter, J.A. 1943. *Capitalism, Socialism and Democracy*. London: Allen & Unwin.

Schumpeter, J.A. 1949. *Capitalism, Socialism and Democracy*. London: Allen & Unwin.

Segal, D. 1979. *Urban Economics*. Homewood: Irwin.

Sen, A. 1988. Development: Which way now? In: Wilber, C. (ed.). *The Political Economy of Development and Underdevelopment*. Fourth edition. New York: Random House.

Sen, A. 1996. Development: Which way now? In: Jameson, K.P. & Wilber, C. (eds.). *The Political Economy of Development and Underdevelopment*. New York: McGraw-Hill.

Small, K. 1992. *Urban Transportation Economics*. Philadelphia: Harwood Academic Publishers.

Solow, R.M. 1957. Technical change and the aggregate production function. *Review of Economics and Statistics*, (39):312-320.

Solow, R.M. 1987. *Growth Theory: An Exposition*. Oxford: Oxford University Press. Chapter 1: Growth Theory and After: Nobel Lecture: ix-ixxxvi.

Solow, R.M. 1991. Growth Theory. In Greenaway, D., Bleany, M. and Stewart, I. (eds.). *Companion to Contemporary Economic Thought*. London: Routledge.

Solow, R.M. 1994. Perspectives on Growth Theory. *Journal of Economic Perspectives*, 8(1):45-54.

Stonier, A.W. & Hague, D.C. 1964. *A Textbook of Economic Theory*. Third edition. London: Longmans.

Stern, D.I. 1997. Capital Theory Approach to Sustainability. *Journal of Economic Issues*. XXXI(1):145-173.

Todaro, M.P. 1985. *Economic Development in the Third World*. New York: Longman.

Todaro, M.P. 1994. *Economic Development*. New York: Longman.

Todaro, M.P. 1997. *Economic Development*. New York: Longman.

United Nations. 1996. *Human Development Report*. New York: Oxford University Press.

Veseth, M. 1998. *Selling globalization: The Myth of the Global Economy.* London: Lynne Rienner.

Wheaton, W.C. 1979. Monocentric Models of Urban Land Use: Contributions and Criticisms. In Mieszkowski, P. and Straszheim, M. (eds.). *Current issues in Urban Economics.* London: John Hopkins University Press.

Wurtzebach, C.H. & Miles, M. E. 1994. *Modern Real Estate.* Fifth edition. USA: Donnelley.

Yanagihara, T. 1997. Economic System Approach and its Applicability. In: Yanagihara, T. & Sambommatsu, S. (eds.). *East Asian Development Experience: Economic System Approach and its Applicability.* Tokoy: Institute of Developing Economies.

Yanagihara, T. & Sambommatsu, S. (eds.). *East Asian Development Experience: Economic System Approach and its Applicability.* Tokoy: Institute of Developing Economies.

Yoshida, M. 1998. Nash equilibrium dynamics of environmental and human capital. *International Tax and Public Finance*, 5(3). Boston: Kluwer Academic Publishers.

URBAN POLICY FRAMEWORK

Table A.1: Framework for enhanced urban and city image

Urban scale	Social/ demographic identity	Natural identity	Geographic identity	Cultural identity	Urban identity	Infrastructure identity
• Metropolitan • City • District • Precinct • Neighbourhood • Block/Street	• % of urban population below substance income level • GGP per capita • Literacy rate • Life expectancy • Average age • Gender composition	• Nature reserves • Unique geological sites • Major rivers • Major dams • Exposure to pollution • Emission levels	• Ridges and hilltops • Natural scenery	• Proclaimed national monuments and museums • Areas and elements of cultural importance	• Urban landmarks • Urban gateways	• Major existing and proposed through roads • Major streets • Railway lines and stations • Airports

Table A.2: Urban policy-planning package

SECTOR: AGRICULTURE, FORESTRY & FISHING (1 000)			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• **Revitalise urban periphery**	• Periphery development • Integrate urban area and periphery • Integrate urban and periphery activities	• Local Agenda 21 • Prevent excessive dependence on urban structures • Enhance local market development	• Service delivery study • Provide services of equal quality in urban area and periphery

SECTOR: MINING (2 000)			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• **Revitalise urban periphery**	• Support periphery small-scale mining • Support periphery large-scale mining	• Local Agenda 21 • Prevent excessive dependence on urban structures • Incentives to limit pollution • Incentives to rehabilitate used land	• Service delivery study • Provide services of equal quality in urban area and periphery

SECTOR: MANUFACTURING (3 000)			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• **Increase supply of manufacturing goods** • **Provide high quality products** • **Increase exports** • **Strengthening existing business base** • **Create a centre of excellence in a certain industrial sector**	• Focus on comparative advantage • Create a viable SMME environment • Strengthen existing clusters • Focus on existing firms • Attract economic viable businesses • Industrial districts	• Renewal policy • Mix land-use policy • Less regulation • Investment incentive scheme • Provide incentives to landlords to transform vacant office space into mix-usage • SMME incentive package • Export processing zones • Industrial development zones	• Service delivery study • Business advice centres • Information kiosks • Deliberate infrastructure development • Local authority sub-contracting to SMMEs • Acquire venture capital

SECTOR: ELECTRICITY, GAS & WATER (4 000)			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• **Quality service delivery**	• Provide efficient infrastructure • Maintenance • Replacement • Development	• Local Agenda 21 • Access to all • Outsourcing to SMMEs • Payment policy	• Determine demand • Establish waiting list/backlog • Investigate use of alternative energy sources

SECTOR: CONSTRUCTION (5 000)			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• **Provide effective and efficient infrastructure** • **High quality roads system** • **Effective sewage system** • **Efficient electricity provision** • **Provision of clean and safe water** • **Promote private residential development** • **Promote private commercial and industrial development**	• Provide efficient infrastructure • Maintenance • Replacement • Development	• Renewal policy • Incentives to upgrade and maintain property • Renewal tax incentives • Relaxation of minimum standard requirements according to a sliding scale	• Create an inventory • Service delivery study • Reduce building restrictions without compromising safety and standards • Outsourcing of collective services

SECTOR: TRADE (6 000)			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• **Create successful trade partnerships** • **Provide viable trade opportunities** • **Increase trade activities** • **Increase monetary inflow** • **Restrict monetary outflow**	• Focus on domestic market • Exploit globalisation opportunities • Assistance to enter export market • SMME development • Value-added • Local import substitution • Product diversification	• Tax incentives • Trade incentives • National export promotion offices	• Purchasing of local goods by public sector • Campaign to buy local goods • Create SMME assistance centres • Publication of local consumer needs

SECTOR: TRANSPORT, STORAGE & COMMUNICATIONS (7 000)			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• **Efficient and effective public transport system** • **Accessible road system** • **Accessible rail system** • **Access to air transport system** • **Provide quality communication system**	• Reliable transport system • Safe transport • Affordable transport • Safe parking • Sufficient and affordable parking • Discourage excessive dependence on motor vehicles • Enhance communication system	• Public transport subsidy • Higher toll fees for single occupant vehicles • Create car-free zones in inner city • Access to communication for all • Public transport information kiosk	• Provide mass transit systems at edge of car-free zones • Promote car pooling • Create a sufficient and attractive road network • Concentric/Ring roads • Service quality survey on communication system

SECTOR: FINANCIAL, REAL ESTATE & BUSINESS SERVICES (8 000)			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• **Create a strong commercial and financial core** • **Create an international investment destination** • **Improve and enhance real estate development** • **Increase monetary inflow** • **Restrict monetary outflow**	• Enhance economic activity • Retain existing businesses • Attract new and successful businesses • Promote comparative advantage • Create an investment haven • Promote economic clusters • Promote entertainment cluster	• Privatisation • Domestic investment incentive package • Foreign investment incentive package • Investment (e.g. tax rate reductions or tax holidays) • Labour (e.g. tax credits for jobs created) • Financial (e.g. assistance with local location) • Release of unused public land	• Assistance in real estate planning • Market available retail and office capacity • Revitalise vacant retail & office space • Recruit businesses that meet unfulfilled needs • Upgrade decaying buildings • Affordable rental rates • National/international conferences • Trade fares

SECTOR: GOVERNMENT, NGO, COMMUNITY & SOCIAL SERVICES (9 000)			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• **Strict fiscal management**	• Well-developed fiscal plan • Priority planning • Opportunity cost	• Strict fiscal discipline • Disciplined budget • Reduce budget deficit • Capital expenditure plan • Long term policy	• Review financial planning • Fiscal planning study
• **Provide public or community services**	• Capacity building • Improve quality of basic public services • Enhance community facilities	• Minimum standard requirement • Sub-contracting • Outsourcing	• Audit & planning • Upgrade public halls, libraries, museums • Outsourcing of collective services • Customer service training • Head-hunting campaigns
• **Supply affordable serviced housing** • **Provide residential amenities** • **Provide low-cost housing**	• Neighbourhood planning • Support low-cost housing initiatives • Enhance housing stock • Create residential haven • Access to public transport • Provide high density housing • Create a climate of payment of rates and taxes • Boot-strap strategy	• Filtration • Replacement • Uncomplicated rezoning • Uncomplicated land-use restrictions • Market related rent control • Home business districts • Provide incentives to landlords to transform vacant office space into mix-usage • Low cost housing policy	• Acquire census data on housing stock • Determine waiting list of low-cost housing • Develop an informal settlement profile • Upgrade inferior neighbourhoods with amenities other than housing • Revisit zoning ordinances • Enforce payment of rates and taxes

SECTOR: GOVERNMENT, NGO, COMMUNITY & SOCIAL SERVICES (9000)			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• **Provide an effective health system**	• Provide primary health care • Provide advanced medical facilities • Support medical research • Attract advanced medical know-how • Improve air quality • Improve emergency service facilities	• Health policy document • Minimum health care provision • Emergency services delivery policy	• Acquire information on current health care facilities • Determine standard of current health care • Upgrade clinics • HIV/Aids awareness projects • HIV/AIDS impact analysis • Family planning programmes • Address sexual violence
• **Ensure high quality education**	• Promote local relevant programmes • Promote international accepted programmes • Support location of educational facilities • Attract academic leaders	• Entrepreneurship development programmes • Support research and development	• Provide well equipped educational facilities • Innovation initiatives • Promote educational fares

SECTOR: GOVERNMENT, NGO, COMMUNITY & SOCIAL SERVICES (9000)			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• **Improve public safety**	• Crime prevention • Safe city strategy • Attract tourists/visitors • Marketing	• Visible policing • Create City Improvement Districts • Law enforcement • No-tolerance policy	• Create information destination centres • Clean-up unsafe and deteriorated areas • Provide adequate lighting at night • Create a friendly city police force • Market city safeness • Establish city crime control rooms • Enforce law
• **Poverty eradication**	• Ability to meet basic needs • Improved self respect • Income distribution • Less dependence on local government	• Job creation initiative incentive scheme • Social planning • Welfare programmes	• Database on unemployment • Poverty mapping (household and cluster levels)

SECTOR: GOVERNMENT, NGO, COMMUNITY & SOCIAL SERVICES (9 000)			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• **Public support programme**	• Provide support structures • Demand driven labour force development • Public works programmes	• Job creation • Job retention efforts • Skills training for retrenched workers • Provide incentives to landlords to upgrade and maintain buildings • Transparent tender processes	• Improve amenities • Biased to local contractors • Local preference in public-sector hiring • Local community participation • Outsourcing of collective services • Create empowerment zones • Business enterprise competitions • Promote self-employment options • Establish a local skills register • Economic development ideas bank • Mentor programme by retired business people

SECTOR: GOVERNMENT, NGO, COMMUNITY & SOCIAL SERVICES (9 000)			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• **Prevent excessive decentralisation**	• Support inner-city location • Attract business activity to inner-city • Create a viable inner-city environment	• Strict rezoning policy • Right to transfer building rights in inner-city zone • Retention incentive scheme • Provide incentives to landlords to upgrade and maintain buildings • Provide incentives for inner-city location	• Develop a future decentralisation plan • Review town planning regulations • Ensure safe and clean inner-city • Promote City Improvement Districts
• **Improved innovation/R&D** • **Foster entrepreneuralism** • **Endogenous development** • **Generate new ideas**	• Provide excellent research infrastructure • Attract world class researchers • Support academic research	• Financial support for technology research centres • Provide incentives to basic and applied R&D	• Establish an anchor research facility • Upgrade public research centres • International conferences • Trade fares • Entrepreneurship initiatives • Knowledge based business skills development

SECTOR: ENVIRONMENT			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• **Sustainable land use development** • **Conservation of environment namely:** • **Geology** • **Soils** • **Hydrology** • **Climatology** • **Geomorphology** • **Biology (fauna/flora)** • **Urban morphology** • **Quality environment** • **Heritage**	• Establish green belts • Provide open spaces • Waste management • Enhance conservation areas • Highest and best use of land • Spatial development framework • Controlled urban growth • Integrate land-use and transportation plan • Enhance physical features	• Local Agenda 21 • Incentives for recycling and reuse • Enforce local environmental legislation/regulations • Flexible mix land-use • Flexible zoning • Waste management policy • Policy for protection of views of hilltops and skylines • Anti-noise control • Pollution control • Provide support to squatters to improve communities	• Environmental planning study • Map all service servitudes • Create database on open spaces • Environmental awareness campaign • Environmental educational programme • Upgrading of parks/open spaces • Acquire information on all heritage sites • Determine level of CO2 emissions • Pollution prevention programmes • Recycle rather than burn solid waste • Plant trees to reduce air/noise pollution • Plant indigenous vegetation to lessen use of water and pesticides • Ecological land-use planning • Prevent destructive sprawl • Plant trees

SECTOR: TOURISM			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• Attract domestic tourists • Attract foreign tourists • Lengthening stay • Increase amount spent • Increase amount spent on local goods • Prevent passing through traffic •	• Create a domestic and international tourism destination • Establish a focussed tourism industry • Marketing of services • Mass participation • Promote civic heritage • Create a tourist haven • Stop and shop	• Tourism development policy • Support events in marketing	• Create one stop tourist centres • Provide guided or unguided city tours • Establish annual national/international cultural events • Present an international acclaimed sports event • Establish tourist entertainment and recreation • Provide cultural and recreational facilities • Convention and tourism bureau • Support tourist related financial services • Heritage/tourism trails • Improve safety • Arts/crafts stalls

SECTOR: INFORMAL SECTOR			
GOALS	**STRATEGIC PRIORITIES**	**POLICIES AND POLICY OBJECTIVES**	**POSSIBLE ACTIONS**
• **Integrate informal sector into formal urban business activity**	• Acknowledge informal sector • Develop a well-located market place • Prevent sterile areas	• Assistance centres • Enforce adherence to regulations • Provide infrastructure incentives	• Create a local management body • Provide informal sector infrastructure • Designate areas for trade • Create formal taxi rank • Provide security • Provide waste control • Create empowerment zones

ANNEXURE B

MEASURE OF POLICY SUCCESS (QUALITY OF LIFE INDEX)

B.1 INTRODUCTION

The study in general and this annexure specifically, has a contribution to make in terms of the existing literature on providing an economic measure of policy success by means of a quality of life index. This index will be applicable on a national economy in measuring national welfare or quality of life over time. In this sense, it will be possible to measure and compare the quality of life of different cities and countries and provide insight as to where problem areas may exist and how to correct them. It will thus provide a tool to measure policy success in terms of economic, social and environmental issues, amongst other.

Efforts to enhance, protect and maintain the quality of life reflect a planning strategy associated with a stronger preference for a people-centred vision. Increasingly, it is suggested that if national welfare or quality of life could be improved, economic growth and development would be enhanced.

So far, on more than one occasion, the relative importance of agglomeration economies in explaining the concentration of economic activity in metropolitan areas had been emphasised. While the benefits and externalities that arises due to agglomeration economies are well defined and well known, they have not been adequately measured.

The process of thinking about the future is difficult and frustrating because nobody knows what the future holds. Yet, decision-makers want to know what the future holds. Most decisions concerning the future require at least some assumptions about the future. Some type of future analysis is basically unescapable. The problem with complex economic, social and environmental issues is that it is difficult to understand

them. That is why it needs to be simplified. Therefore some facts will be chosen that is emphasised and some others will be ignored or take as a given.

B.2 BASE MODEL

The economic structure of an urban area can be seen as the first dimension of the planning process; the spatial structure can be viewed as a second dimension and the temporal sequencing of activities as the third.

The basic idea of this quality of life index is that sustainable urban development requires the urban environment to be improved as a factor contributing to the quality of life. Furthermore, it needs to be a factor contributing to the development of the urban economic base. The model of Button and Pearce (1989: 176) stated this formally in saying that urban welfare (UW) depends on the quality of life (QOL) and on the economic base of which urban real income (Y) can be used as a proxy. In turn, QOL depends directly on the quality of the environment (E) and Y depends on economic inputs (N) and indirectly on E. The model is thus expressed as:

$$UW = f(QOL, Y)$$
$$QOL = f(E)$$
$$Y = f(N, E)$$

and hence

$$UW = f(N, E)$$

The aim of urban policy should therefore be to maximise the net benefits of the urban population by influencing E and N. Any given policy package should thus be the least cost one for a given level of welfare creation. Although the purpose of this appendix is not to criticize or evaluate the usefulness of this specific model, one needs to expand the concept of quality of life and incorporate factors not included in the above model. The above model is purely a neo-classical perspective and may be expanded. The ultimate index to be developed will preferably be one that may be quantified and measured.

The quality of life index to be developed will, however, be based on the concept of increased economic growth and development if an improved quality of life can be maintained. Sustainability is also of real importance in this kind of analysis. An indicator of relevance to sustainability is the degree of local provision of goods and services. Sustainability also requires that cognisance of the population structure should be taken. A city with an aging population structure imposes a heavier burden on younger taxpayers and this may lead to priority given to the attraction of new migrants by improved quality of life. Essentially, sustainability also requires that the urban environment should at least not be degraded. National or urban welfare is thus encompassing by quality of life. The objective of developing this index will be to measure the level of welfare or quality of life on various levels. The basic philosophy underlying this framework is that various economic factors need to be measured to enable a country or urban area to identify, address and correct inferior aspects, with the ultimate goal of improving the quality of life and enhancing business activity.

B.3 QUALITY OF LIFE INDEX

B.3.1 Introduction and methodology

One of the main problems in determining the quality of life within an area is the difficulty to quantify such a concept. There is no generally accepted measure of quality of life. Existing measures seem to focus on certain socio-economic variables only, allowing it to be narrowly focussed and biased. A well-known barometer for capturing the quality of the socio-economic environment is the Human Development Index (HDI) developed as used by the United Nations. The HDI consists of three components, namely adult literacy and life expectancy to indicate the level of opportunities, and personal disposable income per capita as an indicator of welfare (United Nations 1996:28). However, these few variables represent only a limited view of the real socio-economic milieu within a country and too much dependence thereon could obscure some important other socio-economic characteristics. Another major shortcoming of the HDI, as calculated by the Development

Bank of Southern Africa, is that it is not published as a time series, but rather as *ad hoc*-flashes at certain intervals.

For the purpose of developing this quality of life index, national welfare is based on supply, demand and contextual factors. The quality of life index to be developed here is based on the assumption that national welfare is equivalent to quality of life. Quality of life therefore, depends also on three main variables contributing equal amounts of weight capturing all three aspects of supply, demand and contextual factors. The idea is thus to develop a system in which the quality of life, using several variables, can be structured. This quality of life index had to be meaningful in terms of both static and dynamic analysis. As is the case with the HDI, this indicator should, nevertheless, be easy to understand and comprehensive. The purpose of this exercise would thus be to develop a quality of life indicator as an index that may be used on a national, regional or urban level. The composition of the index would firstly be explained before the actual calculations are shown.

The idea is to develop a time series of a single index that may be used as an instrument to measure quality of life over time. This means that if the values of the quality of life index increases over time, an improvement has taken place in the general quality of life of the inhabitants of that specific area. A decreasing quality of life index would obviously means the opposite. From the individual items of the index it would be possible to indicate which variables were mainly responsible for the changes in the quality of life index. This would provide a tool to policy-makers to identify those variables responsible for a decreasing quality of life and thus a chance to correct or eliminate policies contributing to that decrease. Furthermore, the possible changes in national quality of life may be measured and compared to the quality of life of various urban areas over time.

The index consists of three main variables, each one consisting of several sub-variables. The three main variables are personal disposable income per capita (Ydc),

capital (K) and socio-economic (SE) variables. In equation format, what have been discussed above, can be expressed as follows:

$$\text{National welfare (NW)} \equiv \text{Quality of life (QOL)}$$
$$\text{QOL} = \text{Ydc} + \text{K} + \text{SE}$$

Each one of these main variables will be discussed individually in more detail below. The time series of each variable will be expressed as an index with 1995 as the base year being set equal to 100. National time series data from 1975 to 1996 was used to create and develop the index, although it may be adjusted and customised for urban or regional areas. Each one of the three main variables will contribute 33.3% to the total quality of life index. The 33.3% contribution of each one of the three main variables will consist of the sub-variables' contribution. The weight of the sub-variables may differ but this will be elaborated upon in more detail below.

B.3.2 Disposable income per capita (Ydc) or demand side

The first main variable is the personal disposable income per capita (Ydc) at constant prices smoothed by a three year moving average. This main variable does not consist of any other variable due to the importance of personal disposable income in terms of quality of life. The contribution of this variable to the total quality of life index will thus be 33.3%. Although the introduction of the Gini-coefficient may provide a better, more comprehensive variable, it is only available at certain *ad hoc*- intervals and not as a time series. Due to this constraint, it was believed that personal disposable income to be a sufficient variable explaining income and thus acts as representing the demand variable. The personal disposable income per capita represents the value of the potential demand that exists in the economy and is therefore seen as reflecting the demand side. The results of the personal disposable income per capita are shown in Table B.1 and Figure B.1.

B.3.3 Capital assets (K) or supply side

To develop the capital variable as reservoir of wealth, a discussion concerning the various sub-variables is necessary. All these sub-variables encompass the capacity of an economy to be able to produce and deliver and thus contributes toward the supply side of an economy.

According to conventional wisdom, the clinical growth factors such as saving (financial capital) and investment (man-made capital) have to be supplemented by the upliftment of human capacity - known also as endogenous growth (Romer, 1996; Jones, 1998 and Sen, 1996). Thus, the definition of capital has been broadened to include human or intellectual capital. It has also been argued that two more components should be added to this definition, namely, natural and social and organisational capital (Schoeman, Blignaut & Jordaan, 1999). Due to the fact that it is assumed that financial, man-made and human capital is already described at length in literature, only natural and social and organisational capital will briefly be discussed for purposes of the discussion here.

(i) Natural capital

Natural capital expands beyond the concept or production factor *land*, to include all natural systems, such as the atmosphere, biological systems, and even the sun (Gilman, 1992). These natural systems affect the quality of capital. For example, sulphur dioxide released into the atmosphere becomes part of negative environmental capital. The natural activity of precipitation converts the sulphur dioxide into acid rain which adversely affects the quality of lakes and forests, respiratory health, buildings, etc. On the other hand, the natural activity of the sun impacts on the environment both positively and negatively, by creating power in solar systems and causing many man-made materials to perish. From a production point of view very little substitution is possible between environmental capital and other reservoirs of wealth such as financial capital or manufactured capital. Although environmental capital can be self-maintaining and even regenerate itself, much of the wealth in environmental capital such as the

ozone layer or complex ecosystems like tropical rainforests simply can not be replaced by other forms of capital (see Pearce and Turner, 1991; Daly, 1996 and Stern, 1997 for a discussion on the natural environment as capital). Of great importance is the fact that humans pose the greatest threat to the quality of environmental capital resources and in so-doing are threatening its own existence.

(ii) Social and organisational capital

According to Ekins (in Gilman, 1992) human capital comprises health, knowledge and skills, and motivation. A major difference between human capital and material forms of wealth is that the former is enhanced by use rather than depleted or worn down. As outlined in the endogenous growth theories referred to, human capital is not constrained by the normal economics of scarcity. The only limiting factors to human capital is time, and in many parts of the world a lack of opportunities and facilities.

Apart from the importance of human capital in the conservation and exploitation of scarce environmental capital, social and organisational aspects should also be considered as part of the broad package of reservoirs of wealth. Social and organisational capital include all of the interpersonal "software" that enables societies and organisations to function, including habits, norms, roles, traditions, regulations, policies, etc. - in other words, the non-physical part of culture (Gilman, 1992). It differs from human capital in that while the latter is attached to a particular individual, the former is transpersonal, non-exploitable and collective. It includes the way in which the legal system operates, the functioning of government, the feeling of the community, the dynamics within families, as well as all art and knowledge that has become part of culture. Similar to the case of human capital, social and organisational capital cannot be depleted and is in fact enhanced by use but it can deteriorate should external effects adversely influence the social fibre of society.

It is therefore essential to include all five forms of identified capital namely man-made or physical, financial, human, natural or environmental and social and organisational

capital as supply variables into the index. Each one of these five sub-variables will contribute equally to the total capital variable. The composition of the five sub-variables will subsequently be discussed.

iii) Capital sub-variables

- Man-made capital (MM) consists only of one element namely fixed capital stock per capita. The contribution of fixed capital stock per capita to the total capital variable is 20%.

- Financial capital (FIN) consists of two elements namely real money stock per capita and per capita foreign reserves in dollar terms. Each one of the two contributes 50% to FIN with FIN contributing 20% to the total capital variable.

- Human or intellectual capital (HC) consists of the dependency ratio and is expressed as the total population divided by the formally employed. The contribution of HC to the total capital variable is 20%.

- Natural or environmental capital (E) consists of two elements namely non-renewable resources and environmental resources. The total value of gold and coal stock per capita would serve as a proxy for non-renewable resources and carbon dioxide (CO_2) emissions per capita as a proxy for environmental resources. However, in the case of CO_2 emissions per capita, an environmental improvement is indicated by a decline in the index value. In order to adjust for this technicality, the reciprocal of the index was calculated and applied. Each one of the two elements contributes 50% to E with E contributing 20% to the total capital variable. An effort was made to include renewable resources (fauna and/or flora) as a third element but after timeless effort, no time series data could be acquired and it was omitted from the model.

- The last sub-variable, social and organisational (S/O) capital consists of two elements namely the number of divorces divided by the labour force and the women

participation rate in the economy. However, in the case of the number of divorces divided by the labour force, a social improvement in the variable is indicated by a decline in the index value. In order to adjust for this technicality, the reciprocal of the index was again calculated and applied. Each one of the two elements contributes 50% to the sub-variable of S/O and S/O contributes 20% to the total capital variable.

This part of the quality of life index can thus be represented by the following equations:

Capital (K) = MM (20%) + FIN (20%) + HC (20%) + E (20%) + S/O (20%)

MM = fixed capital stock per capita
FIN = real money stock per capita + per capita foreign reserves in $ terms
HC = dependency ratio
E = non-renewable resources + environmental resources
S/O = number of divorces/labour force + women economic participation rate

Capital contributes 33.3% to the total quality of life index and the results of capital are shown in Table B.2 and Figure B.2.

B.3.4 Socio-economic indicators (SE)

The socio-economic environment was divided into five categories namely education, health, infrastructure, public safety and leisure. Given the poor state of socio-economic and labour statistics in South Africa, high quality and appropriate time series data on each of these domains that subscribe to the set criteria were difficult to find. However, despite these constraints, a series that could be regarded as representative of each domain and which fulfils the set criteria, was compiled and a composite index calculated. Each one of these sub-variables contribute 20% to the socio-economic variable. The five sub-variables are again made up by several elements. This will now be discussed.

- Education (EDU), is determined by the number of successful matric (grade 12) candidates as percentage of total population and the literacy rate. Both of these elements contribute 50% each to the education sub-variable and education contributes 20% to SE.

- Health (H) consists of two elements as well namely the number of medical practitioners per 1000 of the total population and life expectancy. These two elements contribute 50% each to H and H contributes 20% to SE.

- The number of approved building plans and electricity generated was used to develop the infrastructure (INFRA) sub-variable. Both these elements contribute 50% each to INFRA with INFRA contributing 20% to SE.

- To determine public safety (PS) as a sub-variable the number of thefts per 1000 of the total population was calculated. However, in the case of public safety, an improvement in the socio-economic environment is indicated by a decline in the index value. In order to adjust for this technicality, the reciprocal of the index was calculated and applied. The PS contributes 20% to SE.

- The last sub-variable, namely leisure (L), was developed by using two elements namely the number of hotel beds available as well as the bed occupancy rate. Both these elements contribute 50% each to L with L contributing 20% to SE.

This part of the quality of life index can thus be represented by the following equations:

Socioeconomic variable (SE) = EDU (20%) + H (20%) + INFRA (20%) + PS (20%) + L (20%)

EDU = number of successful matric candidates as % of the population + literacy rate
H = number of medical practitioners per 1000 of the population + life expectancy
INFRA = number of approved building plans + electricity generated

PS = number of thefts per 1000 of the population
L = number of hotel beds available + bed occupancy rate

The socioeconomic variable contributes 33.3% to the total quality of life index and also represents the contextual variables. The contextual variables accommodate the in which people, participating in the economy, have to deal on a day to day basis. The results of the socio-economic environment are shown in Table B.3 and Figure B.3.

In sum, the following may represent the total quality of life index:
NW ≡ QOL
QOL = Ydc + K + SE
Ydc [33.3%]= Ydc
K [33.3%] = MM (20%) + FIN (20%) + HC (20%) + E (20%) + S/O (20%)
SE [33.3%] = EDU (20%) + H (20%) + INFRA (20%) + PS (20%) + L (20%)

The quality of life index is therefore a composite index determined by 18 variables in total and represents a quantitatively and comprehensive indicator of general quality of life.

B.3.5 Figures and data

The various figures and data of each variable will now be presented to show the tendency of each.

Table B.1: Personal disposable income

Years	Personable disposable income (Ydc) (1995=100)
1975	99.08
1976	98.48
1977	98.69
1978	96.16
1979	95.10
1980	96.05
1981	96.65
1982	96.73
1983	97.38
1984	100.56
1985	98.84
1986	94.42
1987	92.54
1988	94.65
1989	96.57
1990	97.83
1991	97.16
1992	96.88
1993	98.39
1994	99.23
1995	100.00
1996	102.37

Figure B.1: Personal disposable income per capita

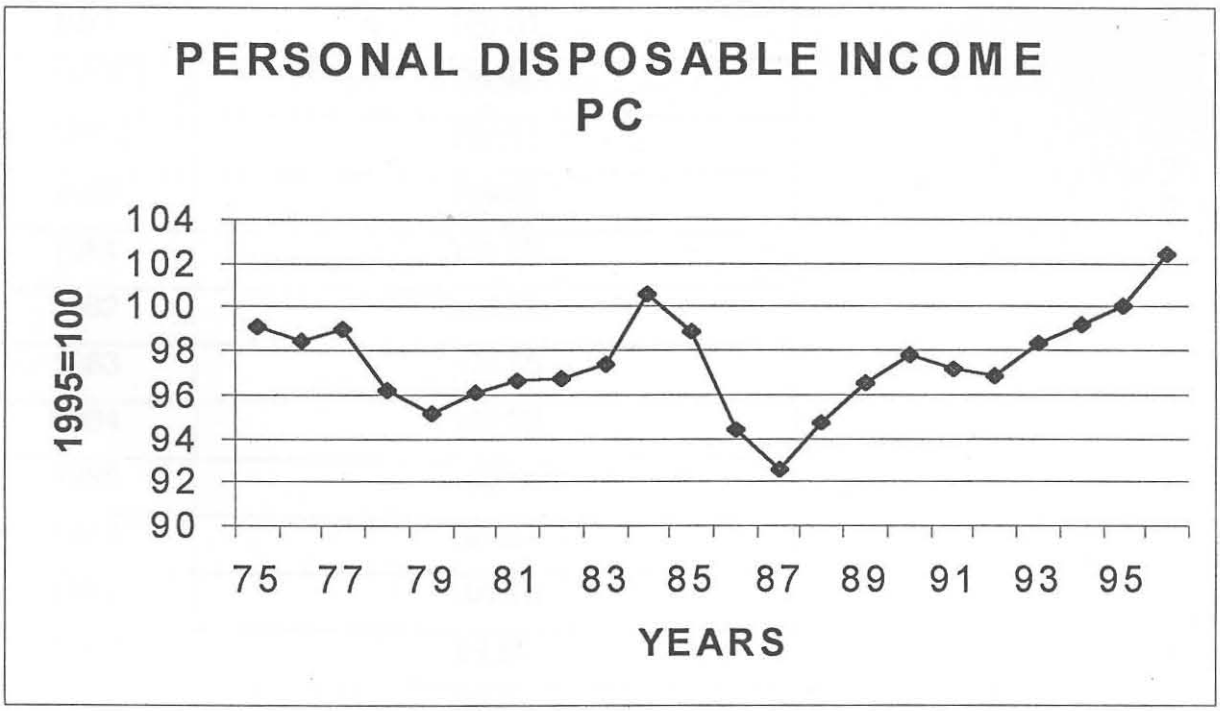


Table B.2: Capital (total of all sub-variables)

Years	Capital (K) (1995=100)
1975	110.74
1976	109.12
1977	100.31
1978	99.32
1979	109.11
1980	119.67
1981	114.08
1982	103.25
1983	106.55
1984	102.30
1985	100.46
1986	98.60
1987	101.75
1988	99.85
1989	97.51
1990	95.61
1991	93.54
1992	97.79
1993	93.43
1994	97.12
1995	100.00
1996	98.85

Figure B.2: Capital

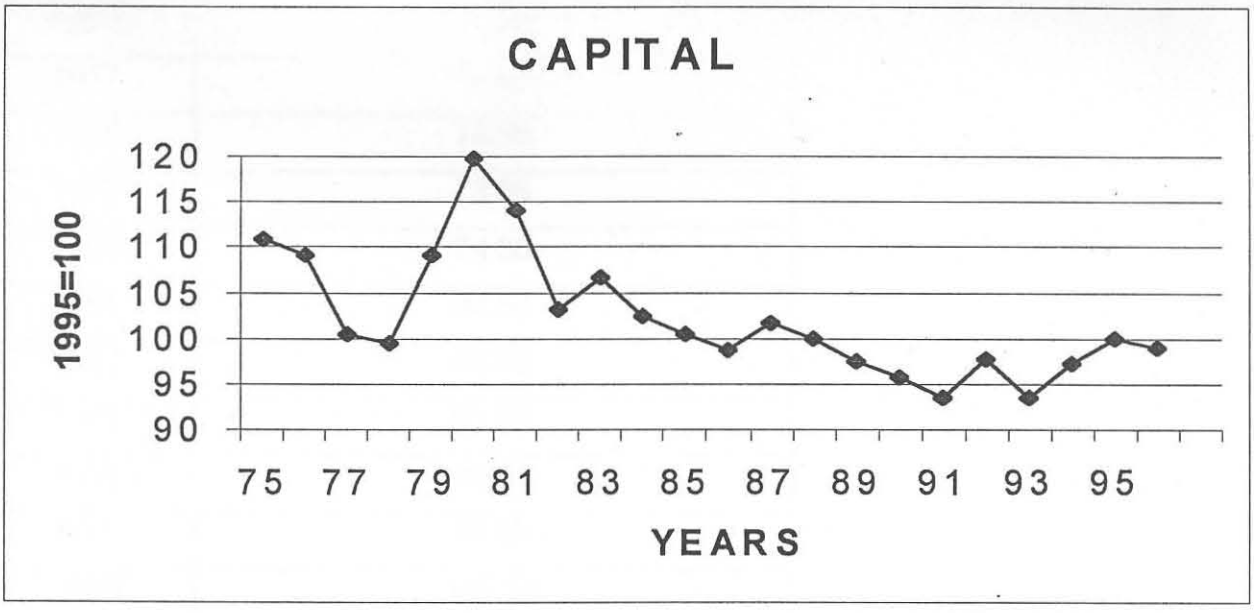


Table B.3: Socio-economic indicators (total of all sub-variables)

Years	Socio-economic indicators (SE) (1995=100)
1975	59.90
1976	59.32
1977	72.91
1978	72.39
1979	73.86
1980	74.30
1981	84.50
1982	89.00
1983	91.99
1984	96.65
1985	95.59
1986	107.31
1987	110.16
1988	113.34
1989	110.56
1990	104.55
1991	103.42
1992	101.34
1993	98.69
1994	98.64
1995	100.00
1996	99.63

Figure B.3: Socio-economic indicators

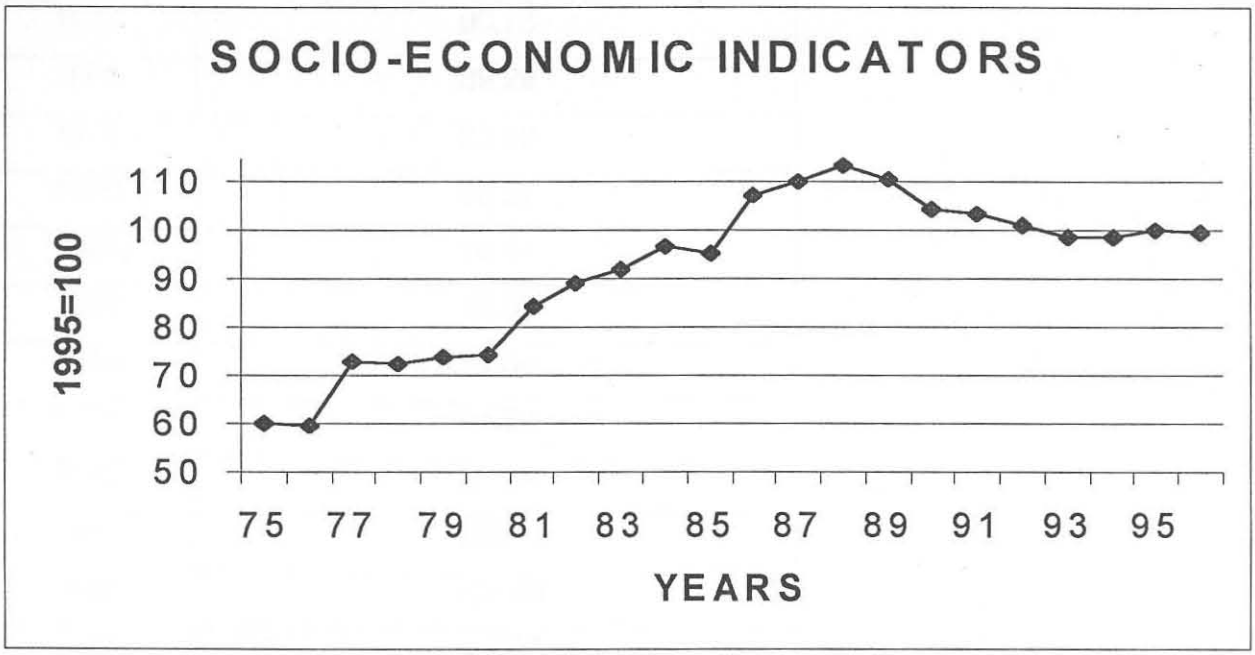
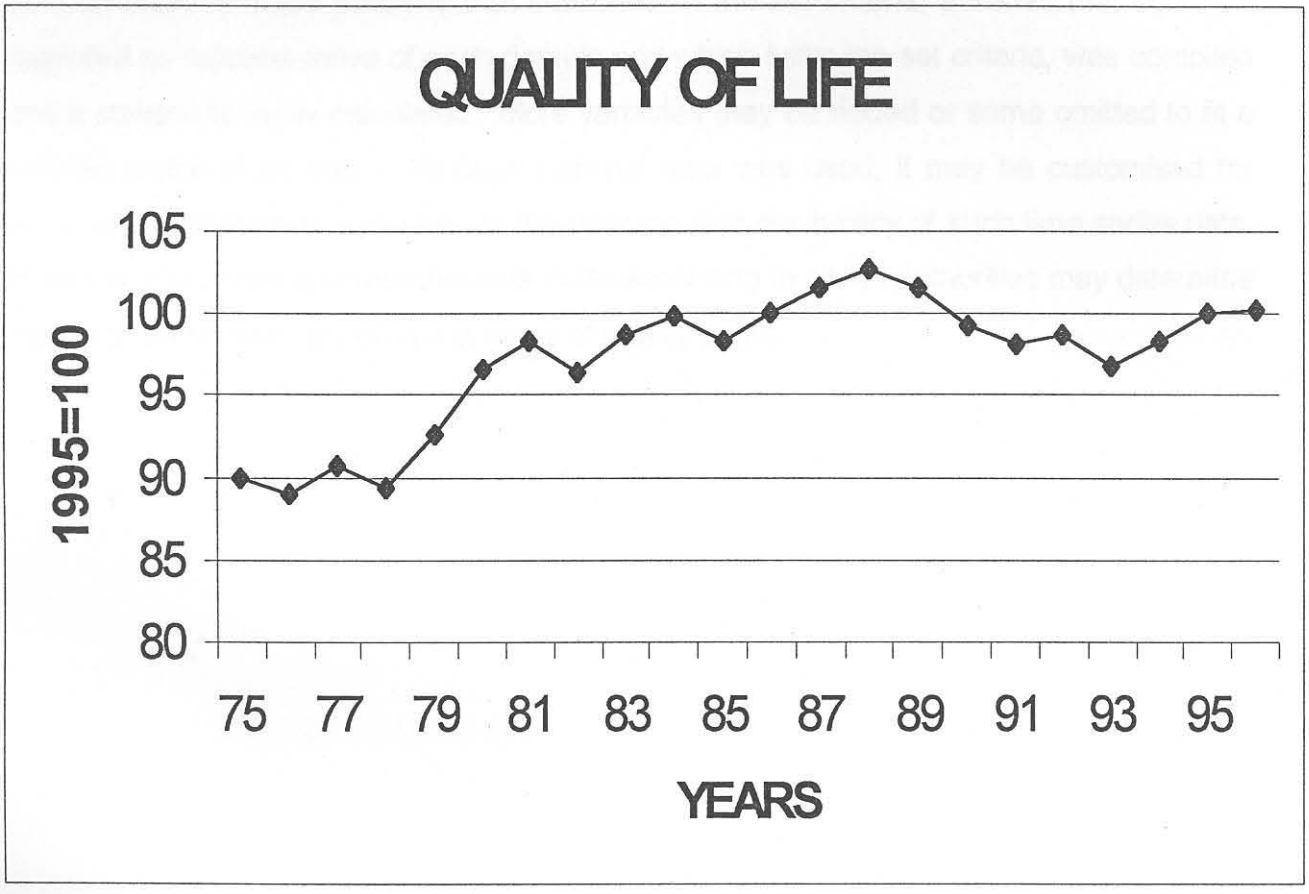


Table B.4: Quality of life (Ydc + K + SE)

Years	Quality of life (QOL) (1995=100)
1975	89.91
1976	88.97
1977	90.73
1978	89.29
1979	92.69
1980	96.67
1981	98.41
1982	96.33
1983	98.64
1984	99.84
1985	98.29
1986	100.11
1987	101.48
1988	102.61
1989	101.55
1990	99.33
1991	98.04
1992	98.67
1993	96.83
1994	98.33
1995	100.00
1996	100.28

Figure B.4: Quality of life



Although the quality of life for the total population in South Africa shows an increasing tendency from 1975 until 1996, it is alarming that the 1996 level is more or less equal to the 1986 figure. The peak period in terms of quality of life was reached between 1987 to 1989. Despite the constraints of availability of high quality and appropriate time series data on each of these domains that subscribe to the set criteria, a series that could be regarded as representative of each domain and which fulfils the set criteria, was compiled and a composite index calculated. More variables may be added or some omitted to fit a specific profile of an area. Although national data was used, it may be customised for urban areas or regions according to the demand and availability of such time series data. However, it provides a comprehensive index according to which authorities may determine the outcome of their set policies in terms of quality of life.

B.4 REFERENCES OF VARIABLES

B.4.1 Personal disposable income per capita (Ydc)

- Personal disposable income per capita at constant prices smoothed by a three year moving average (SARB, various issues).

B.4.2 Capital (K)

MM

- **Fixed capital stock per capita** (SARB Quarterly Bulletin, various issues) Total SA population (SA Statistics, www.statssa.gov.za/ publications/ statistics_in_brief/).

FIN

- **Real M3 per capita** (Unit: R millions) (SARB Quarterly Bulletin, various issues). The consumer price-index, seasonally adjusted (Unit: Index 1995=100) (SARB Quarterly Bulletin, various issues).
- **Per capita foreign reserves in USA dollar**. Gross gold and other foreign reserves (Unit: R millions) (SARB Quarterly Bulletin, various issues) minus Gold reserves (Unit: R millions) (SARB Quarterly Bulletin, various issues). Exchange rates (Unit: SA cents per USA dollar, average for period) (SARB Quarterly Bulletin, various issues).

HC

- **Dependency ratio** (Total SA population/ Formally employed). Total SA population. Formally employed. (SA Statistics, www.statssa.gov.za/ publications/ statistics_in_brief/).

E

- **Co2 emissions**, industrial (Kg per 1995 US$ of GDP) (World development indicators)
- **Gold and coal stock in rand value** (Blignaut, J.N. & Hassan, R.M. 2000. A Natural Resource Accounting Analysis of the Contribution of Mineral Resources to Sustainable Development in South Africa. Working Paper. (www.Ranesa.co.za)

S/O

- **Number of divorces/labour force**, reciprocal. Labour force, total number (World Development Indicators, 1999). Total number of divorces (StatsSA, vital statistics).
- **Women economic participation rate**. Economically active female population/potential economically active female population (15-64 years) (94 October Household survey, 60, 70, 80, 91, 96 census figures).

B.4.3 Socio-economic indicators (SE)

EDU

- **The number of successful matric candidates** was expressed as a percentage of the total population (Quarterly Bulletin, SARB).
- **Total adult illiteracy rate**, reciprocal (% of people aged 15 and above) (World development indicators, 1999).

H

- **The number of medical practitioners** per 1000 of the total population (CCS1994 and 1996).
- **Life expectancy** at birth in years (World development indicators, 1999).

INFRA

- The geometric mean of the index value of **buildings completed** at constant prices (SARB, 1998).
- **Electricity generated** (SARB, 1998).

PS

- **The number of thefts** per 1000 of the total population (CCS 1994 and 1996).

L

- **Number of hotel beds available** (CCS 1975 - 1997).
- **Bed occupancy rate** (CCS 1975 - 1997).