



THE IMPACT OF PERCEPTIONS ON BUILT FORM: A
Proposed Transport Interchange for Durban

Ahmed Olla

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ABSTRACT

The evolution of public transport in South Africa has seen the rise and fall of the train and bus and the domination of the car and minibus taxis. In an urban environment which is ever increasing in population due the effects of urbanization the taxi industry has become the most serviced mode of public transport in South Africa due to its ability to move people efficiently.

The effects of this are evident by the chaos on the roads and in social environments where the demand of the minibus taxis have negatively impacted the very urban environment that they service. This has in turn seen the decline of many other modes of public transport and their facilities due to the lack of use and ability to cater for the growing demand and needs of the public. These public transport facilities and systems are now perceived negatively by large populations that have the choice of other means of mobility.

The need for facilities that provide cohesion of all modes of public transport is required to change the way people feel about public transport and to offer the freedom of using the various modes interchangeably.

This dissertation considers an appropriate response through architectural design to positively change the perceptions of the public. Through extrapolating the impacts that perceptions have on the built form, the creation of transport facilities that can positively enhance perceptions can be established.

While architectural theories on perception and phenomenology provide a method of dealing with the sensory and cognitive aspects of design, active engagement with the users of public transport provide valuable information informing the research and design outcomes. In order to successfully incorporate the interpretations of perceptions qualitative research had been conducted in cohesion with a review of literature and an analysis of case studies and precedents.

Through the research it has been demonstrated that through meaningful architecture the perceptions of people can be changed to positively gain a working transport system with facilities that incorporate all types of mobility. The outcomes of this dissertation also provide a set of recommendations, principles and understanding of the criteria necessary to inform the design of a transport interchange in an urban South African context.

DECLARATION

I declare that this dissertation is my own, unaided work and carried out exclusively by me under the supervision Mr. M.N. Mthethwa. It is being submitted for the degree of Master in Architecture to the University of KwaZulu-Natal. It has not been submitted before for any degree or examination in any other University.

.....

Ahmed Olla

.....day ofyear.....

DEDICATION

To my *family and friends*,
for all your encouragement and support.

To my parents *Ebrahim and Ferial*,
for always encouraging me to pursue what I want in life.

And to my dear wife *Zulaykha*,
for all your love and support during this long journey.

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- To the outstanding staff at the Barrie Biermann Architecture Library for their kind assistance.
- To my wife, parents, sisters and other family members for their support throughout my studies.
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CHAPTER ONE:
INTRODUCTION

1.1 BACKGROUND STATEMENT

Over the last twenty years, the world has been undergoing the most significant period of technological innovation and global restructuring since the first decades of the 20th century (Eldemery, 2009:345). Together with these technological advances and globalization the built environment has been dominated by the effect of standardization. Evolution in technology has created both opportunities for, and barriers to, sustainable development. This combination of technology and built environment has led to architecture which has become continuously replicated. Due to these evolutions, cities have become infested by built forms which have no significant meaning to creating livable cities, hence causing negative mental images of the city to its inhabitants.

Contributing to these negative mental images of the city is the commonly conversed issue of globalization. The effects of globalization on people are often due to factors such as economic, political and cultural exchanges between national countries for centuries. These factors create confusion for people to establish a sense of identity. People are in the process of establishing a sense of identity in what is essentially an insecure world, and this underlying instability may serve to magnify the tensions and lack of control they experience on a daily basis (World youth report, 2003).

Public transport is rapidly becoming one of the most problematic areas for sustainability in South Africa and specifically the major obstacle in achieving urban revitalization, due to the damage that South Africa sustained during the apartheid era. In an evolving country, especially one that started gaining momentum after 1994 when globalization was at its peak, the public transport systems have been neglected due to the pursuit of freedom by the people (Loots, 2002: 1-18). The current trends for personal mobility are shaped by the dominant practices of the industrialized nations: the car as both a symbol and tool of the freedom of the modern world (Cox, 2010: x). Even with these current trends, there is a majority of people in South Africa who still use public transport on a daily basis.

1.2 MOTIVATION / JUSTIFICATION FOR THE STUDY

In the recent past, in most urban areas the focus of public transport bodies was largely the provision of basic services for low-income communities, whose travel choices do not extend to walking, cycling or driving to their destinations. In most medium- to high-income areas, only rudimentary services exist which can barely be considered an alternative to the motor car (CSIR, 2005:1). Public transport services in South Africa have been designed solely for the purpose of getting people from low-income areas to the urban city centers with no consideration for human perception and social lifestyle.

Public transportation touches on all aspects of the city. Economic development, quality of life, social equity, public health and ecological sustainability (Tumlin, 2012: 2). Over the years the focus on public transport in South Africa has shifted to the use of the automobile and other means of private transport such as the minibus taxi. These modes of transport have been adopted due to the fact that they are more reliable due to the decline of public transport systems. Factors that led to the decline of public transport have gotten their roots from corruption, negative media, crime, government funding, lack of resources and poorly standardized built form. All these factors intertwine and overlap each other.

A built environment, where people can be comfortable and where the use of the building or functions of using the building is not merely a person's only option but rather a choice that needs to be established. To be attractive to people with a choice of modes, transit must meet certain basic requirements: It must be convenient, relatively fast and easily accessible, frequent and reliable. It should also be generally affordable while not being considered solely as a social service for those who have no other mobility options (Tumlin, 2010:39). In South Africa there is a lack of transport facilities that could contribute to changing the perception of the people towards public transport.

1.3 PROBLEM STATEMENT, AIMS AND OBJECTIVES

1.3.1. Research Questions

The primary question which will be used to guide this dissertation is:

- What is the Impact of perception on built form?

Sub-questions for the research are:

- What is the current human perception on public transportation?
- What are the circumstances that led up to the current perception of public transport?

1.3.2. Statement of Research problem

The failure of architecture in current times to deliver an environment which enhances physiological aspects of people has led to their disconnection from the built environment. Architecture today is standardized with little or no consideration for the users' phenomenological feelings. Edwards (2011:3) argues that "the forces of internationalism and of standardization do tend to unify the function and shape of architecture, especially in the transport realm." Together with this, other negative factors are born such as lack of social interaction in the built environment. There is a need for facilities that ultimately and positively, enhance the perception of people towards the built environment.

1.3.3. Overall aims and objectives of the study

The ultimate aim of this dissertation is twofold. Firstly it strives to understand the way people perceive public transport in South Africa and the impact that this perception has on its built form. Secondly it considers the factors that contribute to people's perception on architecture, in achieving an appropriate built form which enhances the built environment and positively changes the way people perceive public transport in South Africa.

In achieving the aims stated above, the objectives of the research are as follows:

- To establish the definition of human perception
- To gain an understanding as to what influences people to perceive things differently in relation to built form.
- To understand the impact that these perceptions have on architecture.
- To understand the impact that human perception has on public transport.

1.4 SCOPE OF THE STUDY

1.4.1 Hypothesis

Perceptions can only be achieved through engaging with the built form and experiencing the environment in which it exists. The image that the people have on public transport can be positively changed through meaningful architecture which includes enhancing the phenomenological and perceptive ingredients of the built form.

1.4.2 Research Scope and Limitations

The issue identified for study in terms of architectural relevance is twofold. The first looks at the cause-effect relationship of the built form influencing perceptions and the second looks at how human perception impacts built form. This study is meant to derive architectural methodologies to create a building which enhances the environment in a positive manner, creating an environment that enhances people's sensory perceptions and makes them comfortable in their surroundings. The study is not only limited to architecture but also the feeling of individuals with regards to the five senses. It also analyses the public transport systems that exist internationally and in South Africa to gain an understanding of how facilities should be designed more efficiently for its users. The research will exclude analyzing the private sector of transport facilities and focus more on government funded or subsidized public transport facilities. The research does not intend on creating a universally applicable solution to the problem in all contexts but rather focuses on the context of Durban, South Africa.

This dissertation is researched under the following assumptions:

- People base their perceptions on things without properly experiencing them and therefore have no idea what the actual feeling is.
- The decay of Durban's Public Transport system has caused many people to give up on public transport and drift to other means of mobility.
- The built form needs to respond to sensory perceptions and allow people to live and experience their environments in order to develop a positive perception towards it.

1.4.3 Definition of Key Terms

- **Perception:** the act or faculty of apprehending by means of the senses or the mind; cognition; awareness.
- **Impact:** The consequences of personal judgement on the lifestyles.
- **Built Form:** In this dissertation the built form refers to architecture with specific regards to public transport architecture.
- **Chora:** Place of space.
- **People:** Where the word people are used in this dissertation it refers to the public.
- **Urban Environments:** In this dissertation urban environment refers to the city centres or the CBD of cities. It includes the built form as well as public space and transport systems.

1.5 RESEARCH STRUCTURE

This study reinforces the concept of perception in the built form. The environments that people perceive in current times are based on assumptions rather than on phenomenological encounters. These assumptions negatively influence what people perceive towards a certain environment and it is these assumptions that cause negative mental images about cities, hence the relationship between perceptions and built form.

In the chapters to follow, it is hoped that the research findings will assist in proposing a transport interchange that achieves the objectives of the research in terms of the use of architecture as an integrative tool in urban revitalization and changing perceptions of people towards public transport.

The research will begin by grounding the key theme of perceptions in a theoretical social aspect and will unfold the foundation of perceptions to gain insight into the definition and historical issues. It will then consider how perceptions are interpreted in architecture and will involve identifying aspects that physically and psychologically affect mankind. Through the processes above, the key issue of perceptions will then be linked to the built form and will examine architectural aspects of what perception entails. The precedent and

case studies to follow will substantiate the impact of perceptions on built form and will compare characteristics of a variety of buildings on a macro and micro context. Through theoretically analyzing these precedents and case studies a further interpretation on the impact of perceptions on the built form will be established.

Understanding the foundation and interpreting perceptions are the key areas of this dissertation. Transposing these theoretical frameworks from the research and implementing the research towards the design of a built form is the ultimate goal of the author of this dissertation.

CHAPTER TWO:
METHODOLOGY

2.1 INTRODUCTION

This section outlines the methods used to carry out this research. It specifies the intended scope of study and indicates the techniques that are used for selecting and gathering appropriate data for the research topic.

2.2 RESEARCH MATERIALS

2.2.1 Primary Research

This is data that is gained first hand through direct contact with local South African case studies and interviewees that are directly affected by these case studies on a daily basis. This will provide an opportunity for the research to develop information deduced from these findings which will be tested against the secondary data gained from published resources that deal with perceptions of people.

Interviews will go hand in hand with the selected case studies in order to provide a more accurate understanding of the relationship between the current built environment and its inhabitants. The interviewees will include people who experience the environment on a daily basis as well as professional practitioners who have dealt with these areas being studied. This will provide a first-hand explanation of any critical issues deduced by the author and expose the gap between the understandings of public perception from a bottom-up approach.

2.2.2 Secondary Research

This section of the research will gather information from books, journals, and structured reports, dealing with the way people live. This information will be pertinent to the dissertation to ensure that this study builds on existing ones and adds value to the relevant fields of architectural study.

A review of literature will be used to gather views expressed by specialists that have written material on the problem at hand. The material will be sourced from published books. The material itself will deal with the issues that relate to human perception and architecture; this includes the influences of social media platforms and technology as well as spatial configuration and planning techniques of the current built form in a modern

urban context. The literature review will also provide the theoretical framework for the understanding of this dissertation.

The appropriate information on the selected works will be gathered through an analysis of the ensued precedent studies from published journals, books, photos and published articles from the internet. The precedent studies will be selected from international examples to give an understanding of the methods in which the issue at hand is being addressed globally. The selection criterion is based on the ability of transport facilities to create change in the urban context and a transport facility that exemplifies an interchange.

2.3 CASE STUDY

Case studies will be carried out in order to gain an understanding of the current lack of cohesion between the built environment and perception of the people. This will include existing transport buildings as well as public transport systems that exist in South Africa that local people use on a daily basis. Observation studies will be conducted at the location of these case studies to gain firsthand experience on the facilities. The key case studies are:

1. Park Station, Johannesburg CBD, Gauteng
2. Moses Mabhida Station, Kingspark, Durban.

2.4 DATA COLLECTION METHODS

The purpose of this research is to create a systematic method for collecting and gathering data for analysis, in order to clarify and resolve the problem at hand. The methodical approach used for the research concentrates on the collection of data and site investigations which are used to produce a clear understanding of the research problem and issues inferred by the topic. Approaches for collecting and analyzing data will be through the following methods:

- Qualitative and Empirical Data: Observation studies, surveys, diagrams and sketches
- Research data: Philosophical and historical background of precedents and case studies
- Questionnaires and Unstructured Interviews: given and done at random, with people who use or work in the building being used as a case study or the general public.

2.5 RESEARCH LIMITATIONS

The study is limited to qualitative research methods and does not include any analysis or comparisons of statistics of figures. The research is based on published information and the authors own analysis and are limited to primary and secondary research as outlined above. The study is based on the information provided during the qualitative methodology and assumes this information as the most accurate. The research is limited by the resources made available and only to where permission has been granted to conduct such research.

2.6 METHODS EMPLOYED IN THE DATA ANALYSIS

The methods used to analyse data are demonstrated through diagrams and comparison of information gathered from the qualitative empirical studies. This information is tested against information provided by published sources in order to analyse the data to establish accurate outcomes. The data gathered will be summarized to provide a clear understanding of specific outcomes.

CHAPTER THREE:
LITERATURE REVIEW

3.1 INTRODCUTION

The following concepts and theories have been identified as foundations of this study. They provide the necessary framework to gain an understanding of the impact that perceptions have on built form. The following theories will also be the framework for the entire literature review. In order to gain a pre-understanding, a short breakdown is included below.

3.2 THEORETICAL AND CONCEPTUAL FRAMEWORK

Perception Theory

Perception Theory deals with the observations of people with regards to the various senses of one's self in relation to their environment. Pallasmaa discusses in his works 'The Eyes of the Skin' (2005) about the multisensory experience. Architecture is essentially an extension of nature into the man-made realm, providing the ground for perceptions and the horizon of experiencing and understanding the world (Pallasmaa, 2005: 41). Another way of understanding Perception Theory is to look at it from the precipitants point of view, the interpreter. As Bonta (1979) explains the interpreter as the person who attributes meaning to a scenario, by a variety of indirect hints to reinforce their interpretation. Perception in architecture also includes cultural backgrounds; some people might perceive situations differently due to their cultural backgrounds. Pallasmaa's and Bonta's attempts to explain perception on built form paves the way for the research as it gives one an understanding and framework on how to interpret architecture from two very different perspectives.

Genius Loci

Christian Norberg Schulz, architect, architectural historian and theorist, was one of the main authors who analyzed the theory and the history of architecture in a phenomenal perspective. In his previous work, 'Intentions in Architecture' (1963) and 'Existence, Space and Architecture' (1971), he discusses 'existential foothold' and 'existential space'. Norberg- Schulz realized that there was still a need to explore the character of places on the ground and their meanings to people. His explanation of the genius loci concept is found in his book, *Genius Loci: Towards a Phenomenology of Architecture* (Norberg-

Schulz, 1979) where he defines genius loci as representing the sense people have of a place, understood as the sum of all physical as well as symbolic values in nature and the human environment. It is from this study, that Genius Loci can be related to perception, the way people live and the attitudes people have with regards to their sense of place. It is important for people to have this as it gives them a sense of a spiritual place of belonging.

Image of the City

The psychological theory explained by Kevin Lynch in his work ‘The Image of the city’ (1960) and ‘what time is this place’ (1972) emphasises the theory of Genius Loci as it is based on the same theories along what Lynches work is about. In the ‘Image of the city’, Lynch was concerned with the way people construct mental maps from their daily interactions with a city’s streets, landmarks and districts. He emphasises that people should play an active role in perceiving the world and have a creative part in developing their opinions (Lynch, 1960:5). In ‘What time is this place’, he demonstrated how time is embedded in the physical environment and how collective well-being is intertwined with a sense of place in time. Lynch’s work is a background of what the study is based on and his work is directly relevant to the impact of perception on built form.

3.3 CONCLUSION

The theories above will be utilized within this research in the literature review section of the document. The extrapolation of these theories will provide the necessary theoretical tools to inform the research regarding the design of a transport interchange.

CHAPTER FOUR:
THEORETICAL FOUNDATION OF PERCEPTIONS

4.1 INTRODUCTION

Understanding the foundations of the Theory of Perception is critical in gaining a framework of understanding as to how perception impacts on built form. The term perception can often be misunderstood by people. It is important to therefore understand its roots and the ingredients which make up perception. This chapter involves conceptualizing the theory of perception from a gestalt perspective similar to that of Norberg-Schulz (1965) and Lynch (1960), and then breaking it down into fragments.

In order for one to grasp the fundamental foundations of perception one needs to understand its influences on lifestyle and on the environment. As well as how perceptions influence mankind directly. The concept of perception affects economic, political, cultural and social realms.

“Perceptions of physical and social environments have common characteristics. Such perception is affected not only by culture and previous experience but by expectations which these generate and the consequent mental set which may affect how various specific objects are perceived” (Rapoport,1977:26).

There exists, several discussions in literature about problems of perception. This means that perception is interpreted by every person differently. These interpretations spring from a person’s foundational belief in the concept of perception. The interpretational aspect of perception will be discussed further in the research but what is considered in this chapter are the formidable problems that arise by the definition of perception. *“Reality and appearance can indeed diverge: its fundamental premise is that illusions can occur”* (Smith 2002: 22). There are several arguments in literature that perception could be influenced by several elements. An example of this could be from the argument that Smith(2002) portrays, he says that illusion can be understood as applying to any perceptual situation in which a physical object is actually perceived but in which that object perceptually appears other than it really is, for whatever reason.

This chapter will create a theoretical framework on the concept perception so that one has a thorough understanding before creating the existing connection of perception to built

form. This understanding will be shaped by the definition of perception, understanding the various meanings and types of perception and the influence of perception on mankind.

4.2 THE HISTORICAL ORIGINS OF PERCEPTIONS

The Theory of Perception has been developed through a process of discussion in literature. These discussions have laid a foundation with which gives people an understanding of where perception originated from and what schools of thought led to the discovery of the concept, Perception. The foundation of perception is based on the hypotheses of theories such as Phenomenology, and Genius Loci. The process of discussion which led to each chronologic theory is based on discoveries made by each theory and together these discoveries or rather hypotheses created the foundation for perception.

The study of structures of consciousness as experienced from the first-person point of view is what originally evolved from phenomena. This conception of phenomena informed the discipline of phenomenology. In his *Logical Investigations* (1900-01) Husserl outlined a complex system of philosophy, moving from logic to philosophy of language, to ontology, to a phenomenological theory of intentionality, and finally to a phenomenological theory of knowledge (Smith: 2013). According to classical Husserlian phenomenology, the human experience is directed toward things only through particular concepts, thoughts, ideas and images. These make up the meaning or content of a given experience, and are distinct from the things they present or mean.

The spirit of place which is commonly referred to as Genius Loci in literature refers to the realm of people, citizens, residents and visitors. It is what gives cities their life and directly shapes human perceptions. In *Genius Loci: Towards a Phenomenology of Architecture* (1979), Norberg Schulz explores the character of places on the ground and their meaning for people. Norberg-Schulz considered Genius Loci to represent the sense people have of a place, understood as the sum of all physical as well as symbolic values in nature and the human environment (Jiven & Larkham, 2003:70).

In *Phenomenology of Perception* (1945), Merleau-Ponty develops a rich variety of phenomenology, emphasizing the role of the body in human experience. It is through the literature of Merleau-Ponty that formed the Theory of Perception.

These origins form the ground upon which the theory of perception stands. It is important to grasp the movement of philosophy from a root concept of phenomenology to the concept of genius loci in order to further understand how the key topic of research, perception has been derived in literature. The basic intentional structure of consciousness, we find in reflection or analysis, involves further forms of experience.

“Phenomenology establishes a broad conceptual framework which focuses and maintains attention on perceptual experience itself”
(Glotzbach & Heft, 1982:119).

Thus, phenomenology develops a complex account of awareness which comes from the development of the spirit of a place or Genius Loci and it is from here that humans are able to perceive and generate perceptions on objects and environments.

4.3 DEFINING THE CONCEPT OF PERCEPTIONS

Conceptualizing the term Theory of Perception, one needs to firstly understand the definition of perception. According to Merriam-Webster (2014) perception has three definitions. The first defines perception as the way one thinks about or understands someone or something. The second defines perception as the ability to understand or notice something easily. Then lastly the third defines perception as the way one takes note of something using the senses.

In the Encyclopedia of Perception, Goldstein (2010) suggests that there are a multitude of theoretical frameworks for defining perception. The picture theory of perception considers the eye to be a biological camera, designed by evolutionary selection to produce pictures of the world in the form of retinal images. Gestalt psychology claims that the proper object for study in a scientific psychology is everyday perceptual experience. Constructivism characterizes the perceptual process as an inferential, logical, intelligent and creative one. Embodied perception identifies that the sensory system in humans play an integral part in the perceptual process (Rogers & Epstein, 2010 as cited in Goldstein, 2010:995-998). All these theoretical approaches of perception consider different aspects and lead to various different paths of research. The object though is to create a framework in which all the theories are considered to define the perceptual process.

Perception is described by Merleau-Ponty (1962) as a foundational quality of human experience, but it is not only restricted to aspects of experience, it also has certain emotional (Norberg-Schulz, 1965) and behavioral implications (Bartley, 1958).

Noë (2005:2 as cited by Fish 2010:126) defines perception as a process in the brain whereby the perceptual system constructs an internal representation of the world. Noë's definition of the term perception refers to the cognitive reference whereby the term perception is defined by knowledge and intellect.

Norberg-Schulz's definition of perception was that objects or environments should be viewed in their entirety before perceiving their individual parts. This suggests that the whole is greater than their counterparts. Norberg-Schulz's discussion of perception was largely influenced by Gestalt psychology, to which were also added the socialization of perception and the process of "schematization", that is the way in which perception leads to the construction of an understanding of the world (Habib & Sahhaf, 2012:46). Norberg-Schulz's view on perception is that it should be viewed as a whole, of which the individual parts are mutually interdependent.

From these definitions and from various different sources of literature it is clear that the concept or term perception is very complex and has an excessively broad meaning. The term perception is used in the environmental design literature differently to the way in which it is used in psychology- it seems to be used in the sense of things being seen (Rapoport, 1977: 30).

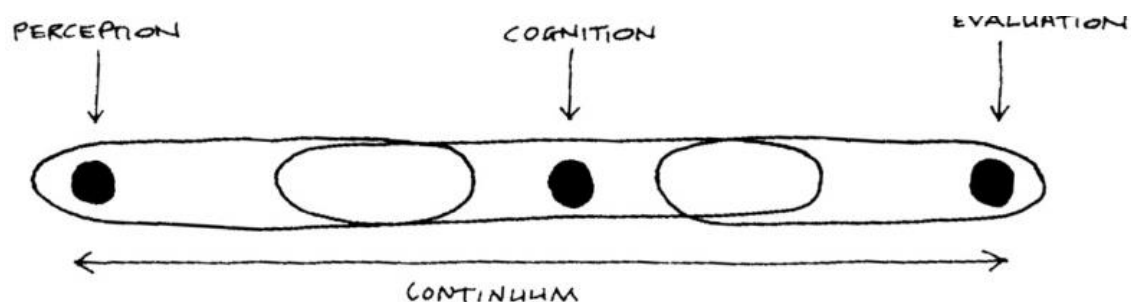


Figure 4.1: showing the continuum of perception, cognition and evaluation (Source: Rapoport, 2014:37)

Based on the theoretical approaches from Merleau-Ponty, Norberg-Schulz, Pallasmaa and others, there are three distinct types of processes that inform the definition of perception. These processes include sensory experience, cognition and evaluation. Figure 4.1 shows

that there is a process with regards to each of these three terminologies, while they form a continuum; it is possible to separate them so that a particular process belongs more or less in one of these categories (Rapoport, 1977). These three terminologies clarify possible variations of what influences perceptions based on factors of mental set, culture and politics. The continuum helps clarify the extensive literature on perception where the term is used interchangeably in three ways.

4.4 THE SENSORY EXPERIENCE

People perceive the world via the five main senses of the body; this is referred to as modalities of sensation. The concept, sensory experience is related to the direct experience of an individual and involves the individual in the specific environment (Rapoport, 1977). Sensory experience is the least abstract meaning in defining perception and involves direct experiences with an environment. The sensory experience is a journey that the body goes through in order to generate perception. Rapoport distinguished five distinct sensory modalities: vision, olfaction, sound, Tactile, Kinesthetic and air movement or temperature (Rapoport, 1977). The sensory experience can be considered as the apprehension of space.

“It is through our senses that we perceive the world; it is through them that a relationship with the world is made possible” (Franck, 2007:55).

The general meaning of perception to people is commonly understood by the most dominant sense in the body, vision. Vision provides the most information compared to the other senses and is considered according to Rapoport (1977) as the greatest help in acting in the world. Although vision is considered by most to be the dominant sense, it does not mean that this is the only sense. The sensory experience can be understood in terms of the individual’s total perception of the external physical and social surroundings and the constant monitoring of one’s internal environment. The bodily experience in the environment responds to sound, smell, feel, texture, temperature as well as vision (Rapoport, 1977). Pallasmaa (2005) emphasizes the fact that vision is most commonly known to be the description of perception. Pallasmaa (2005) has argued that modernist

design at large has catered for intellect and vision, but it has left the body and the other senses, as well as our memories, imagination and dreams, homeless.

“The only sense that is fast enough to keep pace with the astounding increase of speed in the technological world is sight. But the world of the eye is causing us to live increasingly in a perpetual present, flattened by speed and simultaneity” (Pallasmaa, 2005:21).

According to Pallasmaa (2005) the various different senses of the body represent multiple means of communication between the world and the perceiver. The sensory experience is a process of transposing information from the bodily experience to the mind.

‘People experience environments through the senses and all data comes to us through perception- ours and someone else’s (Rapoport:1977: 178).

Pallasmaa (2005) agrees that the senses not only mediate information for the judgment of intellect; they are also a means of igniting the imagination and of articulating sensory thought.

4.5 COGNITIVE INSIGHT

People perceive the world according to what information is received from perceptions. The process of receiving and transposing these perceptions can be referred to as the cognitive process. According to Rapoport (1977) the term cognition can be used to describe the way in which inhabitants understand, structure and learn from their surroundings and use mental maps to negotiate it. Cognition can also be described as comprehension or knowledge and the organizing of such knowledge in the perceptual process. The cognitive process is based on the concept of space.



Figure 4.2: showing the cognitive process in perception

Source: Rapoport, 1977:37

Cognition is the process of reducing information and the ability of making a chaotic environment predictable, orderly and manageable (Rapoport, 1977). People are not passive organisms whose mental representation are simple or direct reflections of the external world, rather the inhabitants of the cities mental representations are active processors of environmental events. As such, considered in these mental representations are past knowledge and biases to bear on how they perceive their environment (McMaster, n.d). From Rapoport's (1977) description of the cognitive process it is then clearly visible that cognition is the manor of reducing information through imposing a structure on the environment. This structure is an integral part of the perceptual process in which information is process and organized.

The structure that is considered can be identified as schemata. Norberg- Schulz qualified space as “existential space”, structured into schemata (Habib & Sahhaf, 2012:46). Rapoport (1977) defines schemata as the way inhabitants organize their past and present memory and experiences and anticipate future behavior by using these memories predictively. Bartlett (1967 as cited in Rapoport, 1977) displayed in his literature based on the work of Piaget that schemata vary with culture and things are remembered not in order of presentation but how they are assembled into schemas. There are several elements developed to aid the structuring of thoughts during perception, these elements consists of:

The development of images

Images are process specific and often beyond awareness of a person. These images include both stimulus and concrete information. Most images are schematic and informed by integrating many separate elements (Segal, 1971) as cited in (Rapoport, 1977). Images and schema play an important role in the cognitive process and are used interchangeably. Images can be considered to be mental representations of the parts of reality known through direct or indirect experiences (Harrison & Sare, 1971 as cited in Rapoport, 1977). Rapoport (1977:34) reinforces this by saying, “*This process occurs over time and cognitions are built up gradually, from direct and indirect experience.*”

Images are also considered by Lynch (1960) to be important in describing the physical reality of the world. Lynch (1960) describes the clarity and ease with which people form

images and memories. This thought process is considered by Lynch (1960) as *'imageability'*.

The construction of mental maps

A major characteristic of schemata is that it includes environments which have never been experienced but are known indirectly. Rapoport (1977) states that such knowledge depends on education of the person, the accuracy of the data provided and the skill one has to interpret such data. It must be understood that direct experience of a place which includes the sensory experience provides a more accurate schemata.

"I would reserve the term mental map to spatial schemata or representation held by the individuals themselves, and reflecting affective, symbolic meaning, preference and other factors"
(Rapoport, 1977: 119).

It is often stated in literature that mental maps can in no way be referred to a realistic map. Mental maps are a series of psychological transformations through which individuals acquire information about their spatial surrounds.

Orientation

Orientation is vital and generally basic to the behavior of all living organisms. Lynch (1960) considers orientation to be linked to survival and sanctity for the specific reason that it involves providing direction. It is the relationship of places and distances organized into a system whereby navigation through space becomes possible (Rapoport, 1977). The development of both images and mental maps require orientational systems and are aids to orientation.

4.6 EVALUATION

Evaluation is the collective term used to describe assumptions of ideas; it is one of the most variable definitions of the perceptual process as described by Rapoport (1977). Evaluation is considered as the perceptual process of ranking information.

"Everyone would see the same buildings and streets but they might be evaluated as a slum by one group and as a reasonable or even

good place to live a certain kind of life by another” (Rapoport, 1977:33).

Cities are designed to accommodate the environmental preferences of its inhabitants. The cognitive insight to perception incorporates people’s ideals, and in turn individuals test these ideals against the images and mental maps produced in the cognitive process. These evaluative schemata according to Rapoport (1977) are influenced by previous encounters, experiences, adaption and culture.

4.7 THE IMPACT OF PERCEPTIONS ON MANKIND

Perception is a process of sensory experiences, cognitive insight and evaluation as described in the previous sub-chapters. The point being laid out is the extent of these perceptual elements and its impact on mankind. Each element in the perceptual process is a prerequisite for the next and as such each relies on the information perceived. The perceptions of physical and social environments have common characteristics.

“Perception is not only affected by culture and previous experience but by expectations which generate and the consequent mental set which may affect how various specific objects are perceived” (Rapoport, 1977:26).

The main purpose of cognition is to identify the environment by breaking it down into schemata and focusing on limited parts of it. Perception through the sensory experience is one of richness and complexity. This sensory experience is desired by most individuals and majorly influences the evaluation of environments (Rapoport, 1977).

“While people want to be orientated and understand the city cognitively, they also wish to experience its richness” (Rapoport, 1977: 207).

A very useful distinction between sensory experience, cognitive insight and evaluation is based on the provision of indirect knowledge, messages and knowledge from all types of media. It is a known fact that individuals base their assumptions on environments or social events from no direct experience. Rapoport concretizes this by stating that:

“Through this non-experiential way people know and evaluate places which they have never seen” (Rapoport, 1977: 31).

Modern truism proves that the experience of a variety of places is a major human interest, although this value today tends to get lost in current times (Norberg-Schulz, 1979). Merleau-Ponty (1962) points out that the life of mankind would be meaningless without science and that it is important to understand that knowledge of the world, especially scientific knowledge arises from a first person perspective or direct experience. Modern day man has believed that science and technology have freed the world from a direct experience of places. With social media and modern technology this has come to be a reality in the current world. Norberg Schulz (1979) foresaw this situation as he suggested:

“This belief had proved an illusion; pollution and environmental chaos have suddenly appeared as a frightening nemesis, and a result the problem of place has regained its true importance” (Norberg-Schulz, 1979: 18).



Figure 4.3: showing a pyramid of perception and its impact on mankind

(Source: http://darmano.typepad.com/logic_emotion/2008/10/perception-pyra.html, accessed 06 March 2014)

The current situation which exists in the world consists of individuals who believe that the physical world can appear to us in perception other than it really is and that direct realism or experiences are not necessarily required. This belief displays the impact that perceptions have on mankind. Through literature it has been argued that this situation is increasingly implausible. ‘*Naïve Realism*’ is the term that has labeled the view that in perception we always perceive the world exactly as it is (Smith, 2002). Figure 4.3 displays how perception influences mankind and alters their ideals and perspective of specific situations.

4.8 CONCLUSION

In understanding the historical origins of perception, one should have a firm understanding as to how perception came about. Through understanding the concept of perception one should have a basic idea of the theoretical counterparts to perception and the various influences of perception. It is evident from defining the concept perception that one can realize its broadness.

With this foundation of understanding, it is clear to develop a framework towards which this research is aimed at. Only with a pure understanding of perception is it possible to relate to the impacts that it has on built form.

The following chapter seeks to illustrate the interpretations that perceptions have on built form and how perceptions act as a design tool in shaping the built form. It also seeks out to form the development of the catalyst that could change the perceptions of people in an urban context and illustrates the route to the development of the transport interchange.

CHAPTER FIVE:
INTERPRETING PERCEPTIONS

5.1 INTRODUCTION

From the preceding definition of the Theory of Perception and the understanding of the theoretical foundations and importance related to it, various key elements have been identified as factors which influence perception and impact on mankind's understanding of the perceptual process.

In this chapter, the interpretations that perceptions have on the built form will be explored with the intention of developing a framework of how to understand and interpret perceptions on built form.

The discussion begins by presenting a general overview of the experimental world and multisensory experience of built form as it is through a person's physical being that the world is experienced and a connection is made possible. As Rasmussen (1959:33) suggested, *"it is not enough to see architecture; you must experience it."* Most often this is done through touch but there are other psychological senses such as memory, spirit of place and phenomena which are to be discussed subsequently.

Interpreting perceptions on built form will require exploring the mental image of the built form perceived by the inhabitants of a city, this will be done through the chronological process outlined in this chapter. It attempts to illustrate how the mental image is perceived in terms of the existing quality of architecture that exists in the world today and this will be one of the major focuses.

The final component of this chapter requires one to understand the meanings and signs in architecture. This can be done by grasping an understanding of semiotics which can be defined as the study of the life of signs within a society. As Bonta (1979: 26) said, *"Semiotic analysis can help clarify certain issues concerning meaning in architecture and art."*

5.2 THE EXPERIENTIAL WORLD

It has been recent tradition of modern day contemporary built environments to place importance in the aesthetic experience of people. Relph (1976) describes that one of the easiest ways to identify attributes of places is through the environment, both natural and built. One of the most notable characteristics of the aesthetic experience is ‘beauty’ in architecture.

Hesselgren (1975) describes ‘beauty’ as an attribute of perception and is understood in general as a feeling and an emotion and hence a subjective phenomenon. Vitruvius (n.d. as cited in Horvath, 2010) referred to ‘beauty’ as an intangible, psychological and emotional effect that the built environment can have on the human spirit. Aesthetic ‘beauty’ in built form can serve to uplift and inspire a community to which it speaks although being subjective (Reeves, 2012). (Refer to plate 5.1) The atmosphere created by the built form captures light perfectly and radiates a beautiful environment for one to experience.



Plate 5.1: displays how the articulation of light in architecture is used to create ‘beauty’ in Freedom Park, Pretoria
(Source: <http://architecture-now2.blogspot.com/2008/09/freedom-park-pretoria-south-africa.html>_ accessed 10 March 2014)



Plate 5.2: shows the sensory experience is being overloaded by the aesthetic experience
(Source: <http://www.thepinnaclelist.com/blog/directory/sensory-overload-in-times-square-the-neon-heart-of-manhattan-new-york/>- accessed 10 March 2014)

While the aesthetical experience brings about beauty it has also contributed negatively in the built environment. (Refer to plate 5.2) Taking advantage of the aesthetical experience, the built environment in modern day has become a popular means of advertising and persuasion through the built form. Pallasmaa (2005) describes architecture as becoming a series of memorable and striking visual images.

Although vision and aesthetic appeal is considered to be the most important aspect, modern designs focus on the visual perception of space has created a disconnection between the body and the sensory experience (Giancarli, 2013). Pallasmaa (2005) also talks about the built environment being purely an aesthetic experience rather than a spatial one. The built environment at present emphasises the intellectual and conceptual dimensions of architecture to such an extent that it ignores the physical, sensual and embodied essence (Pallasmaa, 2005). Merleau-Ponty (1964) and Pallasmaa (2005) both argue that importance lies in the interaction of the senses to develop sensory architecture in opposition to the dominant visual understanding of architecture. Other bodily senses and psychological senses are also of equal importance and architects and designers need to be aware of these modalities of the senses. Pallasmaa reinforces the need for this new awareness:

“This new awareness is forcefully projected by numerous architects around the world today who are attempting to re-sensualize architecture through a strengthened sense of materiality and hapticity, texture and weight, density of space and materialized light” (Pallasmaa, 2005:37).

Montagu (as cited in Pallasmaa, 2005) also acknowledges this growing awareness and argues that it is an overdue insurgence against the lack of sensory experience in the built environment due to the technologized world. Rapoport (1977) states that space connects people and the physical components of the world. He (Rapoport, 1977) goes on to say that a three dimensional space is experienced by people who use their sensual perceptions to understand that three dimensional space. Pallasmaa (2005) emphasises the fact that architecture is an extension of nature into the realm of man and that it provides a ground for people to perceive and the opportunity to experience and understand the world. Merleau-Ponty (1964, cited in Pallasmaa, 2000:25) emphasises the simultaneity of sensory interaction and experience:

“I perceive in a total way with my whole being: I grasp a unique structure of the thing, a unique way of being, which speaks to all my senses at once.”

There exists many studies into the various kinds and types of spaces throughout literature, but regarding architecture and perception one particular type of space exists. This is defined by Relph (1976) as perceptual space in which one experiences. Heidegger (as cited in Zumthor, 2010: 34) states that *“the relationship of man to places and through places to spaces is based on his dwelling in them.”* Zumthor (2010) explains that the reality of architecture is the concrete body in which forms, volumes and spaces come into being. Hall (1966) also states that everything a person does is associated with the experience of space. The emphasis of these statements suggests that space is formed through architecture and is experienced through interaction with the built form.

“We do not grasp space only by our senses...we live in it, we project our personality into it, we are tied to it by emotional bonds; space is not just perceived...it is lived” (Merleau-Ponty, 1962: 22-23).

An experience is an apprehension of an object, thought or emotion through the senses or in the mind. Norberg-Schulz (1965) defines the experiential world as something ever changing and multifarious. Experiences are derived from the reaction of the senses to the objects and spaces that surround them (Horvath, 2010 as cited in Reeves, 2012). These experiences create opportunities for the built environment to arouse emotions, thoughts and feelings within its inhabitants.

“A real architectural experience is not simply a series of retinal images; a building is encountered – it is approached, confronted, related to one’s body, moved about, utilized as a condition for other things”(Holl, 2006).

Pallasmaa (2005) reinforces the idea that architecture is not experienced as a series of retinal images by concretizing that the architectural experience should be experienced in its fully integrated material, embodied and spiritual essence. Pallasmaa (2005) goes on to say that architecture offers appealing shapes and surfaces which are designed for the touch of the eye and other senses, simultaneously incorporating and integrating physical and mental structures giving the inhabitants existential experience a strengthened coherence and significance.



Plate 5.3: Hector Pieterse Museum shows how objects, in this case the brickwork and wooden floors direct the horizontal movement of the journey through the museum

(Source: <http://www.mashabanerose.co.za/projects/heritage/hector.htm>- accessed 10 March 2014)

The experience of architecture is dependent on the ability of the inhabitant to grasp coherence in the built environment. The conceptualization of architecture in modern day with regards to its abstraction leaves the inhabitants of a building with a meaningless experience. In defining this Norberg-Schulz (1965, as cited in Srikanth, 2010) stated that *“a brick is just a brick, it becomes meaningful to the user only when used in a coherent part of an experience.”* (Refer to plate

5.3) It is the duty of the architect to create meaningful environments in which objects can contribute to experiences, rather than creating unconventional buildings which are meaningless to the people experiencing it (Norberg-Schulz, 1965).

Norberg- Schulz (1965) suggests that experience is based on the knowledge that people have which he refers to as schemata. Most people understand certain things only the way they perceive it. Norberg- Schulz (1965) goes on to say that perception is not only based on the aesthetical experience but is determined by the knowledge that an individual has to perceive. Multisensory experience involves interpretation and engagement with an environment rather than accepting it for what it appears to be.

5.3 THE MULTISENSORY EXPERIENCE IN BUILT FORM

It is now clear from the previous discussion that the inhabitants of a city observe built form through the various senses; these can be referred to as modalities of sensation. It is evident that a move from the predominant vision focused approach to the built environment to a more sensual and perceptual approach which includes all the senses is required to create a more positive environment which contributes to the human experience. In order for one to gain a more vigorous understanding, the actual experiences and interaction of human beings need to be understood.

“Every touching experience of architecture is multisensory; qualities of space, matter and scale are measures equally by the eye, ear, nose, skin, tongue, skeleton and muscle... architecture involves several realms of sensory experience which interact and fuse into each other” (Pallasmaa, 2005: 41).

According to Pallasmaa (2005 as cited in Carless, 2011) meaningful architecture absorbs the individual on a largely physical level and consumes multiple senses simultaneously. Pallasmaa (2005) views architecture as the art of reconciliation between one’s self and the world and suggests that this mediation takes place through the senses. The five senses sight, touch, sound, smell and taste are subjectively as well as unconsciously used in perception of the built environment. It is therefore important for one to grasp an understanding into the impact that senses as ‘design tools’ have on perceptions of the built environment. These senses and the interpretation of them with regards to built form will subsequently be discussed in greater detail below.

Sight- The dominant sense

Sight is considered to be the most dominant sense with regards to relating with the environment and it has a strong connection to architecture. Brebner (1982) considers vision to be the main sensory input, with the other senses contributing and complementing it. The first impression we get from architecture relies on the first view that we get on it (Scheifler, n.d.).

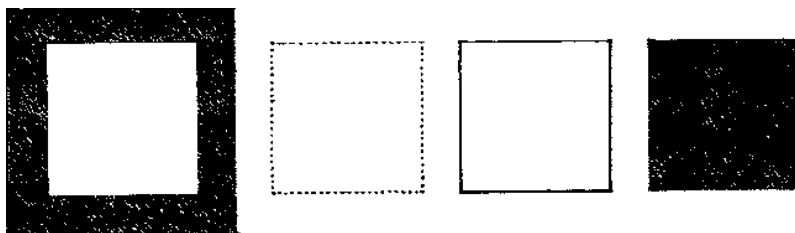


Figure 5.1: shows the effect of visual perception. The square in each instance is perceived differently
Source: Ching, 1979

The visual field comprises of mixed elements that differ in shape, size, color and orientation. According to Ching (1979) human beings tend to organize the structure of the visual field into two opposing groups, positive elements which are perceived as figures and negative elements which provide a background for the figures. A figure as defined by Merriam-Webster (2014) as an object that can be seen only as a shape or outline. A figure

generally stands out from its background and is generally perceived to have a greater intensity than its background. Interaction between positive and negative elements and relies on the understanding and perceptions of people towards architectural compositions. The process of this understanding is commonly referred to as figure and ground.

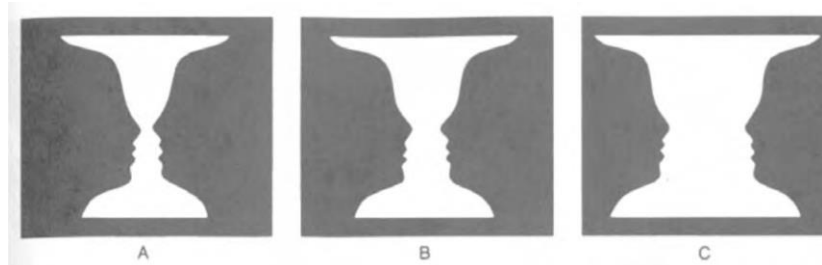


Figure 5.2: shows a figure ground where a pair of black faces is seen alternately with a white vase.
Source: Coren, 1999: 297

One important aspect of sight is the differentiation of focused vision and peripheral vision. Pallasmaa (2005) emphasises the importance of peripheral vision as he states that peripheral vision enfolds and integrates a person with space while focused vision pushes people out of space. Peripheral vision allows the other senses to perceive while focus vision only uses vision.

In the built environment vision is used to perceive the various elements of architecture; most of these elements include shape, color, scale and proportion. These elements all impact and can positively or negatively influence the perception that one has of the built environment. Sight can be positively influenced by built environment as it provides the opportunity for one to perceive and see what actually is. Contrary to this, sight can also negatively influence the outcomes of perception with regards to the built environment as it could make one see what they are expecting to see based on their schemata (Rapoport, 1977).

Touch- The Intimate Sense

According to Pallasmaa (2005) the sense of touch connects the skin to the environment. The skin identifies texture, weight, density and temperature of matter. The sense of touch is closely related to the sense of vision as Pallasmaa (2005: 42) suggests “*that vision reveals what the touch already knows.*” Hegel (as cited in Pallasmaa, 2005) claimed that touch is the only sense which can convey a sensation of spatial depth. He (Hegel as cited in Pallasmaa, 2005) goes on to say touch senses weight, resistance and three-dimensional shape of material bodies and makes one aware of any objects coming towards or moving

away from them. The sense of touch offers more complexities compared to vision whereby one experiences more from touch than by mere sight. The sense of sight and touch are undoubtedly connected. It is also common practice for individuals to often touch something after seeing as it offers a greater perception of the object or environment. As Pallasmaa (2005: 42) states:

“Our eyes stroke distance surfaces, contours and edges, and the unconscious tactile sensation determines the agreeableness or unpleasantness of the experience.”

(Refer to figure 5.4) The smooth white shiny marble tiles around the mosque convey a feeling of cleanliness and the choice of white marble tiles gives the inhabitants a feeling of comfort as it is used for walking barefoot. In this case the choice was also part of cultural aspects whereby cleanliness is part of the Islamic culture. Therefore the experience of the surroundings gives one a sense of cleanliness and gives the perception for the individual that it is safe to walk without shoes.



Plate 5.4: shows the smooth marble tiles of the prophet's mosque in Madinah, Saudi Arabia
Source: Author, 2007

The sense of touch encourages and is stimulated by one's ability to see form and textures (Carless, 2011). Through the sense of touch, the experience that one encounters in an environment should also be considered. Touch is the sense in which people's experiences of their surroundings are connected to themselves (Pallasmaa, 2009). Psychologists refer to the sense of touch as 'haptic perception'. This type of perception includes the entire body, rather than just the instruments of touch, most commonly known to be the hands and feet (Carless, 2011). The Haptic System is one which includes sensual processes of the inner and outer body such as pressure, warmth and pain.

Sound- The Silent Sense

Sound is one of the most crucial senses of the body, as sound provides varied information regarding the environment. Sound provides a relationship between the individual and the environment by the reverberations which reflect off objects. Pallasmaa (2005: 51) suggests

that “*sound measures space and makes scale comprehensible.*” (Refer to figure 5.3) Rooms of varying sizes and shapes are composed of different materials and reverberate conversely, therefore influencing the sounds that occur within these spaces.

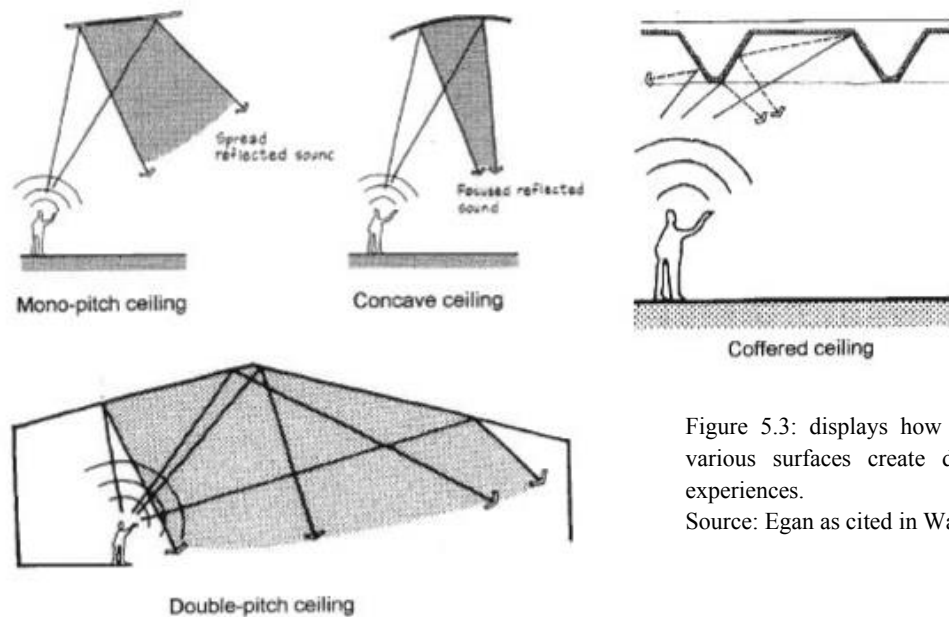


Figure 5.3: displays how the reflection of various surfaces create different acoustic experiences.
Source: Egan as cited in Walden, 2008:19)

Le Corbusier (as cited in Ching, 1979) states that architecture is represented by the masses brought together by light, and that vision is made to see forms in light. Le Corbusier (as cited in Ching, 1979) goes on to say that it is this light and shade which reveals forms. Similarly to this, the sense of sound is informed by the surroundings, and thus it gives one a sense of the three-dimensionality of the space which they consume. Pallasmaa (2005:49) suggests that “*sound is omni-directional.*”

In architecture, acoustics are generally not taken into consideration as it is not considered being a conscious sense. Pallasmaa (2005) argues that the consideration of sound is critical: “*We are not normally aware of hearing in spatial experience...Buildings react to our gaze, but they do return our sounds back to our ears*” (Pallasmaa, 2005: 49). The sense of sound structures and articulates the experience and defines space. Pallasmaa (2005) recommends that the best auditory experience is tranquility. Through tranquility one is given the option of connecting with the acoustic elements of the built form. Pallasmaa (2005) reinforces the need for tranquility with the example of how programmed music in a shopping centre or public space reduces the possibility of grasping the acoustic volume of the space.

Smell- The Odour of Space

The sense of smell is one the most neglected bodily senses. This is due to the fact that the sense of smell is rarely considered in the realm of architecture. The reasons of smell not being considered in the architectural realm are fueled by an ensemble of psychological, physiological and cultural factors (Crunelle, 2002). The sense of smell can be considered as an unconscious sense but is one of the most persistent senses of all sensory modalities (Pallasmaa, 2005). It is stated according to Pallasmaa (2005) that humans only require eight molecules of substance to trigger an impulse of smell in a nerve ending and that a human can detect more than ten thousand different odours.

In the current built environment the sense of smell is being overloaded by aromas and fragrances that flood the atmosphere of the built environment and creates a barrier to the sense of smell causing the inhabitants of a building to smell the mixture of fragrances being forced upon them rather than the natural odours that the built environment produces.

The process of smelling takes the longest to reach the brain, and once it has reached the brain the smell lasts longer than any other sense stimuli (Lehman, 2009). This leads one to the assumption that smell and memory can be linked. Due to this relationship between smell and memory, a connection to the built form is created. The moment the built form is experienced through the sense of smell it creates or triggers a previous memory for the individual. Every space has a designated scent which is remembered by an individual and enables one to *“unknowingly re-enter a space completely forgotten by the retinal imagery”* (Pallasmaa, 2005: 54). The fact that smell is linked to memory provides endless opportunities for architecture that influences and ignites the olfactory process.

The Sense of Taste

The human tongue can distinguish between seven to eight distinct types of taste while the nose can distinguish amongst hundreds of substances (Hadjiphilippou, n.d.). The sense of smell amplifies the sense of taste. Similarly the sense of taste is stimulated by vision. Pallasmaa (2005: 59) states that: *“certain colors and delicate details evoke oral sensation. A delicately colored, polished stone surface is subliminally sensed by the tongue.”* It is clear from Pallasmaa’s perspective that definition or interpretation of taste

in the built environment is not the literal understanding, whereby one has to physically taste an object but rather refers to the oral sensation of the mouth when perceiving something of great appeal. The sensory experience of the world originates in the interior sensation of the mouth (Pallasmaa, 2005).

5.4 THE MENTAL IMAGE PERCEIVED

In the current modern movement of architecture efforts are being made to address the sensory modalities as Pallasmaa (2005) states that people are beginning to discover their neglected senses. Except for mere vision or the five classical senses there exist various other elements of the senses that influence the experience of an individual in a space. These elements include the influence that the built environment has on the sensory modalities. Modern day thinking in architecture considers space as material objects, which consist of material surfaces. There is a lack of understanding space in terms of interrelations and dynamic interaction.

“Architecture of the exterior seems to have interested architects of the avant-garde at the expense of architecture of the interior”
(Pallasmaa, 2005:62).

Sensory Deprivation

In the modern movement of architecture, the body is forced to react to rigid forms created for the convenience of mass production (Franck, 2007). This is due to the poor forms and materials chosen by architects and designers. “As if a house were to be conceived for the pleasure of the eye rather than for the wellbeing of the inhabitants” (Ellen Grey as cited in Pallasmaa, 2005: 62). Zumthor (2010) states that:

“Sense emerges when I succeed in bringing out the specific meanings of certain materials in my buildings, meanings that can only be perceived in just this way in this one building” (Zumthor, 2010: 10).

The modern movement in architecture is currently striving to overcome the deprivation of sensory experiences which has suffered in the technologized world of today. While the concern of sensory modalities has been taken into consideration in the current built form

to incorporate the inhabitant's interaction and understanding, it is still essential to acknowledge that these sensory experiences of architecture contribute to the architectural experience. (Refer to plate 5.5) Peter Zumthor enhances the sensory experience in his work through different textures, colors, massing, qualities of light, temperatures and materials. By achieving success in this, the gestalt experience of the individual is enhanced.

Plate 5.5: shows how the Thermal Vals, Switzerland displays a variety of Textures, colors and volume
 Source: Plumer, 2006:62 (as cited in Reeves 2012)



Architecture is interpreted by Pallasmaa (2005: 41) “not as a self- sufficient artifact”, but rather as something that directs the attention and experience of people to wider horizons. The architectural experience has an impact on elements of tactility, personal and cultural memories, as well as the spirit of the place created. Pallasmaa (2005: 63) states that the elements of architecture are not visual images or gestalt; they are encounters, confrontations that interact with memory.

Images of Tactility

Confrontations with the built environment are represented by tactility. Merriam-Webster (2014) defines tactility as the capability of being felt or touched. Tactility is described by Pallasmaa (2005) as the sense of touch in an individual's experiencing and understanding of the world. In the past man was used as a method of dimensioning and proportioning in construction and designing of buildings. This is evident from

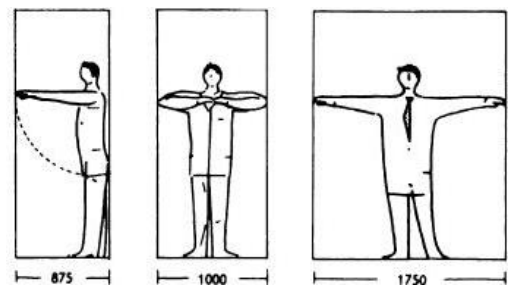


Figure 5.4: displays how the concept of the Vitruvian man still inspires the body as a dimensioning system
 Source: Neufert, 2000:16

Leonardo Davinici's Vitruvian Man which was used as the principal source of proportion among the classical orders of architecture. This sparked a new dimension of linking

people to their surroundings and was a means of inspiring architects and designers for generations (Refer to figure 5.4).



Plate 5.6: The Holocaust Memorial in Berlin displays qualities of tactility
Source: Hadjiphilippou, n.d.: 5

Tactility is important in establishing a connection with the materials of a building as it is through the tactile qualities of the surfaces one encounters that influences one's haptic sense. As Pallasmaa (2005) reiterates that the eyes engage at a distance, and are different from what it sees, the hand necessitates closeness and demands a certain intimacy with that which it contacts. (Refer to plate 5.6) The Holocaust Memorial in Berlin by Peter Eisenman is a thorough example of tactility in architecture. The extremely smooth concrete accompanied by a sprayed foam layer begs to be touched. Although one is guided by vision it is actually the feeling of touch that really satisfies one's curiosity. With its confusing and uneasy atmosphere due to the varying levels of the slabs, an inviting feel is created. This memorial was designed to be experienced. Due to this connection between the building and its inhabitant certain memories and mental images are created.

The Memory of Action

The relationship between memory and actions can be defined, according to Casey (as cited in Pallasmaa, 2005) as the past embodied in actions. Memory is an active ingredient in bodily movements of every individual. Memories are fueled by tactility in architecture. Tactility in architecture promotes slowness and intimacy (Pallasmaa, 2000). Memories are considered to be a psychological factor of spaces and places which influences one's perception. It can also be viewed as an impact of interpretation on the architectural experience (Zumthor, 2010). The body is considered to be important due to its physical capabilities and influences of the sensory organs, but it is also majorly impacted by

memory. Casey (as cited in Pallasmaa, 2005) goes on to say that the capacity of human memory would be impossible in the absence of body memory.

“The body is not a mere physical entity, it is enriched by both memory and dream, past and futures” (Pallasmaa, 2005: 45).

Architectural meaning develops from the archaic responses and reactions remembered by the body and the senses (Pallasmaa, 2005), thus the opportunity for the inhabitants of a space to engage and unite with their environment. Memories are not generated from the visual perspective of a building but rather from the bodily experiences of it. In the modern age of architecture the significances of memory as part of the architectural experience has been neglected.

The Spirit of Place- Genius Loci

From the importance of tactility and the influence of memory of the architectural experience another influential psychological aspect arises. That which not only has an effect on the physical being and mentality, but also the soul. Walter (1988) expresses the ‘genius loci’ as the ‘expressive intelligibility’ of places which can be perceived holistically through ones senses and memory. The built environment accommodates not only the physical existence but also the psychological one. Pallasmaa (2005: 72) mentions that:

“Our domicile becomes integrated with our self-identity; it becomes part of our own body and being”, (Pallasmaa, 2005: 72).

Architecture can be considered as the making of places (Bloomer & Moore, 1977). Architecture has the ability to create habitable environments that involve human interaction and provides a comprehensive architectural experience through appealing to the soul of a person and creating a sense of place. Modern contemporary architecture has failed in providing architecture of meaning and significance due to its search for beauty and visual appeal. It has resulted in a built environment of plasticity and flatness which eradicates the sense of place of its inhabitants. Christopher Day (2004:13) refers to this as the ‘Spirit of Place’. It is only possible for this ‘spirit of place’ to exist through the combination of all sensory modes which penetrates the consciousness and provides the

opportunity for the mental image of reality, one that cannot be acquired through a sense in isolation. All senses have a fundamental role in revealing the ‘underlying essence of a place’ when combined (Carless, 2011). This spirit of place is able to move ones soul and evoke an intense feeling of an individual. Franck (2007) evokes the ‘spirit of place’ by emphasizing the role of the multisensory experience in architecture:

"Architecture is given life and spirit by all the qualities that touch the human senses and the human soul: by light and colour, sound and texture, by expansion and compression of space, by view and prospect. These might be considered literal qualities created by the manipulation of materials and space, but they can go beyond the literal to touch our souls... If the functional nourishes our physical needs, the poetic nourishes our soul. If the former relates to people and objects as machines, the latter relates to living human beings" (Franck, 2007:34).

Through this Franck (2007) offers the substantiation that only the combination of the sensory modes can offer an architectural experience which enhances the ‘genius loci’ or ‘spirit of place’ of a person.

5.5 URBAN SEMIOTICS IN ARCHITECTURE

From the previous discussion on dwelling in experimental world to the exploration of the senses in the built environment, it is evident that there are other elements which are also influenced by perceptions. The feeling of self and understanding the spirit of place leads one to holistically being involved with the architectural experience of the built environment. Although these sensory modalities lead to a holistic inclusion in the architectural experience one still needs to intellectually understand the meaning of architecture. This meaning of architecture can be established through the understanding of signs in the built environment.

Bonta (1979) defines semiotics as a science which studies the life of signs in a society. A semiotic approach to architecture can help clarify issues of meaning in architecture. One of the basic assumptions in semiotics is that the built form is dependent on culture and memory (Baird & Jencks, 1970). Saussure (as cited in Baird & Jencks, 1970: 11) points

out that although a form may initially be arbitrary, subsequent experience of that form may give rise to the form acquiring meaning. The meaning of architecture does not develop from architecture itself but rather from the way architecture is understood. The difference between architectural form and meaning naturally leads one to regard architecture as a system of signs and thus the relevance of semiotics in architecture.

Meaning in architecture is not a common understanding that all people share. According to Baird & Jencks (1970) the concept of meaning is ‘multivalent’ and there are many variations to the definition of meaning. Therefore it is evident from this that every individual interprets their environment differently and is it the duty of architects to ensure that built environments cater for the needs of everyone and not just a specific group of people. The extrinsic meaning of semiotics contends that it is the language that one perceives from the environment that forms meaning. According to (Baird & Jencks, 1970: 7) semiology is the theory of signs and can be considered as the fundamental science of human communication. Thus, the way one perceives an object is determined by the concepts that one has. One of the most fundamental ideas of semiotics in architecture is the idea that any form in the environment, has the ability of being motivated. This can be done through semantics. Norberg-Schulz (1965) describes semantics as the relation between a sign and what it designates.

With the foundations of semiotics in architecture firmly grasped, the focus can be shifted to urban semiotics. Urban semiotics is the study of meaning in urban form as generated by signs, symbols and their general connotations. Urban semiotics focuses on material objects of the built environment such as streets, squares, parks and buildings. Urban semiotics also focuses on un-built cultural products such as building codes, planning documents and popular discourse about the city. The work of Kevin Lynch’s ‘Image of the City’ portrays his thinking about the city and its forms in the same terms as the consciousness perceiving it. Lynch (1960) refers to elements such as paths, edges, nodes, districts and landmarks; and has been widely

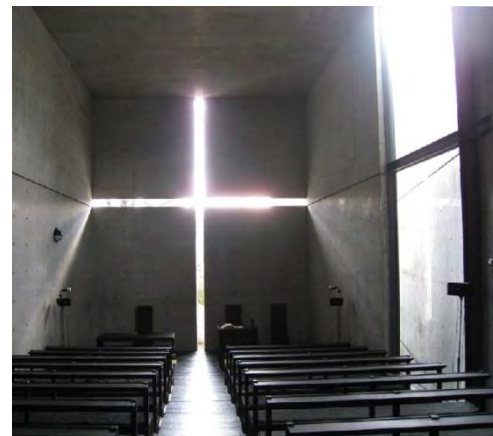


Plate 5.7: Church of the light by Tadao Ando
(Source:<http://www.mooponto.com/2012/09/19/church-of-the-light-tadao-ando-architect-associates/>-accessed 26 March 2014)

criticized by many semioticians for being limited by its exclusive focus on the denotative level of communication and ignoring the connotative meanings associated with urban forms. Semioticians like Krampen (1979) argue that urban structures often become recognizable because they have symbolic meaning beyond their functional forms. (Refer to plate 3.7) Tadao Ando's 'church of the light' is an outstanding example of describing how symbolic meaning in architecture can be evoked through functional built form. His efforts to keep the functions of architecture intact while encouraging the viewer to make an interpretation that is anchored in the physical properties of the parts in relations to the whole with or without convention (Brett, 2011). It is this meaning of architecture that impacts on perception of the built environment.

5.6 CONCLUSION

It is through the bodily experience of architecture that qualities of the built environment can be understood. The senses of modality express the impact that body has on built form and it is these impacts that shape the perceptions of people. Perceptions are also evoked by the psychological effects that are developed by the architectural experience of the individual. Nevertheless, the interpretation of perceptions on built form, although majorly impacted by the architectural experience, would not be viable without grasping the meaning of architecture. The semiotical approach to architecture provides one the option of understanding architecture from the various signs projected by the objects in the built form.

Pallasmaa states that:

“The timeless task of architecture is to create embodied and lived existential metaphors that concretize and structure our being in the world. Architecture reflects, materializes and eternalizes ideas and images of ideal life. Buildings and towns enable us to structure, understand and remember who we are. Architecture enables us to perceive and understand the dialectics of permanence and change, to settle ourselves in the world, and to place ourselves in the continuum of culture and time” (Pallasmaa, 2005: 71).

It should be understood that in the society today, change has occurred in the sensory and perceptual experience of the world. Instead of repeating the mistakes of the past and allowing the same erosion of the existential meaning and lack of sensory experience in the built form, a new way of thinking should be formed. Pallasmaa (2005) states that people must reflect on the various ways in which architecture is tied to the cultural and mental reality of time. Pallasmaa (2005) goes on to say that people should also be aware of the manner in which the feasibility of architecture is being threatened due to the current political, cultural, economic, cognitive and perceptual developments.

The next chapter outlines the key aspect of this research and criticizes the perceptions that people have on transportation. Understanding the current perceptions that people have on transportation and the architecture related to this is vital to altering the thoughts of people from a bottoms-up approach. It is only through an enhanced architectural experience and meaningful architecture that the current perceptions of people can be significantly enhanced in a positive manner.

CHAPTER SIX:
THE INTERRELATION BETWEEN PERCEPTIONS AND
TRANSPORTATION

6.1 INTRODUCTION

With the evolving world, one that is constantly exposed to new technologies and influenced by modernization and globalization it has become a difficult task for people to understand the roles that certain objects in the world have on oneself. As a result of this a pattern of standardization has occurred whereby the same forms of architecture are echoed throughout the built environment for various different buildings which host specifically different functions.

This has an influential effect on transport architecture, as transport is one of the most valuable entities of any city and is generally considered and attended to in a very standardized way whereby it is not dependent on its user's perceptions but rather the task of moving people. Transport is essential as it enables the inhabitants of a city access to essential services and to those services that enhance the quality of life (Cox, 2010: 17). Transport increases the choices that people have regarding habitation and employment. Thus, the focus in this chapter addresses the need for people to move around cities and specifically highlights the factors that hinder the movement of people in cities. It then moves on to understand the general image of current transport situations in cities globally and also introduces the perceptions of people regarding 'transport'. Through thorough understanding of the perceptions on transportation the importance of transport in an urban context will be focused on, to create a framework of its relevance in the built environment. This clarifies the need for a more relevant and meaningful architecture of the transport facilities. It also clarifies the need for cities to be planned and managed with careful consideration of people and transportation in order to successfully change the way that public transport systems are currently being implemented in most parts of the world.

The image that people have on transportation globally, significantly impacts on various factors in the environment. These factors will subsequently be discussed in further detail. Through the classification of these factors the problem of car dominance and its role on the impacts of perception will be analyzed, enhancing and reinforcing the benefits of public transport.

6.2 THE PERCEIVED ENVIRONMENT

The growing population around the world creates a grappling set of challenges for most cities around the world. Besides the population growth, cities are also expected to promote diverse and healthy communities by its inhabitants. Other factors which also create a challenge for cities include economic development, crime and ease of access to public transport facilities. *“Transport differs from other problems because it gets worse rather than better with economic development”* (Penalosa, 2005 as cited in Cox, 2010:1). Transport is an epitome of the complex relationships that exist between the physical environment, patterns of social and political activity, and levels of economic development (Hoyle, 1997:420). These factors can be considered to be an obstruction and negatively cause a damper on the transport systems implemented in most cities. There exist a large number of people around the world who suffer from inability to access affordable means of transport to reach basic amenities, whilst the rest of the population who do have access to transport spend their time stationary in cars, sitting in congested streets, while around them the air is being degraded and streets become unsafe (Cox,2010:2).

Regarding the increase in population growth, the phenomena of urbanization is commonly the main obstacle which affects transportation. Cities are overwhelmed by the rapid growth of people in urban areas and most transport systems that have been implemented have not catered for this phenomenon. Today more than 50 per cent of the world’s population lives in cities and by 2025 this figure will reach 60 per cent (Cox, 2010:27). Richards (1990) states that as the pressure for homes and work spaces grow so too do the need for roads and alternative means of transportation.



Plate 6.1: Urban Sprawl in an American Suburb (Source: http://www.archdaily.com/496567/christoph-gielen-s-ciphers-aerial-views-of-american-sprawl/534bfe35c07a8005610000d2_christoph-gielen-s-ciphers-aerial-views-of-american-sprawl_doublepage-10-jpg/ accessed 17 April 2014)

Movement and mobility are fundamental to the human condition (Cox, 2010: 7). It is thus one of the most crucial elements by which life in all its forms is characterized. Transport

systems represent a method of moving people in and around cities. Yet due to transport planning in most urban settings a technocratic and top-down discipline, dominated by economics and engineering considerations have prevailed (Njenga and Davis, 2003 as cited in Cox, 2010: 19). It is a known fact that driving on busy highways one is not aware of their surroundings compared to people at street level who constantly engage with the environment. The use of the automobile has created a lack of interaction between people and the built environment. As a result a person can drive through an entire city without knowing what's going on in that city.

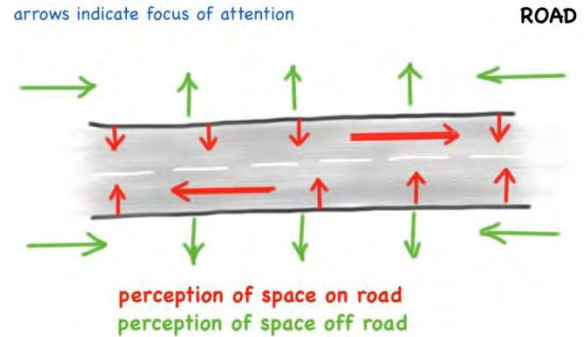


Figure 6.1: illustrates how busy roads and highways affect people and the environment
 (Source: <http://urbandesignideas.blogspot.com/>- accessed 26 May 2014)

The modernist solution to mobility is evident in the built environment. Cities were planned around roads and they therefore determined the types of buildings to be designed. These influences that the current transport system enforces on architecture causes unsatisfactory buildings which do not complement the built environment and the needs of the people but are done to satisfy planning criteria.

“Mass ownership of private automobiles reshaped cities in the industrialized nations and the motor car became a symbol of and synonymous with modernity” (Cox, 2010:15).

As the need for mobility increases so too does the demand for car travel. Retail and leisure facilities are placed on the peripheries of urban centres, requiring motor access. This results in communities that are isolated by main roads and high speed traffic to accommodate for people to access these facilities. (Refer to plate 6.2) Cox (2010:44) reiterates that urban life is shaped around the car, which is ever demanding more land for



Plate 6.2: Major highways and roads in urban city.
 (Source: http://en.wikipedia.org/wiki/Transport_economics- accessed 20 April 2014)

parking and roads, destroying the social fabric of urban environments. The perceived disbenefits of transport are disruption to trips, waiting and unreasoned delays, not the overall journey time.

Issues such as ‘Urban decay’ are evident in cities today. ‘Urban Decay’ is described by (Wong, 1994: 258) as the process whereby a city falls into a state of disrepair. Due to elements of the perceived environment which cause urban decay, city centres have become obsolete and neglected. The traditional method of urban design can be represented by figure 6.2 where the core is being retail and outer core being commercial. Cities today have neglected this type of traditional planning and have reversed the order requiring people to travel out of urban city centres to get to their destinations.



Figure 6.2: illustrates the traditional urban planning layout. (Source: <http://urbandedesignideas.blogspot.com/> -accessed 26 May 2014)

Rappaport’s (1977: 33) view on perceptions of cities is that it is a result of both direct and indirect perception of elements: their location, classification, categorization and arrangement, and finally their evaluation. People measure their current perceptual situations as some ideal or standard which leads to action which affects the real environment. This action creates awareness of the issues affecting cities but rather than creating solutions, the problems are reinstated. As Cox (2010) points out that if a problem of congestion in a city exists then more roads are built to accommodate this congestion. Instead of adding to the problem, whereby the problem might occur again as a city’s population increases, a change in thinking needs to be established to successfully solve problems at hand.

Given the various conceptualizations of the environment, the perceived environment includes perceptions of both people and their artefacts. *“The regularities in the environment are due not just to their design but also the perception of the observers who impose order on the environment”* (Rapoport, 1977: 26).

6.3 THE PROBLEM OF CAR DOMINANCE

Cars, for many people who own them are the most useful means of transport in many urban environments. The current dominance of automobility as the default mode of transport cannot be sustained in either environmental or social terms (Cox, 2010:1). *“The perceived and market right to individual mobility through the city and beyond has resulted in the automobile becoming the primary consideration in the way in which the layout of our cities and the ways in which we move through them is dictated”*. (Butler, 2008 as cited in Slurd, 2011: 3). On a global scale the effects of car dominance impact significantly on the ecological front. Issues such as greenhouse gas emissions which lead to human induced climate change and peak oil are problems that are experienced and are evident in current times.

Health impacts of motor vehicles have become a common discussion in current literature. Urban air pollution is the most commonly known effect of the automobile to the environment. The World Health Organization figures, estimate that 0.8million premature deaths and 4.6 million lost life years can be attributed to urban air pollution (Roychowdhury, 2006 as cited in Cox, 2010:33). Apart from urban air pollution, car dominance also causes significant road accidents. According to Dora (2006 as cited in Cox, 2010: 33) 1.2million deaths worldwide are caused from road accidents. Motorized private transport is also a major cause of inactivity and causes serious health concerns on inhabitants of cities, resulting in obesity and lack of exercise.

Car dominance in urban environments also impact on the social effects of human perception. The car, argues Henderson (2006 : 264 as cited in Cox, 2010: 43) is used as, *“a means of physically separating one’s self from the spatial configurations like higher urban density, public space or from the city altogether.”* The demand of cars in urban environments requires an excess of road infrastructure creating broad and heavily trafficked roads which lead to social isolation.

Cars used at peak periods seriously congest roads and cities have a lack of space to broaden roads in city centres. Richards (1990:35) states that *“most main roads already carry at peak hours a volume of traffic in excess of their environmental capacity.”* The

increasing of roads sizes destroys public space that could be used as a means of integrating social interaction.

Besides the social and health effects of car dominance, other aspects such as the built form are also heavily impacted by the automobile. Town planning requirements demand a great amount of parking to be accommodated for in the built form which wastes prime space that could be used for a variety of functions other than the parking of vehicles. In the past most city centres had provided various parkade buildings in urban centres just to accommodate cars. These buildings were situated at prime positions in the urban context to allow for easy movement to work and living spaces. But



Plate 6.3: Multi-storey carpark in the United Kingdom displays the quality of the current public realm and the built environment. (Source: <http://www.rudi.net/node/18505>- accessed 21 April 2014)

due to the current population crisis and dominance of cars these have become unfavorable in the current urban context. Parkades and parking spaces in urban city centres encourage the public towards the use of cars rather than using sustainable forms of public transport (Dales, n.d.).

The use of private cars in most economies is dominant and rapidly becoming ever more obvious to its users and resulting in unsustainable existing transport and mobility behavior. Cox (2010) compares situations where people lack access to motorized transport as the most sustainable because they have minimal impact on the environment. Cox (2010) poses the realization of compatibility between sustainability and development regarding transport. Yanarella and Lavine (1992) view cities as the centres from which the world is shaped and argue that through the built environment and meaningful architecture sustainable urban environments can be achieved. Unless the centres are able to initiate sustainable processes or developments, sustainability on global scale will never be achieved.

There is no single mode of transport that can substitute the automobile but Cox (2010: 67) argues that conditions can be created to raise the status, desirability and efficiency of other modes of transport and reduce that of the automobile. In literature at present the current urban design movement of ‘New Urbanism’; which strives to recommit traditional town planning designs to a modern context by suppressing the



Plate 6.4: Portland, Oregon displays a good example of New Urbanist development (Source:<http://forums.penny-arcade.com/discussion/141610/the-new-urbanism-> accessed 20 April 2014)

dependence on automobiles while encouraging a small-world lifestyle where jobs, shops and homes are all located at close proximity to each other (dictionary of construction, 2014.); is currently being implemented by most cities who are attempting to change the means at which cities function. According to Jacobs (1962) car dominance is generally frowned upon by critics and cars are blamed as the villains for the congestion and ills of cities. Jacobs (1962) views the destructive effect of the automobile as much less a cause as a symptom of incompetence of city building and planning.

Public perceptions of transportation can be altered by improving public transport, implementing changes to the urban environment that integrates pedestrians and walkability on an urban scale and densifying built form. The problem of car dominance can be suppressed and urban environments made more sustainable.

6.4 THE ROLE OF PUBLIC TRANSPORT IN AN URBAN CONTEXT

New Urbanism in most cities today focus on one specific element that impacts on all others to successfully implement strategies in urban environments, ‘Public Transport’. Public Transport can be considered a source of regeneration in an urban context. It enables access to essential services and to those services that enhance the quality of life (Cox, 2010: 17). According to Edwards (2011:1) “ *a combination of rising oil prices, growing anxiety over consequences of global warming and a determination to address urban regeneration has resulted in greater attention being paid to public transport.*” Public transport in the contemporary global world has the potential to create sustainable

urban environments by increasing accessibility to and within the city, encouraging movement within the urban realm. The main barrier against the success of public transport in most global contemporary urban environments is the means by which the current transport systems and networks currently enable our mobility. Private automobiles have dominated the majority of the world and the manner which they are being used considered completely unsustainable.



Plate 6.5: shows the social interaction in public spaces at transport facilities (Source: <http://openbuildings.com/buildings/manchester-piccadilly-train-station-profile-1445/media-accessed> 21 April 2014)



Plate 6.6: Berjaya Times Square, Kuala Lumpur shows how public transport has been integrated into the urban realm yet still allows for public space and social interaction at street level (Source: Author, 2012)

The rise of ‘Urban Decay’ in most cities in the last decade has led many of them towards striving to implement change in the form of ‘Urban Revitalization’. Urban revitalization is defined by (Beauregard & Holcomb, 1981: 1 as cited in Brunner, 2010:15) as the ‘giving of new life’ or energy to the urban realm through redevelopment of urban areas that have become run down or impoverished.



Figure 6.3: illustrates efforts made towards urban revitalization (Source: <http://www.thefifthstate.com.au/archives/59954/acc> sessed 26 May 2014)

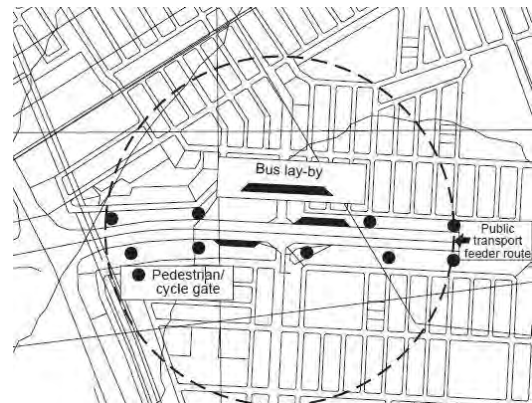


Figure 6.4: illustrates the resurgence of urban revitalization into existing built environments (Source: CSIR, 2005: 15)

Wong (1994:258) expands on the definition of urban revitalization by stating what captures the problems of social and economic decline as well as the challenge of finding new ways to improve the social and environmental quality of living. Cox (2010:70) reiterates the importance of urban revitalization through a sustainable



Plate 6.7: shows a transport interchange used as an urban revitalization tool (Source: <http://www.skyscrapercity.com/showthread.php?t=1136783&page=2> accessed 27 May 2014)

version of transport needs to incorporate both social and environmental bases of sustainability. Gehl (2009) emphasises the need for cities to be made inviting through urban revitalization, *“In a society becoming steadily more privatized with private homes, cars, computers, offices and shopping centers, the public component of our lives is disappearing. It is more and more important to make cities inviting, so we can meet our fellow citizens face to face and experience directly through the senses. Public life in good quality public spaces is an important part of a democratic life and a full life.”* Urban revitalization can be used as a means of transposing public perception. Public transportation therefore offers the opportunity to increase accessibility into the urban public realm generating urban revitalization.



Figure 6.5: illustrates section showing the stations connection with the built environment at street level (Source: <http://www.skyscrapercity.com/showthread.php?t=1136783&page=2> accessed 27 May 2014)

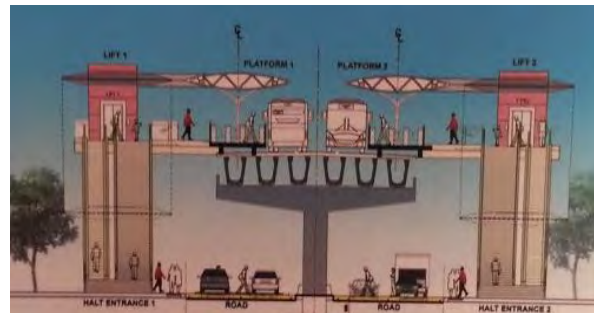


Figure 6.6: illustrates section showing the station integrated into the urban realm (Source: <http://www.skyscrapercity.com/showthread.php?t=1136783&page=2> accessed 27 May 2014)

Land use planning plays a vital role in urban revitalization and changing the perceptions of people in a city particularly with regards to public transport in the urban context. Land use allocation involves in its process the zoning of the built environment by urban designers, with consideration of future change in the city as well as how future population

growth is accommodated for (Richards, 1990: 2). Land use zoning of cities are an important component of organizing a city. Richards (1990) criticizes the way that existing land use zoning of cities are planned and argues that all elements of a city are directly and indirectly influenced by transportation. Land use planning not only changes the zoning of the urban context but also transforms the image of the city, the ways in which it is perceived and experienced and the cognitive and emotional relationships between urban environments and its inhabitants (Beauregard & Holcomb, 1981:51).



Plate 6.8: Scarborough, Ontario shows a city shopping centre surrounded by parking for cars which could have been used to create more lively and dense developments closer to the city centre (Source: Richards, 1990:7)



Plate 6.9: Sketch diagram, Warwick Mall, illustrates the attempted inclusion of shopping centres into a sustainable public transport systems. (Source: <http://www.skyscrapercity.com/showthread.php?t=7485107>-accessed 22 April 2014)

(Refer to plate 6.8) One major issue which arises from land-use is the lack of density. Cox's (2010) analysis of the situation gives the solution that denser urban development ensures closer physical proximity to all amenities and guards cities from becoming victims of urban sprawl. Shopping centres and similar commercial developments are described by Richards (1990:5) as an issue which is a major contributor to the problem of transport in the city. Shopping centres occupy a major portion of urban space with most of it being used to accommodate cars. (Refer to Plate 6.9) Richards (1990) promotes the inclusion of shopping centres in the urban context but identifies the need for them to be integrated with a working public transport system to positively reduce the need for useless parking space and an abundance of roads as a result thereof. Mixed use developments are also an important factor and contribute to transport issues of urban areas. By promoting inner city developments this could actively reduce the need for people to use cars as a means of transport at city centres and to rather use public transport to move around the urban city centre (Richards, 1990: 6). Cox (2010) views cities as

places for people and stresses the fact that transport systems and the use of public spaces need to be oriented to human scale needs. The urban environment should not be severed or excluded as mobility provisions are made.

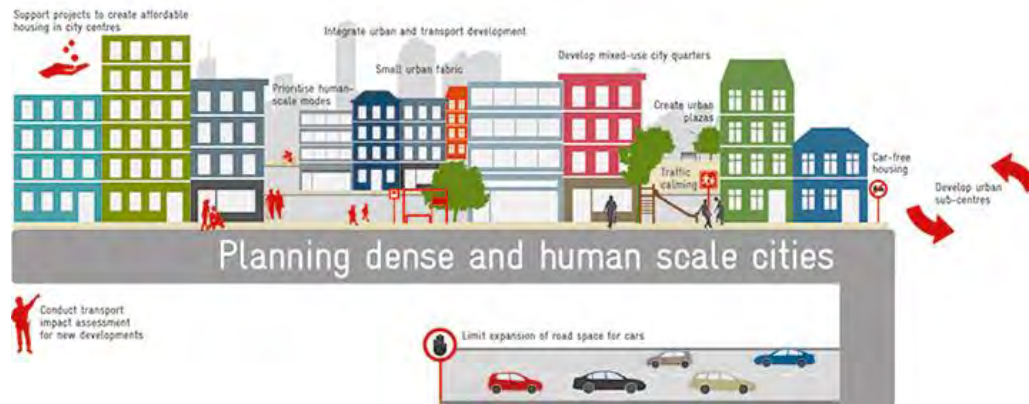


Figure 6.7: illustrates diagram showing a conceptual solution of a workable urban context (Source: <http://sustainabletransport.org/planning-dense-and-human-scale-cities/> accessed 27 May 2014)

“The use of public transport generally involves a longer walking trip than one using a private car, and for this reason it is essential that the ‘walking environment’ is seen as an extension of the public transport system” (Richards, 1990: 44). For public transport to impact on people’s perceptions towards it, walking conditions have to be improved and reconsidered. Safety is critical towards the creation of an improved urban environment and is an important factor that influences the way people feel towards current public transport systems. Safety within an urban environment can be achieved through ensuring that pedestrians are safe from motorized traffic and that constant surveillance measures are implemented in public spaces to ensure pedestrian safety from issues of crime. *“Increasing studies on travel behavior have shown that time spent travelling daily is actually considered by most as space to think, to unwind, to be themselves”* (Cox, 2010: 42).



Plate 6.10: illustrates street life activities (Source: <http://deohs.washington.edu/built-environment-and-public-health> - accessed 22 April 2014)

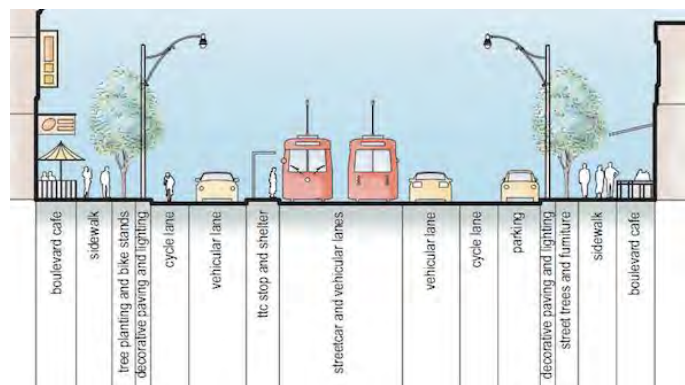
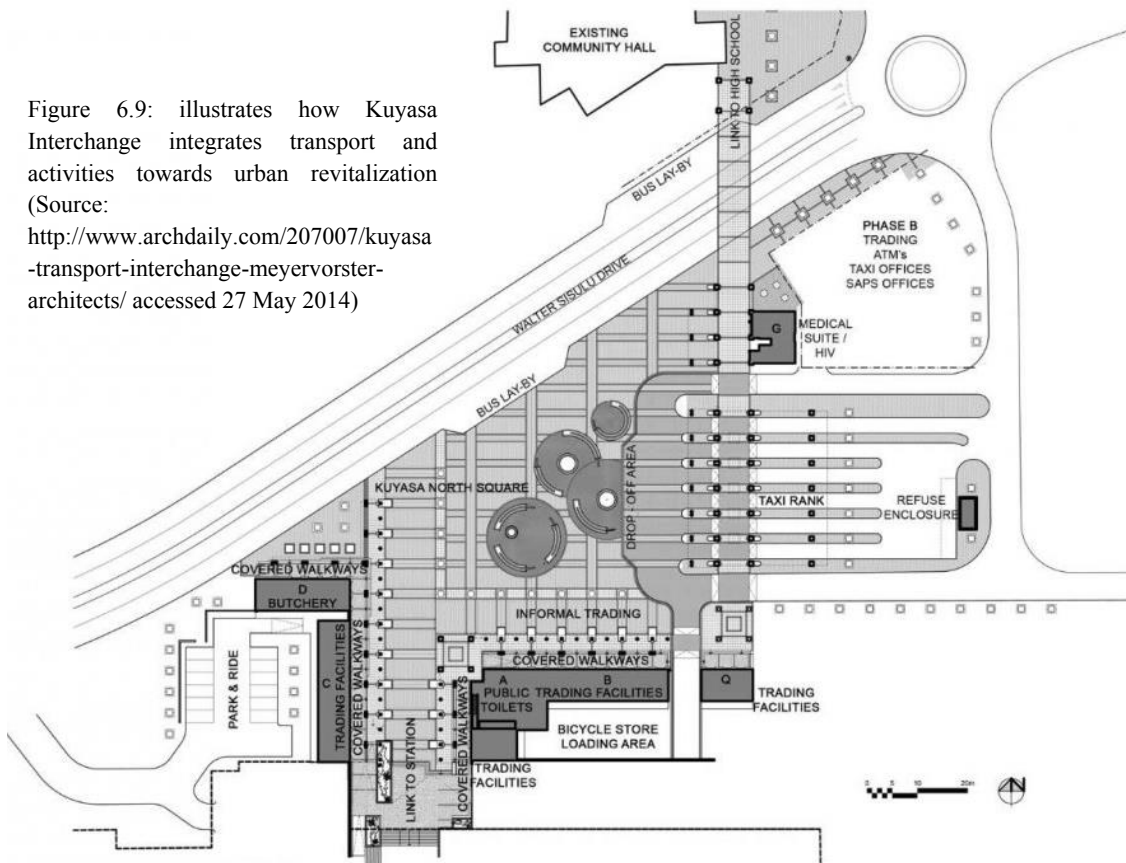


Figure 6.8: illustrates the urban street scape that cities are striving towards implementation as a means of urban revitalization (Source: http://www.blogto.com/city/2012/01/revisiting_the_urban_design_streetscape_manual/ - accessed 22 April 2014)

In cities, there are also various different elements that contribute to the urban context of a city. According to Jacobs (1972 as cited in Brunner, 2010:19) “a diversity of people, or groups, is the only condition for liveliness.” In the urban context this can be achieved through creating an environment which hosts various different functions of buildings to create a lived atmosphere in the city centre. Transport interchanges indirectly promote diversity by offering opportunities to a diverse population which undoubtedly can promote social interaction. (Refer to plate 6.10 & figure 6.8) Through diversity the urban context is also positively enhanced by the mixed land use, allowing many activities to occur in urban areas. These activities include commercial retail, food related activities, street life-oriented activities, public service buildings, health institutions, and recreational facilities (Brunner, 2010:19).

Figure 6.9: illustrates how Kuyasa Interchange integrates transport and activities towards urban revitalization (Source:

<http://www.archdaily.com/207007/kuyasa-transport-interchange-meyervorster-architects/> accessed 27 May 2014)



In urban areas transport plays a vital role in enhancing the quality of life, the sensible use of land resources and creating environmental balance. The urban context should concentrate on reducing traffic by promoting public transport which integrates housing, employment, education and recreation in its system. If this can be achieved than a significant change of people’s perception towards transportation will be established.



Figure 6.10: illustrates how Kuyasa Interchange is integrated with housing and commercial zoning (Source: http://futurecapetown.com/2012/04/changing-face-of-transport-in-kuyasa-transport-interchange/#.U4YmQ_mSxIE accessed 27 May 2014)

Creating a shift from the dependence of the automobile to public transport requires cities to manage successful development opportunities; enhance the character, identity and sense of place; create a safer public realm, streets and spaces; and sustainability (McDougall, 2010). (Refer to figure 6.11) By ensuring these elements are integrated into the urban context and built environment the perceptions of people could be altered positively towards public transport.



Figure 6.11: illustrates efforts to integrate the built form with the public realm (Source: Edwards, 2011:153)

Sustainability is a key element in altering people's perceptions on public transportation. Cox (2010:30) refers to the term 'EcoMobility' as the combination of non-motorized transport and public transport as a form of environmentally sustainable mobility. This provides inhabitants of a city the ability to move around their local environments without utilizing privately owned vehicles. One of the changes frequently encouraged to affect a modal shift in urban traffic is in the use of public transport: buses, rail and tramways, as well as various forms of paratransit (Cox, 2010:66).

6.5 THE DEVELOPMENT OF PUBLIC TRANSPORT FACILITIES

In the nineteenth and twentieth century, as a response to economic, political and urban decay issues of the world saw the construction of many impressive buildings of transport in the form of train stations. Prior to this, transport infrastructure was the domain of engineers (Edwards, 2011:24). Engineers determined the infrastructure of transport systems as well as the facilities that house them with their large span iron, steel and glass structures with little attention given to people's perceptions or quality of space. *"There were no parallels in terms of feats of engineering, scale of human movement, or complexity of function"* (Edwards, 1997: ix).



Plate 6.11: shows the elements which establish the historic transport facility as a specific building typology (Source: <http://www.nyc-architecture.com/GON/GON004.htm> accessed 24 April 2014)

These developments were created to alleviate the problem of congestion on roads and to create some form of distinction and identity in the urban setting as most cities have realized that the quality of life continues to deteriorate under the impact of cars and even more road building (Edwards, 1997: ix). This situation gave the passenger train station an opportunity to enhance the public realm and to create a building typology of particular relevance and visual complexity (Edwards, 1997: ix). These major stations enhanced the quality of urban space into highly desirable locations and were used to give cities some form of 'symbolic presence' (Brunner, 2010:24).

The Atocha Station in Madrid, Spain is a modern station that expresses the attempts made by cities to convert previously neglected stations into generators of urban regeneration. Binney (1995: 93) describes the Atocha station as a marriage between the old and the new in both functional and visual terms. (Refer to figure 6.12 and plate 6.12) The station comprised of town distinct elements. The train shed which housed the platforms, the main concourse and the main symbolic façade building which was fronted by a public space.

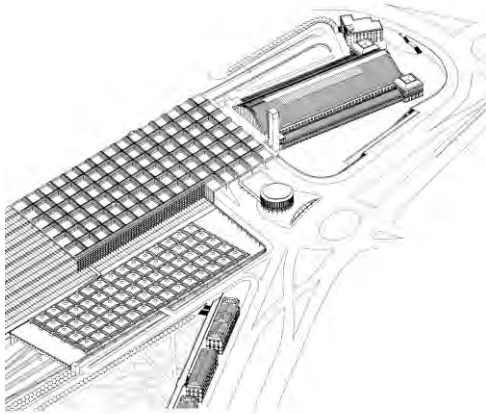


Figure 6.12: illustrates the 3d layout of the train station (Source: Binney, 1995: 97)



Plate 6.12 shows the symbolic façade fronted by a public square (Source: <http://www.landezine.com/index.php/2009/08/botanical-train-station/> - accessed 23 April 2014)

The separation of the two main elements of the station promoted a sense of movement capturing the essence of the urban realm and allowing people to move from it to the railway system with ease. (Refer to plate 6.12) The grand internal space of the main façade building created an interior environment which promoted social interaction and heightened the sensory experience of the buildings users. (Refer to plate 6.14) The train shed provides a sense of airiness and space is increased by the fact that three sides of the shed do not have glazing. The provision on natural light through a single line of square roof lights runs between each canopy (Binney, 1995: 93). Through careful planning train stations of the early nineteenth century provided excellent examples of public transportation architecture which heightened the multisensory experience of individuals as well as lifted the perceptions of people towards the use of public transport (Refer to plate 6.13).



Plate 6.13: shows the internal qualities of the façade building (Source: <http://www.amusingplanet.com/2012/09/botanical-garden-inside-atocha-train.html/>- accessed 23 April 2014)

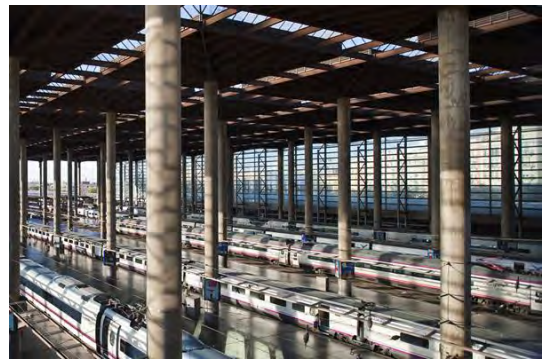


Plate 6.14: shows the train shed and concourse platforms (Source: <http://www.architectmagazine.com/transportation-projects/esto-gallery-train-stations.aspx> accessed 23 April 2014)

With the prevalence of the automobile as a result of lack of connectivity of various other modes of public transportation such as airlines and buses these buildings of transport soon became neglected. The effect of this is evident in the current situation of urban environments where car use is a symbol and tool of freedom in the modern world (Cox, 2010: 1) and is a dominant means of personal transportation. Although due to issues such as global warming and urban decay, the focus has shifted towards sustainable public transportation as a tool in enhancing the perceptions of people towards the use of it once again.

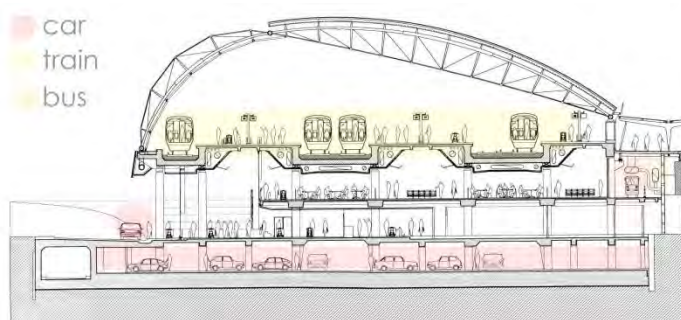


Figure 6.13: illustrates a section of Waterloo train station, London (Source: Binney, 1995: 11)

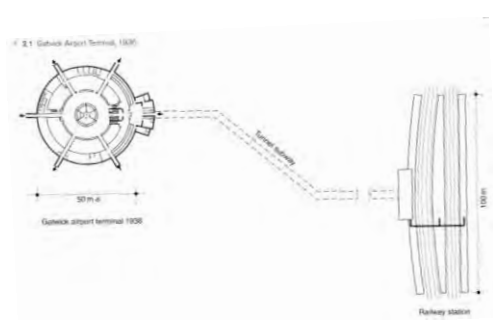


Figure 6.14: shows Gatwick airport terminal integrated with a train station in an attempt at intermodal transport (Source: Blow, 2005: 4)

Sustainable methods of implementing transport systems in urban city centres require the need of intermodal transportation. (Refer to figure 6.13) This involves the integration of various modes of public transport to achieve a new approach to mass transit in order to change the way people feel about current public transport systems. The transformation from the use of the automobile to public transport creates great importance towards the

design of transport facilities in encouraging acceptance of new forms of urban movement (Edwards, 2011:1). Blow (2005:1) states that with transport coming of age, the separation of individual transport facilities are being replaced by ‘joint up thinking’ and transport facilities are beginning to take advantage of interchange opportunities. This shift towards intermodal transport also encourages enhancing the experience of users within these facilities. According to Cox (2010:9), “*Studies of transport are oriented largely around the static destination and starting points...rather than being structured around the processes and experiences of motion.*” Cox (2010) implies that transportation is affected from the source of activity rather than the experience during the process of mobility.

(Refer to plate 6.15, 6.16 & 6.17) The architecture of modern transport facilities express the use of form, natural and artificial light, space and bold construction techniques. These characteristics are crucial in the design of transport facilities as they enhance the experience of its users by creating perceptual markers, allowing the user to orientate themselves within the facility (Edwards, 1997: 94). It also helps to create easily identifiable and symbolic architecture in the urban context which contributes to giving the inhabitants of the city a new perspective on public transport.

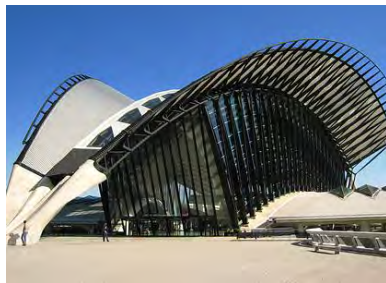


Plate 6.15: shows the expressive bold use of architecture in transport facilities..(Source: <http://www.urban75.net/forums/thread-206479/page-3stations.aspx> accessed 24 April 2014)



Plate 6.16: shows the use of light and generosity of space at modern transport facilities (Source:<http://inhabitat.com/santiago-calatravas-gorgeous-oriente-station-is-topped-with-a-leaf-like-canopy-that-looks-lighter-than-air/oriente-station-lisbon-portugal-6/> accessed 24 April 2014)



Plate 6.17: shows the elements which establish the modern intermodal transport facilities (Source:<http://www.archdaily.com/412837/the-flinders-street-station-shortlisted-proposal-zaha-hadid-architects-bvn-architecture/> accessed 24 April 2014)

6.6 THE TRANSPORT INTERCHANGE

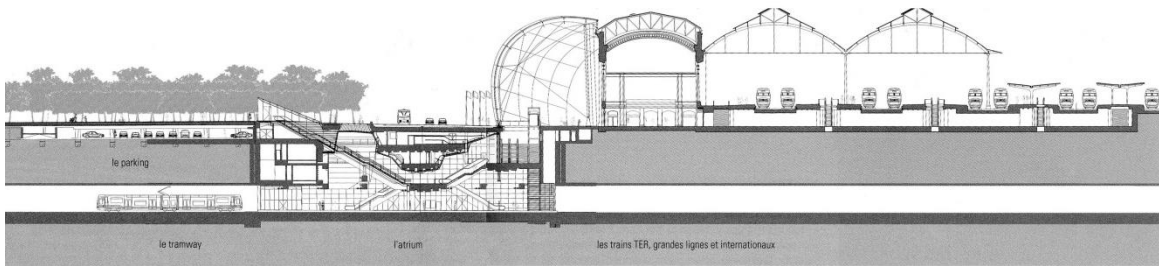


Figure 6.15: illustrates a variety of architectural spaces at a typical modern transport interchange (Source: Edwards, 2011: 28-29)

The ‘Transport Interchange’ serves as a facility that accommodates various different modes of transport. Transport Interchanges are the epitome of sustainable development and contribute widely to urban revitalization. A transport interchange has the ability of connecting flows of people and transport infrastructure together in a logical fashion (Edwards, 2011:1). The interchange is considered by Edwards (2011:2) as a hub that permits transfer from one mode of movement to another. (Refer to figure 6.15) The interchange can also be considered as a place of connection whereby people are able to move around cities, of transfer whereby people are connected from one mode of transport to another and of social interaction whereby people are given the opportunity to socialize.

Edwards (2011:3) views the interchange conceptually as a place that exists between gateways, movement patterns, land use functions and the web of connecting spaces. The Transport Interchange is a place or destination that accommodates functions and services. Edwards (2011:3) goes on to say that the interchange “operates at different scales, interfaces between landscape and urban



Plate 6.18: shows Kuyasa interchanges connection with the urban realm (Source: <http://www.meyervorster.co.za/home.asp?m=7&idkey=542/> accessed 25 April 2014)

elements and interacts in detail between buildings and their more intimate spaces.” In terms of integrating the interchange with its context, a variety of factors should be considered in the design which actively engages with the urban realm and its users, creating liveliness and interaction (Refer to plate 6.19 & 6.20). These factors include the



Plate 6.19: the park square and welcoming entrance shows how a well-defined street edge can create liveliness and interaction
(Source:<http://www.hassellstudio.com/en/cms-projects/detail/tianjin-binhai-transport-interchange/> accessed 25 April 2014)

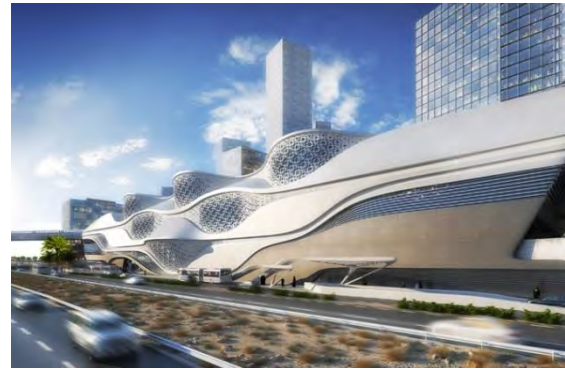


Plate 6.20: shows how architectural form may can be used to express identity in creating a landmark
(Source:<http://www.dezeen.com/2013/05/16/king-abdullah-financial-district-metro-station-by-zaha-hadid-architects/> accessed 25 April 2014)

design of a building with an active and defining street edge, one that is easily identifiable by its users and holds some sort of identity in the urban context (Refer to plate 6.18). *“There is a distinct connection between street life, the events accommodated on the street and the numbers of peoples present”* (Gehl, 2000:23). This connection of the built form to the urban realm can be used as an opportunity to provide visual stimulation to the user in harsh urban environments through architectural aesthetics. The creation of a built form which captures the attributes of a place will provide a more navigable environment, and one where visual stimulation contributes to experience of a ‘sense of place’, leaving users with an inspiring feeling of belonging (Cullen as cited in Gehl, 2000: 183).

“The interchange emerges as an important, or at least rejuvenated, transport facility- one that is not justified by energy efficiency alone but by the search for wider social sustainability acted out as light, space and mobility” (Edwards, 2011:1).

In order to achieve sustainability as a step towards urban revitalization attention to ecological design of transport buildings must be involved. Edwards (2011:2) argues that there is no good conserving fossil fuels in green transportation and then wasting it on lack of interest in low energy designs of transport interchanges. (Refer to plate 6.21) Transport interchanges therefore have the ability to promote widespread ecological design.

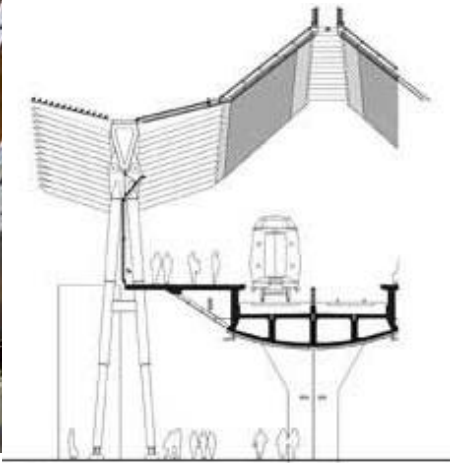


Plate 6.21: shows the expressive use of ecological design by the natural sunlight and the use of the roof design to collect rainwater (Source: Edwards, 2011:146)

Figure 6.16: illustrates a section of the roof structure design (Source: <http://www.arcspace.com/features/grimshaw-architects/bijlmer-arena-station/> accessed 25 April 2014)

Modern transport Interchanges are classified by Edwards (1997:17) as ‘cities’ as they accommodate various transport modes. A facility classified as a ‘city’ should also therefore accommodate a vast range of social functions for its users. These facilities according to Dominik et al. (2000: 240-241) include activates such as retail, social related functions and civic services such as police stations and municipal offices (Refer to plate 6.22& 6.23).



Plate 6.22: shows how the use of a transport facility serves as host to various other functions as well (Source: <http://sgwestregion.com/transport/> accessed 25 April 2014)



Plate 6.23: illustrates retail and other commercial functions are incorporated into a transport interchange (Source: <http://www.adamcoupe.com/blog.htm> accessed 25 April 2014)

“The modern interchange is a hybrid that accommodates new transportation technologies and seeks to provide expression for the interconnected nature of modern multicultural and pluristic life” (Edwards, 2011: 10). The challenge of the modern contemporary interchange is the ability to handle large numbers of transferring passengers not only to and from them but also within them. (Refer to figure 6.22) This process involves integrating complex movement patterns due to the multi-facets of transport, while producing a built form of quality, comfort and architectural distinction as this will positively influence the perceptions of the buildings users. Bloomer & Moore (1977:59) stated that *“a building is an incitement to actions, a stage for movement and interaction.”*

(Refer to figure 6.24). Essentially, the interchange is about processing passengers between modes of mobility: the process is people-centered and consists of moving users from one transport source to another (Harbour, 2006 as cited in Edwards, 2011:2).

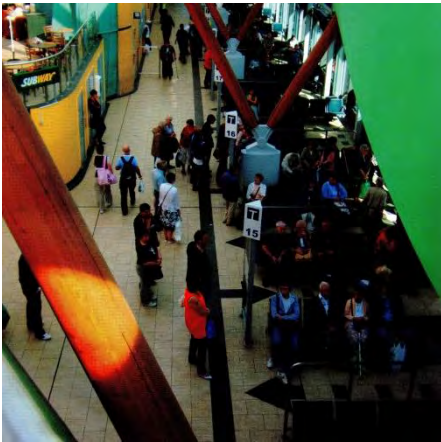


Plate 6.24 shows the internal spaces of the interchange that offer opportunities for interaction between individuals (Source: Edwards, 2011: 126)



Plate 6.25: shows the internal spaces of the interchange that must process large capacity movement (Source: <http://www.theguardian.com/environment/green-living-blog/2009/oct/26/bike-train> accessed 25 April 2014)

However, good transport architecture celebrates the mundane process of circulation and movement by creating uplifting spaces that, through their scale, volume and clarity, reduce stress and anxiety among the travelling public. Further to this Bloomer & Moore (1977: 59) state that “*all architecture function as a potential stimulus for movement, real or imagined*”. (Refer to plate 6.26 & 6.27) The expression of movement within a built form may be achieved in varying ways of alternating textures and colour, structure and the use of focal points along the movement and stasis of the individual to create an experience of continuity. Therefore it is possible to express movement in a building without having to make the building really move.



Plate 6.26: shows a change in texture implies movement (Source: <http://en.wikipedia.org/wiki/Blackpool> accessed 25 April 2014)



Plate 6.27: shows how the use of colour creates movement (Source: <http://gautengfilm.co.za/locations/all-locations/10-baragwanath-taxi-rank-and-traders-market/> accessed 25 April 2014)

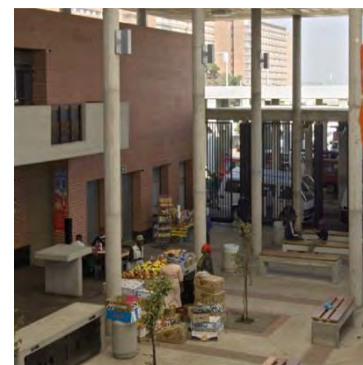


Plate 6.28: shows how the use structure creates movement (Source: <http://gautengfilm.co.za/locations/all-locations/10-baragwanath-taxi-rank-and-traders-market> accessed 25 April 2014)

The transport interchange has an important role to play in contributing to sustainable development through meaningful architecture that enhances perceptions on public transport. In most cities transport interchanges have become a major catalyst of urban regeneration (Edwards, 2011:3), contributing to impact positively on altering perceptions of people towards public transportation in urban city centres.

6.7 CONCLUSION

The perceived environment of public transportation of city users has deteriorated with the passing of time. More recently people have also increasingly come to know the environment through information which is not experiential, so that there are changes in their knowledge due to messages provided by the media and other information systems. Rapoport (1977:300) states that *“both experienced and indirectly known environments are evaluated as good or bad, desirable and undesirable”*.

The irony is that transport policies currently being pursued by many global cities are expressly designed to replicate just those conditions that sustainable transport is trying to overcome. Extensive road networks to facilitate ever-increasing levels of motorization are still praised as progressive and signs of achievement. Cities need to overcome this practice and strive to move towards sustainable public transportation to overcome the negative perceptions held by city inhabitants.

It is clear now that the relationship between transportation and changing perception of transport users can be married together by the transport interchange. Transport Interchanges should integrate the use of light, space, expressive form and bold construction techniques to increase legibility in the built environment and allow for the establishment of improved interior environments (Edwards, 1997: 94). These integration techniques provide the opportunity for the cities inhabitants to perceive the environment as being improved changing their overall perception towards public transport.

As shown in the growing body of architecture, much is gained from understanding the impacts of perception on the built form. The next chapter seeks to identify successfully modern contemporary examples of transport interchanges to gain further insight into the principles implemented by these facilities to positively enhance the experiential and cognitive perceptions of people.

CHAPTER SEVEN:
THE ARCHITECTURE OF PUBLIC TRANSPORT

7.1 INTRODUCTION

The following analysis will explore how, through architecture and urban design one can create an environment that alters the perceptions of people towards promoting the use of public transport and remove the stigma of car dominance. In exploring these precedent studies it will be possible to gain relevant knowledge on how the design of a transport interchange and a well implemented transport system can impact on perceptions of public transport.

7.2 THE TRANSPORT INTERCHANGE AS AN URBAN REVITALISATION TOOL: Arnhem Central Transport Hall, Netherlands.

7.2.1. General Information



Plate 7.1: shows the main façade of the building.
(Source: <http://www.unstudio.com/projects/arnhem-central-masterplan> accessed 14 May 2014)

The Arnhem Central Transfer Hall is the central piece of the Arnhem central masterplan. The Transfer Hall serves as an interchange linking various transport programmes and levels. The building and masterplan was designed by the UN Studio in 1996 with the first phase opened in 1998. There are still a few phases of the masterplan set to be complete in late 2015.

The development plays a vital role in the renewal of the urban city centre and creating a working public transport system. The building sits adjacent to the railway line and connects to various office and residential tower blocks. The Transfer Hall shelters the facilities and waiting areas for the trains, trolley buses and bus station, as well as commercial zones and a conference centre. The main design initiative was to create a linking hub between transportation modes that service the city centre and surrounding areas and the office plaza.

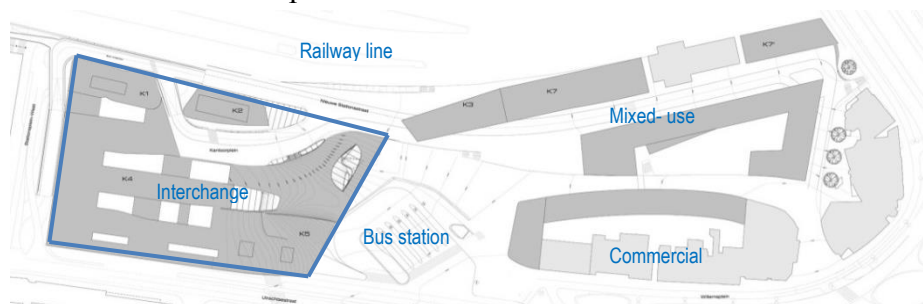


Figure 7.1: illustrates the site plan showing the interchanges as the hub of all surrounding activities and forms.
(Source: <http://www.unstudio.com/projects/arnhem-central-masterplan> accessed 14 May 2014)

7.2.2. Concept

The main concept behind the Arnhem Central Transfer hall is a ‘one terminal concept’. This encompasses combining bus terminal, train station, taxis, bicycles and car parking into an integrated transport interchange. The main challenge in this was the varying heights that each mode of transport operated on. This was solved by constructing the building to bring together all transport systems and facilities. The main area is organized as a roofed over, climate controlled, multi-level terminal form that interconnects all these facilities.

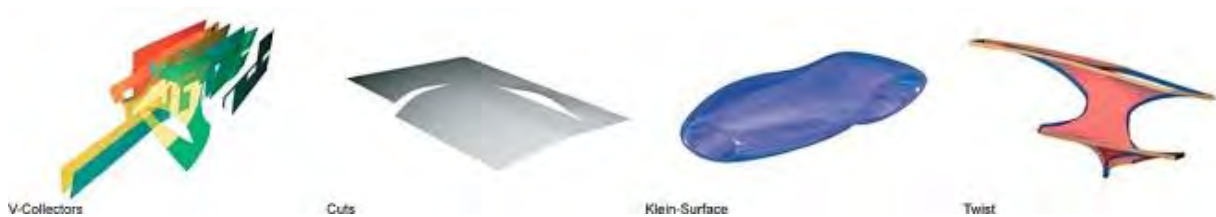


Figure 7.2: illustrates conceptual ideas of the roofed over form which covers the main area of the interchange (Source: <http://www.unstudio.com/projects/arnhem-central-masterplan> accessed 14 May 2014)

The new identity of the station area acknowledges the regional significance of Arnhem in its design. The design is also meant to express the improvement of public transport services in Arnhem and to enhance the urban context of Arnhem. It is the key element in Arnhem’s masterplan to revitalize the city. This specific development was chosen due to the spectacular number of people that passed through the precinct. For many people the town starts at the interchange. This emphasises the influence that a development of this scale can have on changing the urban context through revitalization and changing the public’s perceptions on the method of movement in and around the city of Arnhem.



Plate 7.2: shows the conceptual structure and form of the building (Source: <http://archinect.com/people/project/22107538/arnhem-central-transferhal/22118354> accessed 14 May 2014)



Plate 7.3: shows the main façade of the building. (Source: <http://archinect.com/people/project/22107538/arnhem-central-transferhal/22118354> accessed 14 May 2014)

7.2.3. Design Principles



Plate 7.4: shows the external streetscape of the Interchange. (Source:http://translate.google.co.za/translate?hl=en&sl=nl&u=http://www.arnhemcentraal.nu/project/&prev=/search%3Fq%3Darnhem%2Bcentraal%2Bstation%26es_sm%3D122 accessed 14 May 2014)

The overall interchange design was based on pedestrian and traffic flows. Grounding the design of the interchange provided an approach to minimizing the impact of existing traffic in the area and allow for a safer and more walkable pedestrian urban environment. In promoting a more user friendly approach to the facility, it promotes users to feel more comfortable accessing the station and therefore

promotes usage as the previous station was plagued with traffic congestion and an unsafe walking environment.

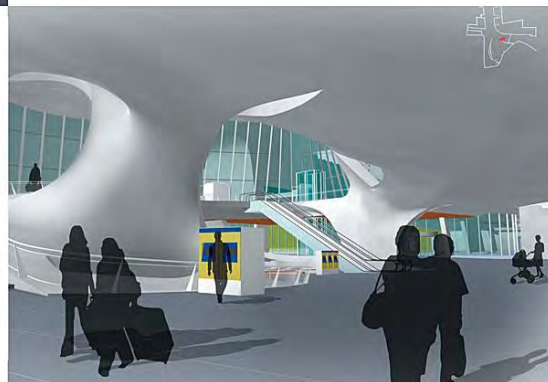
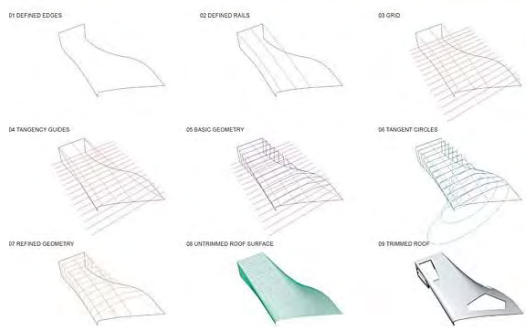
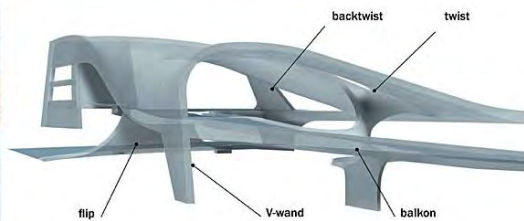
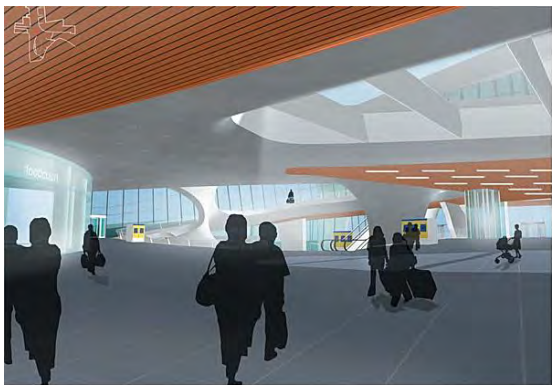


Plate 7.5: shows the structural elements of the interchange and its positive effects on the interior spaces. (Source:<http://archinect.com/people/project/22107538/arnhem-central-transferhal/22118354> accessed 14 May 2014)

Light, space and comfort were also some of the central elements in the design and are portrayed throughout the interchange in the structure of the building. The architects used the structure of the building to create meaningful spaces and enhance the experience of the user in the building. The design and construction techniques of the building are

progressive and each element in the building is different. (Refer to plate 7.5) The twist is the main structural element, constructed of steel and concrete and is the main support of the roof over the main concourse volume. From here, all the other structural elements join together, giving the building a continuous image. The sculptural form of the building provided the opportunity to allow for ultra-modern spaces, a frequent element in a public transport facility. The structural components of the building also allow for open plan spaces which are in keeping with the intentions of promoting an easily navigable building.

7.2.4. Spatial Planning

The main principal behind the planning of the building was movement, the movement of passengers from one mode of transport to the next. Due to the concept of a one terminal building, a multi layering system of the different transport facilities was created. Together with this a central concourse area was established, an area where all passengers pass through to reach their next destination. This area as indicated in orange in figure 7.3 is the movement spine of the interchange and leads to every area of the building.

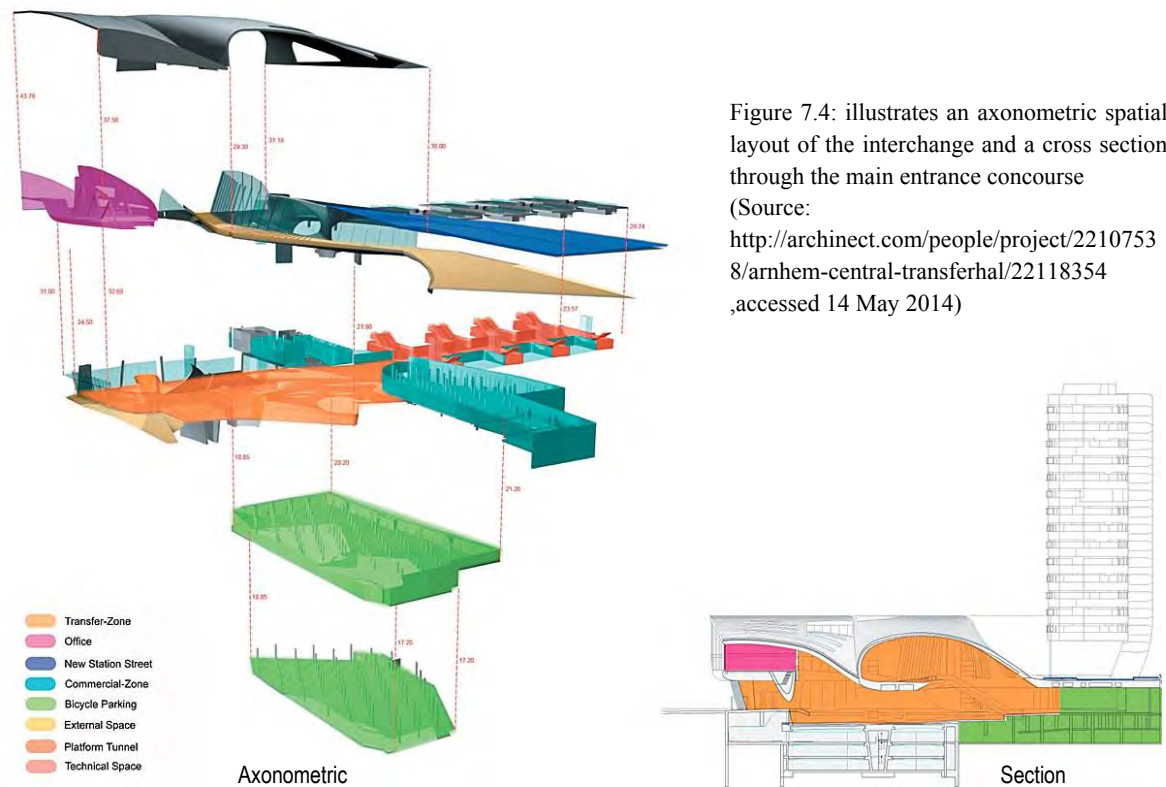


Figure 7.3: illustrates the plans of the interchange.

(Source: <http://archinect.com/people/project/22107538/arnhem-central-transferhal/22118354> ,accessed 14 May 2014)

The central area became the starting point in the building where one would start their experience of the interchange. This area was designed to be an open, high and bright space with as few obstacles as possible. And this was achieved by minimizing the use of columns and creating a singular unifying central structure. This clarity of space made it possible for the user to easily find their way around the building at a glance.

Services such as ticketing and luggage lockers are located on the periphery of the main concourse to allow for free open movement corridors. Great care was taken to enhance the movement of people. The entrances have large turnstiles to accommodate wheelchairs and strollers.



The platform tunnel which leads off the main concourse provides access to the train platforms. The platform is also directly connected to the bus station and the car park to allow efficient transfer between them. The platform also ensures that one passes all kinds of amenities, services and shops while switching modes of transport.

The basic spatial structure of the interchange is defined by the transport facilities that it houses. The basement levels feature bicycle parking. The ground/ street and first level

house the main central volumetric concourse together with commercial components and train platform links. The upper most level contains offices which overlook the main concourse and a new station street added to the train station concourse.

7.2.5. Perceptual Connotations

The materials and colour palette of the interchange are chosen to particularly heighten the sensory perceptions of its users. Neutral tones were used to slow down the atmosphere of the fast pace and business of the concourses. The use of natural light and ventilation is evident in the design of the building and is characterized by the use of large transparent windows and skylights that create a bright and pleasant spatial experience for the buildings users.



Plate 7.6: shows the structural elements of the interchange and its positive effects on the interior spaces. (Source: http://translate.google.co.za/translate?hl=en&sl=nl&u=http://www arnhemcentraal.nu/project/&prev=/search%3Fq%3Darnhem%2Bcentraal%2Bstation%26es_sm%3D122, accessed 14 May 2014)



Plate 7.7: shows the structural elements of the interchange and its positive effects on the interior spaces. (Source: <http://www.unstudio.com/projects/arnhem-central-transfer-hall>, accessed 14 May 2014)

The use of glass surfaces posed a challenge to architects with regards to the climate control of the building. Through substantial research on sunlight, light penetration, the development of heat and glare the solution was the use of a type of solar glazing which limits the amount of sunlight passing through making the climate in the station more manageable.

The Arnhem Central Transfer Hall achieves its overall initiative of creating a building that serves to create a renewed urban environment enhancing the public spaces and promoting the use of public transport in doing so. In doing so they have effectively transposed the stigma that people have of using public transport and successfully altered the public's perceptions.

7.3 THE ARCHITECTURE OF THE TRANSPORT INTERCHANGE: North Greenwich Interchange, London.

7.3.1 General Information



Plate 7.8: shows an aerial view of the interchange in its context
(Source: <http://www.fosterandpartners.com/projects/north-greenwich-interchange/> 14 May 2014)



Plate 7.9: shows the general façade of the North Greenwich Interchange
(Source: <http://www.fosterandpartners.com/projects/north-greenwich-interchange/> 14 May 2014)

The North Greenwich Interchange is a transport interchange in London designed by Foster and Partners in 1995 and was officially opened in 1998. The development is a vital element in London's transport strategy. The interchange serves commuters from the surrounding areas and acts as a hub for people during their commute. The project played a significant role in the regeneration of the North Greenwich peninsula. The interchange ensures that the people can travel locally and across London without recourse to their cars. The building is designed to change the perceptions of people on the use of cars in the heavily congested city of London by promoting the use of public transport.

7.3.2 Concept

The concept for the North Greenwich Interchange was to place emphasis on the links and connection of people to transport facilities as well as the internal connection within the station from one mode of transport to the next. The site sits adjacent to the River Thames and therefore the interchange serves as a connection across the river via the trains running underground.

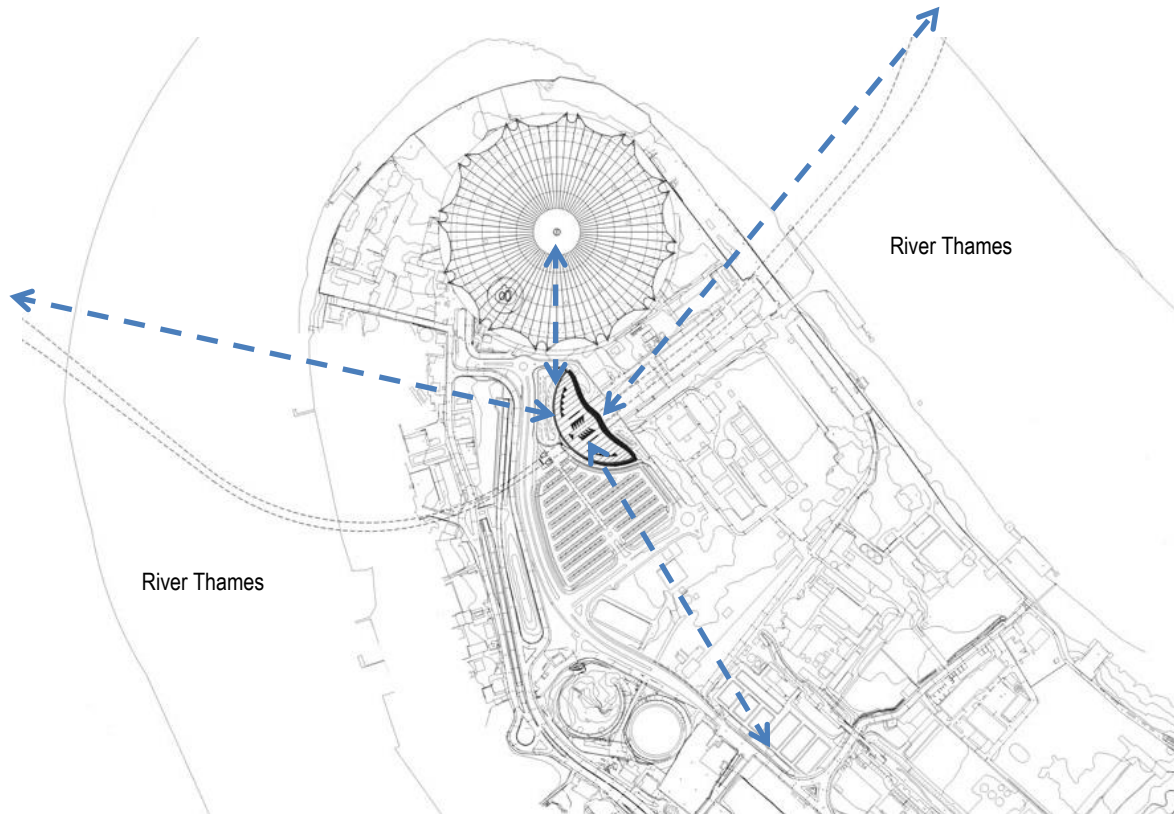


Figure 7.5: shows the site plan with its contextual links
 (Source:<http://www.fosterandpartners.com/projects/north-greenwich-interchange/> 14 May 2014, Edited: Author 2014)

7.3.3 Spatial Planning

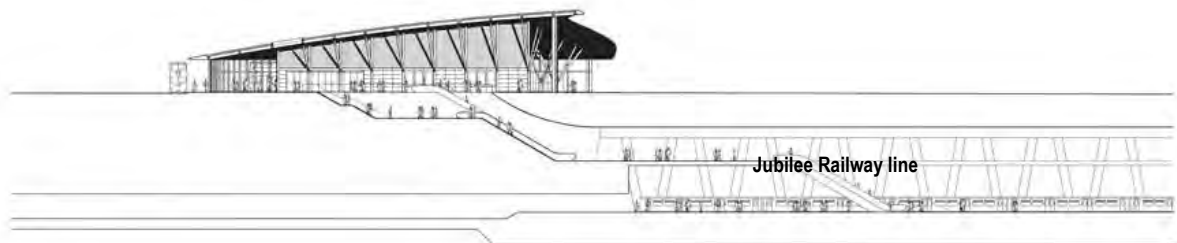


Figure 7.6: shows the section of the North Greenwich building and its connection to the train platforms
 (Source:<http://www.fosterandpartners.com/projects/north-greenwich-interchange/> 14 May 2014, Edited: Author 2014)

The building is positioned above the entrance to the North Greenwich Interchange which is an extension of the Jubilee Railway Line. The interchange is also located in close proximity of the O2 entertainment arena and functionally serves together with the surrounding area of North Greenwich to connect it to the greater London. The interchange functionally serves to facilitate the movement of people using trains, buses, taxis and cars.

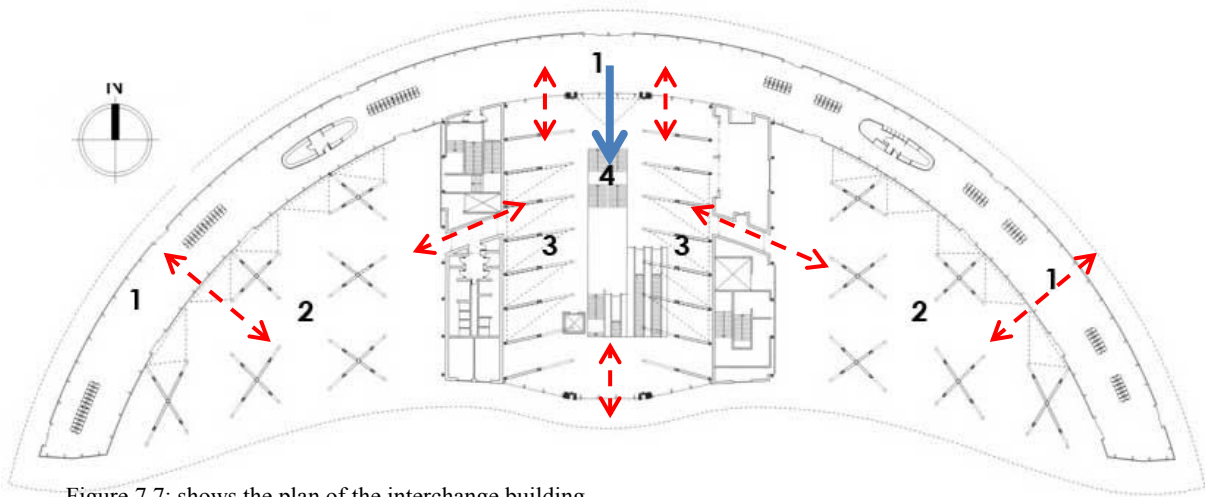


Figure 7.7: shows the plan of the interchange building
 (Source:<http://www.fosterandpartners.com/projects/north-greenwich-interchange/> 14 May 2014, Edited: Author 2014)

One of the key design initiatives was to create a facility that promotes the efficient transfer of people between the different modes of transport. The curved footprint of the building was derived from the movement of buses along the one side of the building. The curve shape of the building allows for a greater more effective platform for buses to operate. The vehicle and taxi zones are located symmetrically alongside the main concourse waiting area. These are within close proximity of the buses and allows for easy transfer of people between bus, taxi and cars. The waiting room is sandwiched between the two modes of transport creating a functional space to both.

7.3.4 Design Principles

The building comprises of glass and steel primarily and is identified by its dramatic curving roof structure. This element in the design of the building emphasises the aspect of trying to create an ‘identity’ for itself. The aerodynamic shape of the building is symbolic of bird’s wings in flight.



Plate 7.10: shows the curved roof structure of the external concourse
 (Source:<http://www.fosterandpartners.com/projects/north-greenwich-interchange/> 14 May 2014)

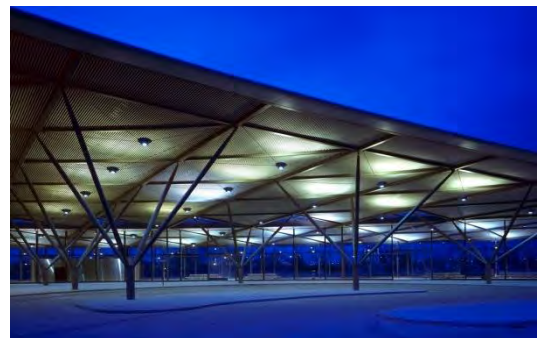


Plate 7.11: shows the steel structure supporting the vast roof canopy
 (Source:<http://www.fosterandpartners.com/projects/north-greenwich-interchange/> 14 May 2014)

The curved roof is supported by a tree-like steel column structure with which symbolism lies in its connection to the ground. The canopy structure over the external concourse

stretches for 160 meters. It shelters the concourses on both sides of the building providing protection for the weather and a comfortable outdoor space.

The form of the building is quite lengthy and stretched to accommodate the maximum of the platform area for buses and at the same time provides adequate drop –off zones for vehicles and taxis. From the elevation of the building the façade seen from street level forms the image of a hi-tech building with its sophisticated and complex steel structure combined with its modern contemporary use of glazing. The building is in keeping with the image of a transport facility and successfully portrays this to the public via the building’s design.

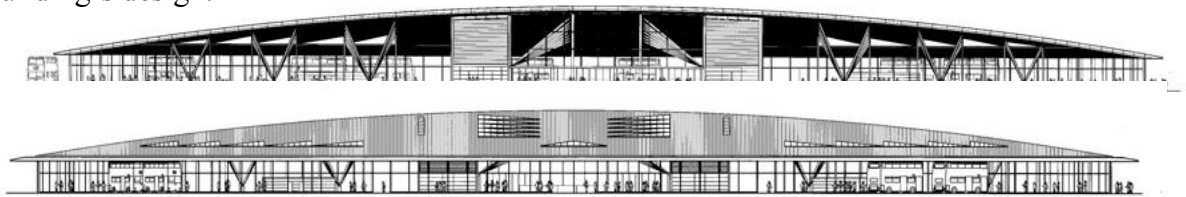


Figure 7.8: illustrates the elevation of the curved roof structure within the context of the building.
(Source:<http://www.fosterandpartners.com/projects/north-greenwich-interchange/> 14 May 2014)

7.3.5 Perceptual Connotations

The roof canopy of the interchange is perforated to allow the penetration of natural light into the concourse illuminating the deepest spaces of the building during the day. This provision of natural light emphasises the implications of the design towards making people comfortable within their environment. This form of design leads people to change their way of thinking and their perception towards the architecture of transport facilities.



Plate 7.12: Shows the perforated roof sheeting and the specially designed light.
(Source:<http://www.fosterandpartners.com/projects/north-greenwich-interchange/> 14 May 2014)

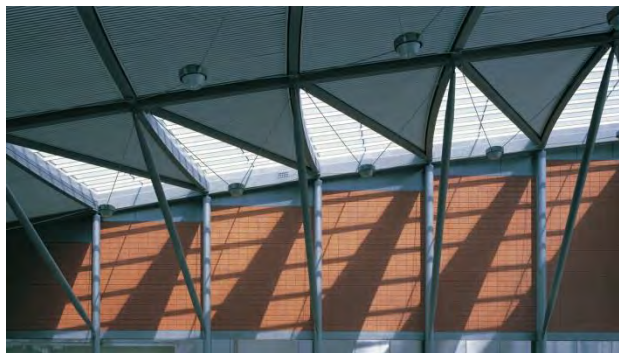


Plate 7.13: shows how the perforated roof sheeting allows natural light into the concourse.
(Source:<http://www.fosterandpartners.com/projects/north-greenwich-interchange/> 14 May 2014)

At night, the sensory perceptions are engaged via the specially designed lighting units suspended from the ceiling (Refer to plate 7.3.5). The specially designed light can both project light upwards onto the reflective aluminium ceiling panels as well as illuminate the area immediately below with a spotlight attached to the bottom section of the fitting.

The hi-tech complex structure of the building combined with the materials used ensures the user an experience of openness, simplicity and clarity of form. The openness of the building also provides the user the ability to engage with the external spaces. With particular reference to the waiting area as users are able to visually see if their transportation has arrived without possibly having to be outside. The clarity of the form and simplicity was designed to help users of the building to orientate themselves easily.



Plate 7.14: shows the openness of the spaces along the interior concourse.

(Source:<http://www.fosterandpartners.com/projects/north-greenwich-interchange/> 14 May 2014)



Plate 7.15: shows the clarity of the form on the interior concourse.

(Source:<http://www.fosterandpartners.com/projects/north-greenwich-interchange/> 14 May 2014)

The buildings contribution to sustainability apart from the natural light offers natural ventilation via the suspended glass panels along the edges of the canopy. The suspended glass panels also offer the interior concourse protection from the weather.

The North Greenwich Interchange is a development aimed at providing users with an alternative means of mobility via public transport. In this case, apart from the development being environmentally sustainable in a sense it also considers the ease of mobility for the people that require getting to the other side of the River Thames. The interchange cognitively conquers the perceptions of people in this instance and thereby promotes the use of public transport. The emphasis here therefore lies in the ability of such a development to change the way people perceive by creating an alternative way of thinking that benefits the user directly.

7.4 CONCLUSION

The precedent studies analyzed both display qualities of satisfying the task by changing the perceptions of people towards public transport effectively through the use of architecture. The success of this can be emphasized by the way that these two developments have been approached and by the elements in the design.

The Arnhem station is an exceptional example of how a development such as a transport facility can influence change in a busy, neglected urban space and transform it into a thriving hub of social activity and engaging public space. In doing so the facility has proved to positively enhance the urban fabric of the city and change the way people perceive public transport.

The North Greenwich Transport Interchange is an extraordinary example of a building that reinforces the need for interconnected transport facilities in urban environments. Providing ease of mobility and a safe environment people can be made to feel that the use of public transport is far greater and more beneficial to them than the use of a car. In doing this people become more trusting and reliant on the public transport systems provided to them, creating a more sustainable means of mobility.

CHAPTER EIGHT:
PUBLIC TRANSPORT IN A SOUTH AFRICAN CONTEXT

8.1 INTRODUCTION

The two case studies selected for the research are Park Station, Gauteng and Durban Station, Kwa Zulu Natal. The choice of these two stations is twofold. It firstly expresses the current notion of public transport in South Africa which displays the elements that impact on people's perceptions and challenges what public transport should be, and secondly, being local they provide a more accurate example of transport facilities in a South African context. The case studies will focus on key issues such as the location, justification, background/ history, climates, special relationships, vehicle and pedestrian movements, structural form, and elements of visual interest; all of which incorporates much of the theoretical findings from the literature review.

8.2 PARK STATION, JOHANNESBURG CBD, GAUTENG

8.2.1 Introduction

Park Station is a transport facility in Johannesburg, owned by the Passenger Rail Agency of South Africa (PRASA) and is one of the largest transport interchanges in Africa. The original station was designed by architects George Leith and Gerard Moerdyk and was completed in 1933. Being a transit hub which hosts various modes of public transport and public facilities it is an important landmark in the Johannesburg urban fabric. Approximately 129,085 people pass through Park Station on an average weekday (City of Johannesburg, 2003: 175-177 cited in Melcher, 2012: 37). The location of this interchange and the movement of people between the various modes of transport is the main focus of this case study as it highlights the importance of spatial planning and capturing movements of people positively transforming the station from a vaguely disregarded train station into a successful user-friendly, safe transport interchange.

8.2.2 Justification of Case Study

Park Station provides an excellent example of urban revitalization. With the addition of modern public transport solutions such as the 'Gautrain', the new Bus Rapid Transit Transport Service known as 'The Rea Vaya' and the 'Metro Mall Taxi Rank' together with the existing 'Metrorail' service and the 'Municipal and Putco Bus Services' and the 'Inner city- coach services' the station has been transformed into a multimodal facility. The station itself has being transformed from a very unsafe, uncomfortable and

disregarded place into a destination that people can feel safe and use on a daily basis and not just for pure need of mobility. The effects of this can be reflected in the design and layout of the building, with its hierarchy of spaces and abundance of natural light as well as the ease of movement between the various modes of transport. The transport interchange has given life into the surrounding building edges allowing for the regeneration of the urban context.

As the facility was originally a train station with bus and taxi ranks on its periphery, it has not been originally designed to accommodate the various other modes of transport. The emphasis of this case study is to therefore analyse the various elements that have impacted on positively changing and enhancing people's perceptions of this facility. The study of such a facility aids this dissertation by revealing the benefits of creating meaningful spaces that promote people to feel comfortable and safe in their environment, thereby changing their opinions on public transport and promoting them to use it.

8.2.3 Location

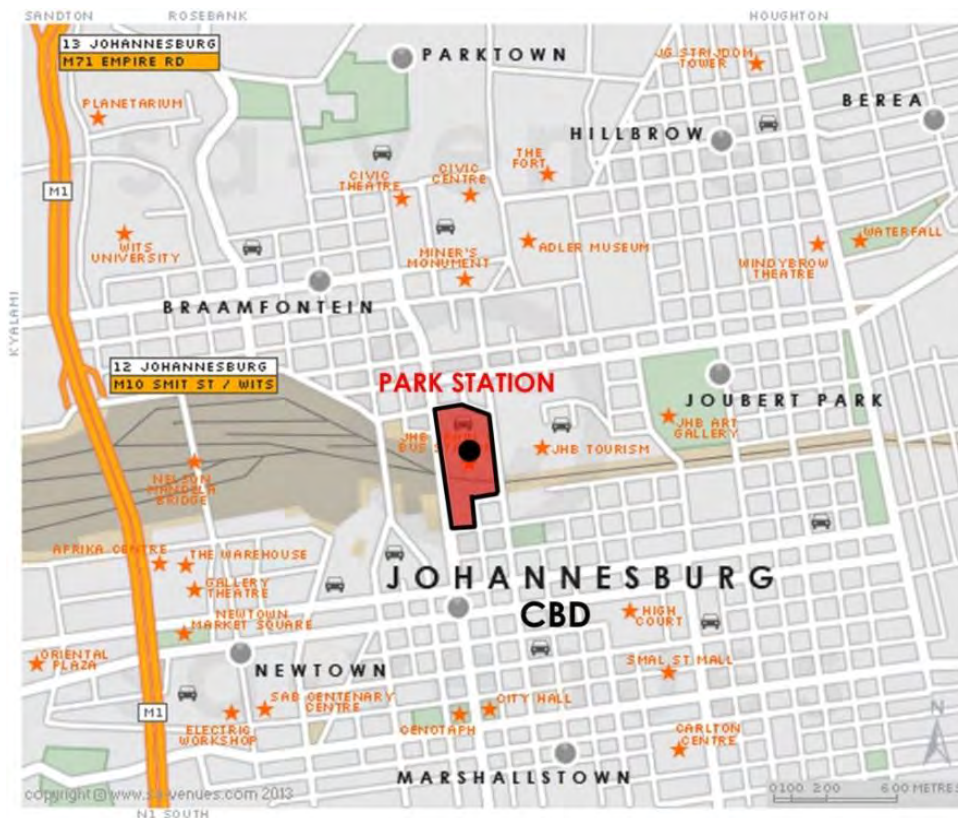


Figure 8.1: shows the location of park station with its surrounding macro context (Source: <http://www.sa-venues.com/maps/gauteng/johannesburg-central.php> edited by author, 2014)

Park station is located in the CBD of Johannesburg, bordered by Braamfontein, Newtown, Marshalltown and Hillbrow. In the CBD it is located in the block above the main railway line bordered by Rissik, Wolmarans, Wanders and Noord Streets. The Park Station Precinct is part of a greater urban revitalization programme to rehabilitate the inner city by providing functional, livable and safer environments. The main access routes to the Park station are via the M1 highway and through the surrounding precincts. Park Station is situated central providing easy access from all directions.



Plate 8.1: shows the location of park station with its surrounding micro context (Source: <http://www.allatsea.co.za/mygallery/jhbgallery10.htm> edited by author, 2014)

8.2.4 Historical and Social Context

From the historical timeline of Johannesburg it can be established that Park Station construction dates back to 1896. According to Chipkin (1993:253) the preliminary work that paved the way of the current station began in 1946 which was initiated by a vast building project that would extend over two decades.



Plate 8.2: shows the original station exterior façade and interior concourse (Source: <http://www.artefacts.co.za/main/Buildings/bldgframes.php?bldgid=5099> accessed 11 May 2014)

The station being built in the Apartheid era was designed to accommodate according to separation of races. This led to certain areas thoughtfully designed for whites and certain areas designed without any consideration for the discriminated people using the trains. The dramatic station concourse of the original station building was restricted to whites only for six decades, until apartheid was dismantled.

The rebuilt station sits adjacent to the original station building and is a result of multiple additions and alterations done to improve public transport services by increasing pedestrian movements and public facilities. This new station welcomed people from all walks of life and there was no discrimination of colour, origin, race, religion, sexual orientation, age and financial status. Due to circumstances of modernization and urbanization, certain ways of life became the norm and the use of the train as a mode of public transport declined.

Until the year 2000 the station was considered a run down, no go area due to the decay of the station and its environment and caused the usage of trains to decrease rapidly, only being used by people who had no other possible means of transport out of the metropolitan area.

In recent years, Park Station precinct had undergone several phases of an urban revitalization programme which was aimed at improving the quality of the public realm, contributing to the enhanced safety and perceptions of the people. This has given a positive message to the inhabitants of Johannesburg that the city is now a safe and healthy urban environment in which people can live in dignity.



Plate 8.3: shows the social context of the current station concourse (Source: <http://www.artefacts.co.za/main/Buildings/bldgframes.php?bldgid=5099> accessed 11 May 2014)

8.2.5 Empirical Data

8.2.5.1 Multi-Modal Transport



Figure 8.2: illustrates an integrated transport map of the public transport routes operating from Park Station to surrounding areas. (Source: http://www.reavaya.org.za/outes/parkstation_integrated_map.pdf accessed 11 May 2014 edited author, 2014)

The layout of public transport infrastructure and the routes around the city are vital to the success of a transport interchange. The use of public transport depends on its efficiency to get it users where they need to be in the most efficient time possible. The connection or transfer points need to be made easy and mobility from one mode of transport to the next need to be done without any interruptions. Park Station is situated at the centre of the surrounding areas and intersects with each mode of public transport, therefore making it a relevant transport interchange. Apart from its ideal location it is also situated along major pedestrian routes, which promotes walkability and in greater sense sustainability and displays the emergence of New Urbanism in Johannesburg. It also provides people with an image of the city, by displaying the effectiveness of the city in providing working transport facilities for the people.

8.2.5.2 Spatial Layout and Planning principles

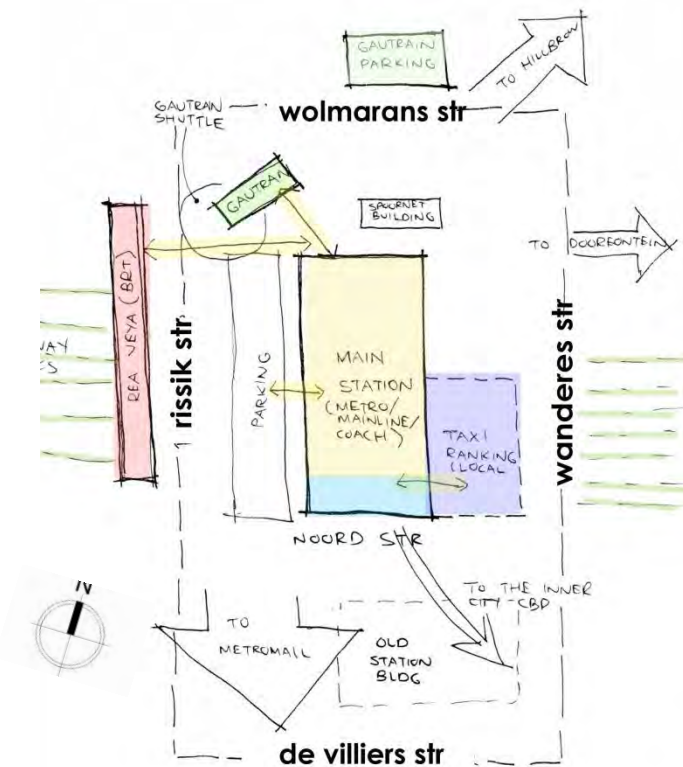


Figure 8.3: shows the site plan of Park Station Precinct showing the varying modes of transport (Source: author 2014)

The new station complex architectural layout was determined by the existing east-west axis of the main line railway traffic and by the north-south axis of the vehicle routes above the railway tracks. The architectural design of the station is evidence of this movement line, as the station was designed as a string of volumetric buildings. Park Station is considered to be a transport interchange as it has incorporated various modes of public transport to the original mode of transport that it was designed for. The addition of Gautrain, Rea Veya and Coach Buses as well as the local taxi and bus ranks

to the station created a challenging task of implementing a successful flow of pedestrians between the various modes. The main reason for this being that these additions are not located in the station building therefore creating delays in transferring between transport modes. Park Station accommodates the movement of people via the two main levels. The separation of transport uses in this case allows the user to experience the building and provided opportunities for retail and food stores during transition between travelling.

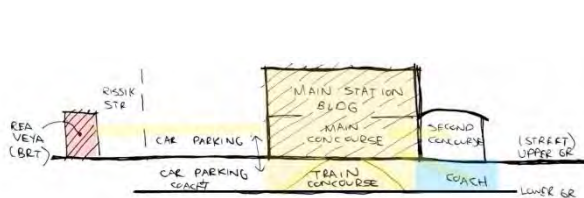


Figure 8.4: Illustrates a cross section of the Park Station precinct showing the different modes of transport (Source: author 2014)

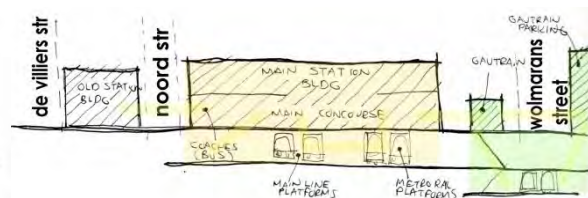


Figure 8.5: Illustrates a longitudinal section of the Park Station precinct showing the different modes of transport (Source: author 2014)

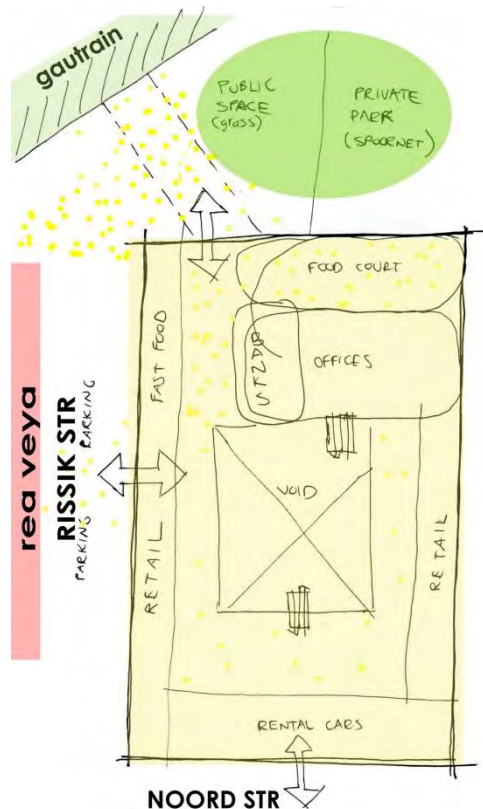


Figure 8.6: Illustrates lower plan of Park station indicating modes of transport and pedestrian flows represented by yellow dots
(Source: author 2014)

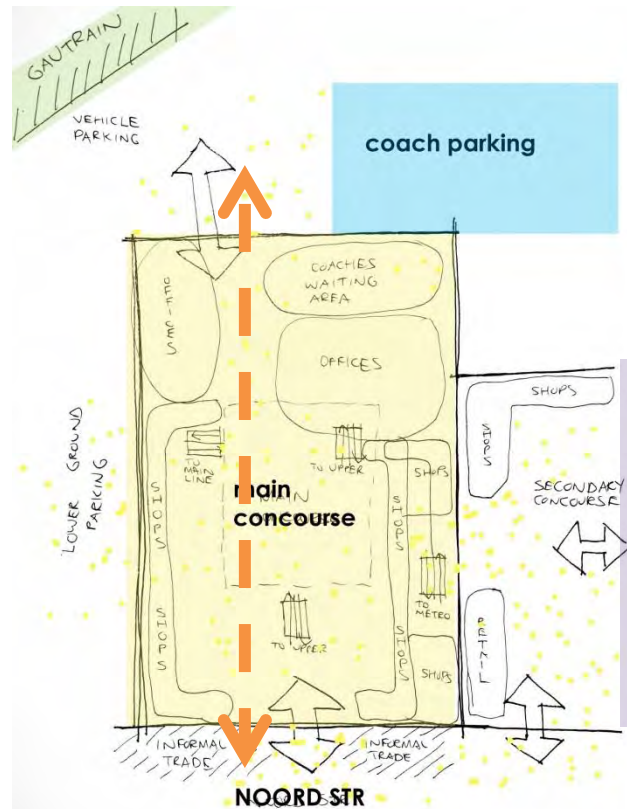


Figure 8.7: Illustrates upper plan of Park station indicating modes of transport and pedestrian flows represented by yellow dots
(Source: author 2014)

One of the main advantages of the north-south axis of the building is that it provides users with a protected link through the precinct as it acts as a thoroughfare. This also benefits the retail along the main concourse.

Main line Rail and Metro Rail

The main station building houses the main-line rail, known as the Shosholozza Meyl which runs from all major cities through Johannesburg. (Refer to figure 6.3) This is located in the main station building and is positioned directly of the main concourse as this was the primary consideration in the original design of the station. (Refer to figure 6.4)The Shosholozza Meyl offers an out of the city service and takes passengers to most of the major provincial cities. The Shosholozza Meyl plays a vital role in the impact of perceptions on public transport as it brings in people from out of the city into the station and through the station into the city. Thus the station acts as a portal, welcoming passengers. This has proved to be successful as the main line rail exits onto the main concourse and through the station before exiting allowing the passenger to experience the station.

The Metrorail which links most rural and urban areas is located similarly along the main concourse as with the main line. It offers more platforms than the main line train as it processes more users. The location of the metro rail allows for easy pedestrian movement to and from the platforms as this was also designed in conjunction with the main line. The layout of the metro rail provides entrances off the main concourse and exits onto the secondary concourse; this allows for less congestion when exiting and entering the platforms and defines the ease of movement. The metro rail exits onto the secondary concourse which consists of food outlets and which provides access to local taxis. This has proved to be effective in Park Station as the taxi industry is popular in Johannesburg. It also allows the user the opportunity to use the local Buses, BRT or Gautrain.

Gautrain



Plate 8.4: Shows Gautrain building at Park Station (Source: Author 2014)

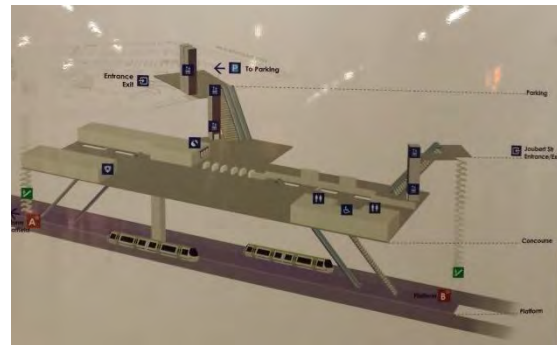


Plate 8.5: Shows 3d axonometric of the Gautrain station (Source: Author 2014)

The Park Station precinct houses the Gautrain which is a modern insertion into the public transport industry, aimed at alleviating the mobility of people and bringing a new dimension of the way transport facilities should start to operate. The impact on the public transport industry has significantly changed the way people view the transport system in Johannesburg. The Gautrain station ground level building is located adjacent to the main station building, along Wolmarans and Rissik Streets. This was done with in intention of minimally impacting on the current structure and foundations of the existing station. The underground station is located diagonally beneath Smit and Wolmarans Streets and its two stories below street level. Access to the underground station is via escalators and lifts.



Plate 8.6: Shows Gautrain Station parkade on Wolmarans Street in the background
(Source: Author 2014)



Plate 8.7: Shows Gautrain shuttle feeder bus
(Source: author, 2014)

There is a Gautrain parking facility situated across the station on Wolmarans Street. This parkade has the capacity for 1200 cars and also contains a short term parking zone as well as a drop off zone (Refer to figure 8.6). The Gautrain also has its own feeder bus shuttle and distribution service which operates within each precinct of each station bringing people to and from the Gautrain (Refer to figure 8.7).

The Rea Vaya



Plate 8.8: Shows Rea Vaya bus
(Source: author, 2014)



Plate 8.9: Shows Rea Vaya station structure
(Source: author, 2014)

The Rea Vaya is a Bus Rapid Transit transport service that operates from the Johannesburg CBD and links to Braamfontein and Soweto. It officially started on 30 August 2009 and today has a variety of routes available. The Rea Vaya service is a fast and reliable service to users. Apart from creating a reliable service it has also created vibrant spaces and connects previously unlinked economic nodes across the city. The Rea Vaya aims to reverse the stigma that people have towards public transport in South Africa.

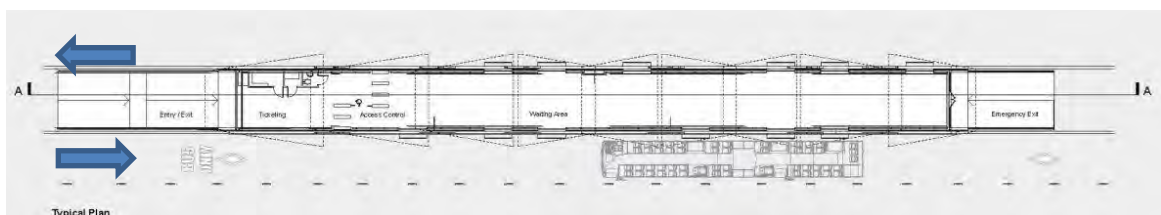


Figure 8.8: Shows Rea Vaya station floor plan (<http://www.onair.co.za/pdf/reavayaproject.pdf> accessed 13 May 2014)



Figure 8.9: Shows Rea Vaya station street elevation (Source: <http://www.onair.co.za/pdf/reavayaproject.pdf> accessed 13 May 2014)

The Rea Vaya is situated adjacent to Park Station on the east side on Rissik Street and has direct access from the street (Refer to figure 8.6). The movement of people between the main station building and the Rea Vaya Structure are via the car park on the east and through the food court at the north side. The Rea Vaya contributes to the Urban Renewal of the precinct in allowing people more variety in public transport.

The Metro bus and Minibus Taxi Services

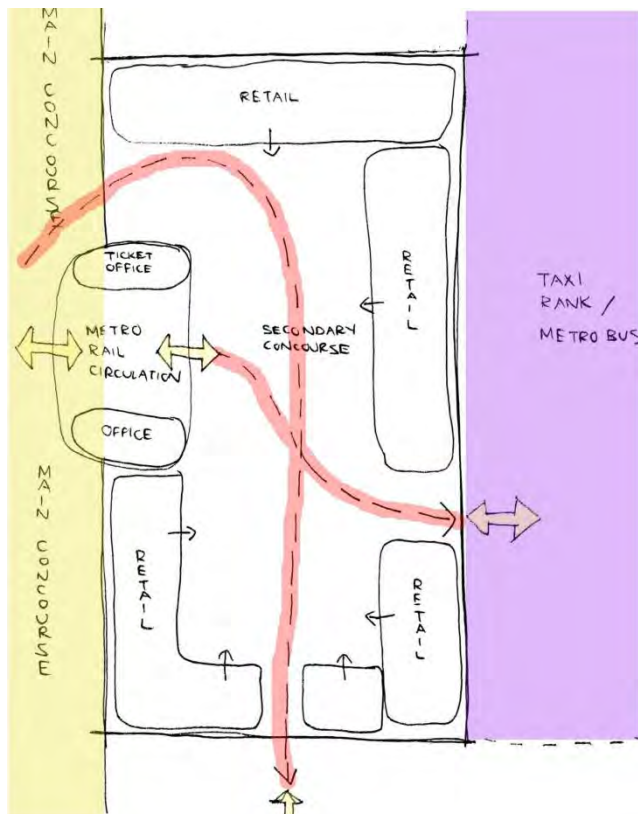


Figure 8.10: Illustrates the spatial layout of the secondary concourse, and show pedestrian movement towards the Metro bus and Minibus taxi ranks (Source: author, 2014)

The Metro bus and local Minibus taxi services are located to the west of Park Station (Refer to figure 8.6). Access to these ranking facilities is via the secondary concourse adjacent to the main station concourse. The Metro bus and Minibus Taxis provide the service of feeder routes to major transport facilities. Being a vast informalised industry, there is abundance of informal trade around these facilities. The ranking facilities are not part of the main station but a corridor of movement has been designed to accommodate these facilities to provide ease of mobility to users during transition.

8.2.5.3 Structure: Old versus New

The structure of the existing main station consists of brickwork, concrete and steel. This was the traditional method of construction in the nineties. The emphasis of the transport architecture in the past was to emphasise that transport facilities embodied an architectural language that expresses technology. This was done to show that cities progress and that they are evolving. (Refer to figure 8.10).



Plate 8.10: Shows Main Station consisting of a brickwork and concrete structure (Source: author, 2014)

The additions to the Park Station Interchange make use of steel and glass to express transparency of the stations as well as because it expresses a shift away from the traditional methods of construction but at the same time express the architectural language of transport facilities. The Gautrain Station structure was designed to emphasise the symbolic meaning which in this case represents ‘mining’ as the station is set two stories underground and consist of a series of tunnels. This was done in order to create a sense of enrichment of the passengers towards Gautrain system.



Plate 8.11: Shows Gautrain Station and its use of steel and glass (Source: author, 2014)



Plate 8.12: Shows Rea Vaya station structure and its use of steel and glass (Source: author, 2014)

The Rea Vaya aligns itself with the hi-tech stations of the past, in a form that is challenged to the cultural and climatic specifics of Gauteng. The architecture of the Rea Vaya station structure reflects on Gauteng's 'urbanity'. This was done through emphasizing scale that is human, form that is playful and disordered which reflects its context and color that is vivid and bright to express change evolution (Rea Vaya, n.d.).



Figure 8.11: Illustrates a section through the Rea Vaya expressing the structure (Source: <http://www.onair.co.za/pdf/reavayaproject.pdf>, accessed 13 May 2014)

The structural elements consist of broken overlapping roof planes that allude to townscapes which represent Alexandra and Sophiatown. Red painted tubular steel pylons that lie diagonally facing the sky, represents lighting hitting the ground during a Highveld storm and glazed side screens painted in blue steel tubes each of which display a piece of local artwork.

8.2.5.4 Hierarchy of spaces

Park station consists of a series of mega forms with varying heights (Refer to plate 6.13). These varying forms have developed as a result of constant alterations to the existing station. Due to this the internal spaces of the station vary, giving users a sectional experience. As one enters through a low dark volume space, a large open space which is naturally light is forced upon them.



Plate 8.13: Shows a panorama of Park Station, highlighting the volumetric buildings (Source: Bhengu, 2008:55.)

The hierarchies of spaces are also defined by the various entrances of the station. The main station building consists of low profiled dark entrances which are not identifiable to users and there lacked a sense of identity for the station, making it difficult for people to locate the entrance, only finding it through consecutive use (Refer to plate 8.13 and 8.14).



Plate 8.14: Shows the primary entrance of the main station building onto the upper level
(Source: Author 2014)



Plate 8.15: Shows the entrance of coach users and the users of the car lower ground carpark
(Source: Author, 2014)



Plate 8.16: Shows the revamped secondary entrance from Rissik Street on the north side.
(Source: <http://citysightseeing-blog.co.za/2014/02/18/park-station-in-johannesburg/>, accessed 13 May 2014)



Plate 8.17: Shows the entrance of the newly added Gautrain Station
(Source: Author, 2014)

The additions of the modern public transport facilities have physically impacted on the hierarchy of the spaces. (Refer to figure 8.16 & 8.17) The entrances to the new facilities have welcoming hi-tech structures, which are highly noticeable and creates such sense of identity and image for the station. The newly designed entrances also contribute to the internal spaces by creating double volume entrances to connect with the spaces inside the station.

8.2.5.5 Multi-Sensory Stimulation

The main concourse of Park Station is situated at the center of the station above the main-line rail and the metro rail platforms. The form of the building is monolithic with a light weight roof structure with clear story lighting which affords the concourse with an abundance of natural light and ventilation. The benefits of this heighten the multisensory experience of the user in the sense that it creates a comfortable environment.

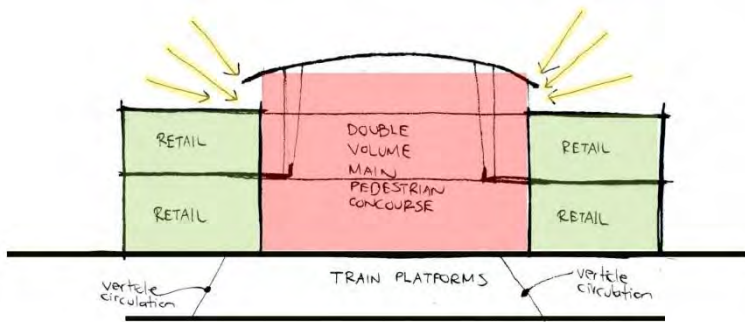


Figure 8.12: Illustrates a section through the Main Station building (Source: Author, 2014)

The main concourse is double volume which links the upper level concourse with the concourse below. The effect of this provides the users of the building with a good understanding of where they are in the building and provides a sense of direction and a method way-finding.



Plate 8.18: Shows the main concourse light weight roof structure and clear storey lighting (Source: Author, 2014)



Plate 8.19: Shows the lower level of the main concourse as viewed from the upper level concourse (Source: Author, 2014)

The Gautrain station also emphasises the enhancement of multi-sensory experience through the layout of the station. The station being located underground requires one to travel quite a distance horizontally and vertically before finally reaching the platform level. This journey is enhanced through the use of lighting in a unidirectional manner to create a sense of direction. The use of different colour floor tiles contributes to creating a break in the long distance travel.

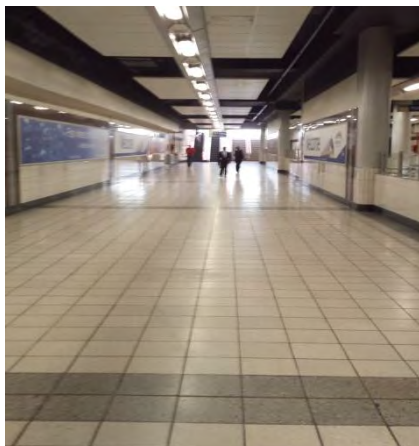


Plate 8.20: Shows the Gautrain concourse (Source: Author, 2014)



Plate 8.21: Shows the Gautrain concourse (Source: Author, 2014)



Plate 8.22: Shows the visual stimulation at on the exterior of the building (Source: <http://citysightseeing-blog.co.za/2014/02/18/park-station-in-johannesburg/>, accessed 13 May 2014)

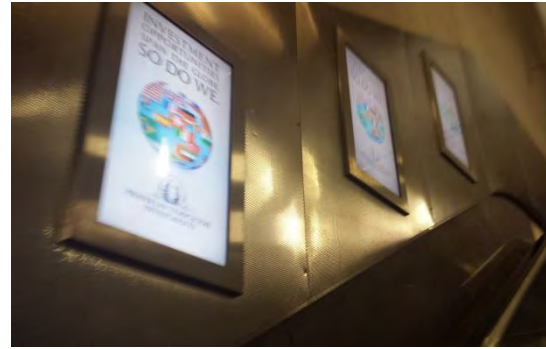


Plate 8.23: Shows the visually stimulating screens around the station (Source: Author, 2014)

Visual stimulation is located on the exterior of the building by advertising signage. These adverts are added onto the buildings due to the blank facades that it contains. These advertisements provide users with knowledge of what to expect inside the building. They also create a form of identity while at the same time obscuring one from the main entrance of the building. Visual stimulation also serves as urban furniture providing users with directions and knowledge such as advertising information boards. Due to the technological evolutions Park Station contains a multitude of the advertising screens which serve to provide information to its users as well as to advertise.

8.2.5.6 Nature and landscaping



Plate 8.24: Shows the green space outside the station (Source: Author, 2014)



Plate 8.25: Shows the landscaping outside the station building (Source: Author, 2014)

The Park Station precinct urban renewal programme which was aimed at creating livable and dignified urban environments was implemented by creating the amount of green space around public areas. This was done by creating public squares around the most

utilized public spaces around the station as the station was the main focus in the urban renewal programme. These parks provide a space where people can socially interact or acts as a space between transitions where pedestrians can relax and rest before moving onto their next destination. These spaces are also created to detract attention from the harshness of the monolithic buildings of the original station and to provide a connection of the building to its environment. The nature and landscaping also contribute to the wellbeing of the building users and promotes a user-friendly environment which is aimed at promoting the use of transport facilities in South Africa.

8.2.5.7 Station as a Destination

Park Station is one the busiest transport facilities in Africa with constant activity within the station building and its location within the busy CBD. The addition of food outlets and retail stores within the station has lately reinforced the station as a destination. The location of these food and retail outlets has created a commercial component in Park Station, one that had been long required.

Besides generating revenue for Park Station the commercial component also promotes usability. It brings people from around the precinct to use facilities at the station. In this way the public stigma of the station has indirectly been changed and the public's perceptions of Park Station have also been transformed positively.



Plate 8.26: Shows food court on the upper level of Park Station
(Source: Author, 2014)



Plate 8.27: Shows major food outlets who have opened and invested in Park Station to provide services to the public.
(Source: Author, 2014)

8.2.6 Conclusion

Park Station Transport Interchange has proven to be successful considering the fact that it was not primarily designed as an interchange. The impacts of the additions and alterations carried out over the years have shown that a strong understanding of designing spaces with regards to the movements of people was considered.

The structure of the building is however not perfectly suited to accommodate all modes of transport and as a result the latest additions to the precinct have been located adjacent to the existing station building. Although links to other modes of transport have been created, they have been done in an inefficient manner, with long unclear routes.

Given the opportunity to design a completely new building for the purpose of accommodating all modes of public transport, it is certain that the building would serve the needs of the users and provide an enhanced built form, one that addresses the complete multi-sensory experience and that can positively transform the perception of people to promote the use of public transport. It will also provide the opportunity to create an interchange where ease of mobility is created concerning movement through the building, to all modes of public transport and will include trade and commercial activity within these movements.

The fact that various modes of public transport are not located in the same structure indicates that a transport interchange is possible with a variety of buildings or structures depending strongly on the link between them. From this case study it is identified that the movement of people strongly influence the design of the spaces within the interchange. It is also important to consider the fact that surrounding urban context also influences the public's perception on public transport.

Park Station still lacks some form of identity, with particular reference to the East Side. This aspect could be addressed by some form of vertical element incorporated into the façade. This would bring the station to form as a successful node in the image of the city providing people with a clear sense of way-finding in the urban context.

8.3 MOSES MAHBIDA STATION, KWA-ZULU NATAL, DURBAN

8.3.1. Introduction

The Moses Mabhida Station is primarily a train station which forms part of Kings Park Sporting Precinct and broader Umgeni rail corridor in Durban. The station was commissioned by the PRASA and Metrorail, and was designed by ARUP Interchange Designs, the creators of some of the world's most prestigious transport facilities. The station was designed to set a new standard in public transport architecture for South Africa and its primary function serves as a transport hub. The project construction began in 2009 and was completed in 2010.



Plate 8.28: Shows a 3d render displaying the main street façade of the Moses Mabhida Station
(Source: <http://www.skyscrapercity.com/showthread.php?t=757362> , accessed 16 May 2014)

8.3.2. Justification of Case Study

The focus of this case study is based on the principles on reimagining public transport in South Africa and creating a sense of change in the urban realm. The Moses Mabhida Station displays qualities of a world class transport hub which meets all international standards that creates a contemporary space that not only forms part of a new transportation node but also creates opportunities for urban regeneration by expressing the emerging aspirations of public transport in South Africa. The station is an expression of the change in public transport and the emphasis and justification of this case study lies in the fact the architecture is used as a method of expressing this change.

8.3.3. Location



Plate 8.29: Shows an aerial view of the Moses Mabhida Station and its location between the surrounding stations (Source: Peters, 2010, edited author, 2014)

The Moses Mabhida Station is set adjacent and just one kilometer from the world class Moses Mabhida Stadium, on a busy commuter hub and provides an invaluable link between the Kings Park Sporting Precinct and the broader Umgeni rail corridor. Access to the station is via the only street entrance on Isaiah Ntshangase Road. This road is flanked by two main roads. Namely Umgeni Road on the west and Masabalala Yengwa Avenue on the east. Public transport access to the station is via either of the two main roads by taxi or bus stops. One of the biggest disadvantages of the station is that there are no taxi or bus stations in close proximity to the site.

The Moses Mabhida Station is located above the Umgeni Rail Corridor and services the railway lines leading to the north and south coasts. These lines pass through places Umlazi, Kwa-Mashu and Kwa-Dukuza and provide people with the possibility of traveling into the city via rail. The train station is also ideally situated as it is in close proximity to the Umgeni road, one of the main commercial zones in Durban as well as to the beaches providing the opportunity for people from outlying areas access to the Durban's beautiful beaches.



1: residential links 2: Beach link 3: Umgeni Road 4: Isaiah Ntshangase Road 5: Masabalala yengwa Ave
6: M4 North 7: Growthpoint Rugby Stadium 8: Moses Mahbida Stadium 9: Kingspark Staidum 10: Railway Yard

Plate 8.30: Shows an aerial view of the Moses Mabhida Station and its location between the surrounding stations
(Source: Google Earth, accessed 17 March 2014, edited author, 2014)

8.3.4. Historical and Social Context

South Africa's history which is celebrated from the break of the apartheid era is still recovering from the historically segregated planning policies that have had long lasting impacts on the urban realm. The effects of this are still evident in current times as there still exists the problem of segregation where people are put into low cost housing in areas that are far from city centres and there are also examples of people who choose to live on the periphery of the city, far from the CBD to avoid the decay of neglected areas.

The station is currently used to transport commuters on a daily basis and has a broad spectrum of users. It is also frequently used by fans for soccer and rugby games as well as for special events held at the stadium. The Moses Mabhida project defines the effort made by South Africa to use public transport to stitch together the public realm to create opportunities for urban and social regeneration. The development signifies the potential for transport facilities to change the perceptions of transport facilities and to bring awareness to the evolution of public transport in South Africa.

8.3.5. Empirical data

8.3.5.1 Design Principles

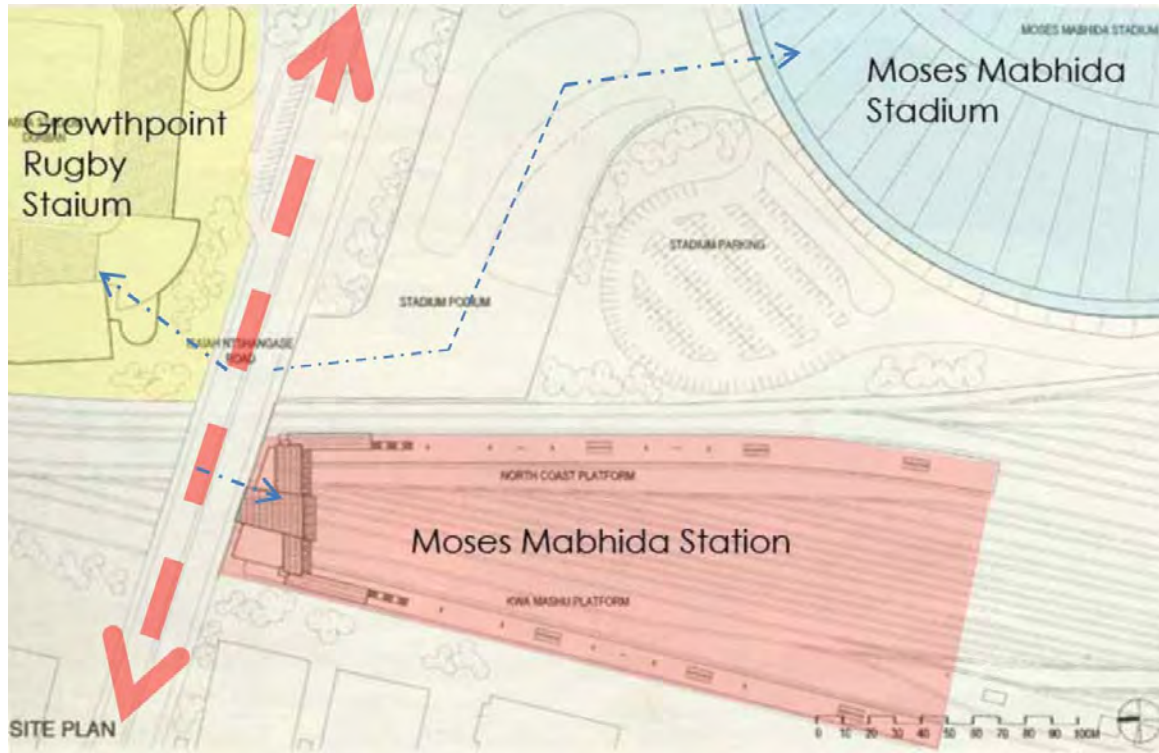


Figure 8.13: illustrates the site and contextual plan of the Station
(Source: Peters, 2010, edited author, 2014)

The main requirement of the station was for it to provide a built form to accommodate daily commuters as well as to transport fans to big events at the adjacent Moses Mabhidha Stadium. The main conceptual initiative was to develop a design that would work both as a thoroughfare and a destination.



Plate 8.31: Shows the expression identity of the station with the stadium behind (Source: Author, 2014)

The conceptual significance of the station is identity. The station needed its own personality which separated it from the overshadowing stadium in its background. This was done by creating an architectural language that was very expressive. In doing so the

station expresses the dignity shown to public transport and the emergence of world class architecture. The design approach was to create something embedded in the culture of KwaZulu-Natal.



Plate 8.32: Shows the architectural language of the station.
 (Source: <http://www.slideshare.net/carolinesohie/2010-sep-oct-leading-architecture-moses-mabhida> accessed 17 May 2014)

The design approach inspired an architectural language that blends into the crafts and local traditions of Durban while simultaneously connecting it with the industrial port context of Durban. This design approach included considering combining

different elements of the cultures in Durban, these include the colorful patterns, the local made woven baskets, the adjacent seaside, ships, rusty steel containers and the landscape of the harbor.

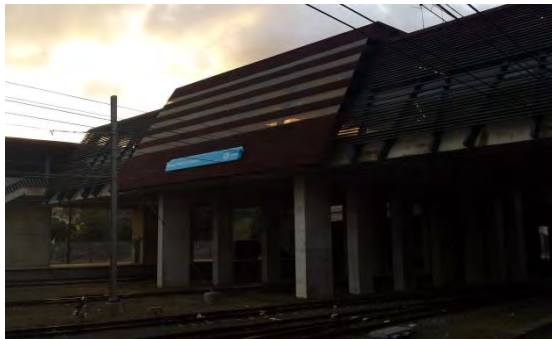


Plate 8.33: Shows the expression forms and materials used in the station design (Source: Author, 2014)



Plate 8.34: Shows the expression forms and materials used in the station design (Source: Author, 2014)

These elements are all combined to form the expressive architectural language that the station echoes today. This language is expressed in two ways, the manner in which the architectural forms are woven together to form the stations overall composition, as well as the materials used in its construction (Yates, 2010: 25-29). The station was designed using a layering system to make it user friendly and to make it stand out in the city landscape.

8.3.5.2 Spatial Layout

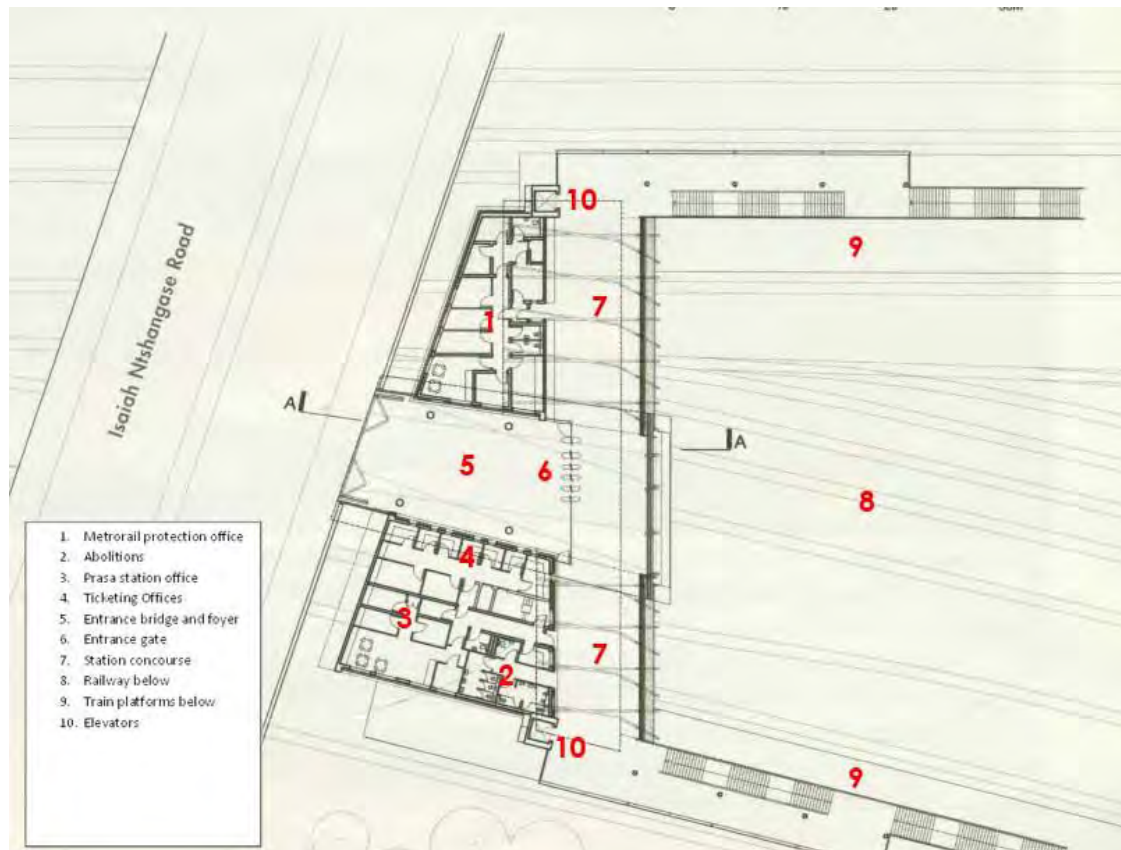


Figure 8.14: illustrates the upper ground station plan
(Source: Peters, 2010, edited author, 2014)

The layout of the station is based on two levels. The upper level is in connection with the road and stadium concourse platform and the lower level which leads directly onto the train platforms. The entrance bridge had to be connected to the entire precinct and was done so by connecting it to the stadium concourse along Isiaah Ntshangase Road. The idea behind this was to give the user the feeling of moving from land to ship when entering the station, introducing the first allusion of the harbor (Yates, 2010: 25-29).



Plate 8.35: Shows the entrance bridge from the stadium concourse into the station (Source: Author, 2014)

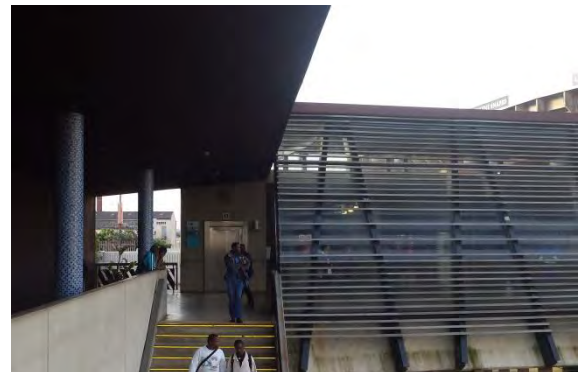


Plate 8.36: Shows the lift and stairs to the lower level platforms (Source: Author, 2014)

Passengers approach the station from the bridge and pass into the entrance foyer where they are welcomed by ticketing kiosks, an information office and access gates into the station. Once pass the gates, passengers move onto the main upper level concourse. Here all the admin and security offices and ablutions are housed. The concourse then leads to staircases on either end of the concourse with the option of an elevator for those frail or disabled people to the lower platform level. There are two platforms, each of which serves two trains on either side of the platform. The platforms extend the length of a train and accommodate three sheltered structures on both platforms.



Plate 8.37: Shows the platform waiting area structure (Source: Author, 2014)



Plate 8.38: Shows train platform waiting areas (Source: Author, 2014)

8.3.5.3 Structure



Figure 8.15: illustrates section of the station (Source: Peters, 2010)

The station building is designed to be an independent structure, apart from its surroundings in the architectural language as well as the physical structure. The station is a completely freestanding structure based on the concept of a mooring ship bound to its surroundings only by the main pedestrian bridge. The station consists primarily of concrete. Additional materials used are steel and timber.

The main station concourse comprises of two concrete shells engineered to float over the rails, helping to minimize the structures visual impact of the station on the railway tracks. The bridge over the railway lines connects the building with the stadium concourse. This

helped with reducing the scale of the building to its users. The entire station is covered by a series of canopies, two of which are secondary covering the concrete shells and the other sits higher covering the bridge and entrance foyer. Timber is used in the design but purely for aesthetics.



Plate 8.39: Shows the varying canopy structures and the concrete shell form which houses offices (Source: Author, 2014)



Plate 8.40: Shows canopy structure from the interior concourse (Source: Author, 2014)

The platforms had to be arranged at an angle and it was actually the geometry of these platforms that dictated the way the layering structure of the station works. Throughout the station a pattern of lines appear on the floor, representing the different platform spaces below. These lines are projected onto the canopy of the station which appear as lighting, representing the concept of weaving in a basket. These spatial lines are continued throughout the station and lead the way for the passenger in the station. The effect of these spatial lines on the canopy resulted in a bold geometry which was signified by the reference to the neighboring industrial port of Durban (Yates, 2010: 25-29). The weaving concept was inspired by the vast weaving skills that lie at the heart of KwaZulu- Natal's craft culture.

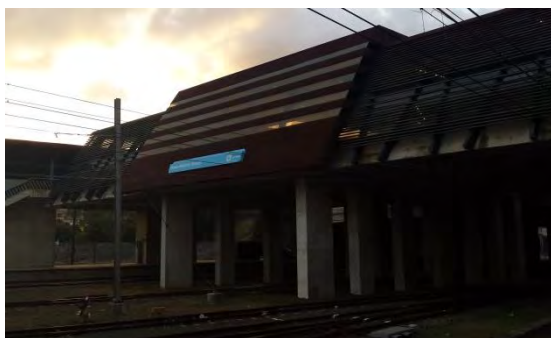


Plate 8.41: Shows lines on the fenestration and the varying heights of the canopies (Source: Author, 2014)



Plate 8.42: Shows the lines continued on the canopy (Source: Author, 2014)

8.3.5.4 Multi-Sensory Stimulation

The choice of materials for the station was chosen to reflect on the architectural language while simultaneously being robust and durable to deal with the stations operational demand. Concrete is used for the overall structure and forms the base of the station. Self-weathering steel was used to form the outer skin of the building as well as for the cladding used throughout the building (Refer to figure 8.43). Timber was used aesthetically to provide a rhythmic texture and give natural warmth to the building (Refer to plate 8.44). Toughened laminated safety glazing was used to restrict the heat penetrating through the large windows. The choice of materials result in a mix of natural timber woven into the more urban material of concrete and steel (Yates, 2010: 25-29).

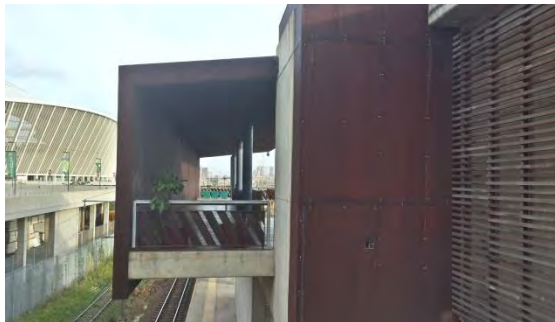


Plate 8.43: Shows the cortan steel used as the outer skin of the building (Source: Author, 2014)

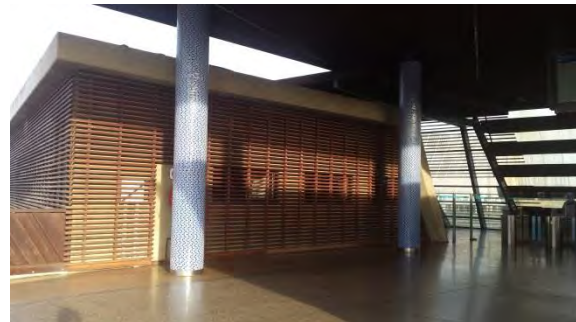


Plate 8.44: Shows timber slats are used aesthetically in the building (Source: Author, 2014)

The careful choice of materials also meant less complicated detailing evident in much of the contemporary transport facilities of today. Elements of design in transport facilities involve intricate details of seating, electronic displays and signage. At Moses Mabhida Station these elements were integrated into the design throughout the building giving the building a simple yet elegant pattern (Refer to plate 8.45 and 8.46).



Plate 8.45: Shows how signage and patterns have been incorporated into the concrete walls (Source: Author, 2014)



Plate 8.46: Shows seating has been incorporated into the concrete of the platform (Source: Author, 2014)

Light is cleverly incorporated into the design of the station. In doing so large windows were chosen to be used on the platform to offer a view of the adjacent stadium but had to be screened due to the stations unfavorable orientation. This also provided the opportunity to allow natural light to create a dynamic design of woven shadows through the fenestrated façade throughout the day (Refer to plate 8.67). At night the station becomes transparent with light from inside the station shining out through the timber slats which forms part of the fenestration transforming it into a glowing beacon symbolizing the image of hope of change (Refer to plate 8.48).



Plate 8.47: Shows how light is conveyed onto the upper level concourse (Source: Peters, 2010: 3)



Plate 8.48: Shows the effect of light radiating from the inside of the concourse at night (Source: Peters, 2010:2)

8.3.6. Conclusion

The Moses Mabhida Station has achieved the ultimate goal of creating a vibrant and memorable atmosphere. The station has rooted itself to the local culture and context in fresh ways and in the process of doing so have provided an inspired gateway to and from the Kings Park Sporting Precinct.

From the design of the station, the structural intellect and distinguishing material selection it has proven to provide a building which successfully expresses its being and contrasts significantly from its overshadowing stadium. The station is a contemporary space that forms an integral feature in Durban's unique urban environment and is an expression of the liberating role that public transport plays in South Africa (Yates, 2010: 25-29). The Moses Mabhida Station demonstrates how such a transport facility can be incorporated into a South African context to change the perception people have of public transport.

8.4 CONCLUSION

The analysis of the two case studies provides an invaluable overview of the way public transport has evolved in South Africa. It displays the way stations are being designed to accommodate international design standards and trends yet still incorporate itself into the culture and context of South Africa. In doing this it provides people with the assurances that efforts are being made to reintroduce the reliability of public transport and the world class facilities that are associated with them.

Public transport in South Africa has been fragmented due to the lack of cohesion between the various modes of mobility. Due to this, there is a lack of choice between personal mobility and people are forced to use the easiest and most convenient method of public transport which in the case of South Africa is the minibus taxi. The service provided by the minibus taxis in South Africa have over time proven to be unsafe and unreliable and through active discussions with people it has been proven to be the most costly, yet it is still the most used mode of public transport due to the efficiency and availability. The effects of this on other modes of public transport have been catastrophic and have contributed to the decline of usage for trains and buses.

Park Station displays that by creating a facility that accommodates all modes of transport in one single hub, provides people access to a choice of personal mobility. It allows one to even cross between various modes of transport to reach their desired destinations. Promoting an 'interchange' facility has successfully converted the station from being a rundown undesired location to a world class facility.

The Moses Mabhida Station has proved that through careful design and planning techniques an environment which enhances the multisensory perceptions of its users can be made possible through the use of architecture. In doing so providing a memorable, safe and reassuring environment where people feel comfortable being around and using on a daily basis. Transport by train is one of the cheapest modes of transport in South Africa and yet it is one of the most neglected modes of transport. The Moses Mabhida Station is proof that meaningful architecture, that enhances the sense of being, can successfully change the stigma that people have of unsafe, neglected transport facilities which negatively affects the use of public transport.

CHAPTER NINE:
ANALYSIS AND DISSCUSSION

9.1 INTRODUCTION

Empirical research done for this study consists of case studies of local examples of transport facilities, unstructured interviews of transport users and people that work in transport orientated environments, and questionnaires given to the general public to gain an understanding of their perceptions towards public transport in South Africa.

9.2 INVESTIGATIVE APPROACH

The investigative approach for this dissertation was one of qualitative research. This method of investigation offered a more favorable approach as it involves direct contact with users of public transport. It provides the opportunity for broad questioning and the gathering of word data from participants. The qualitative method of research also provides the opportunity to describe the collected data in themes and patterns which are exclusive to the participants involved, thus not requiring a vast amount of people or statistics to derive information for the study.

9.3 SUMMARY OF ANALYSIS, DISCUSSION, KEY RESPONSES AND FINDINGS

9.3.1 Analysis Of Interviews

Interviews were mostly conducted with groups of people at public transport facilities. Through much engagement with people it was established that by interviewing a group of people more information is extrapolated due to people feeling more comfortable answering in a group discussion.

The information gathered from the group discussions have given valuable insight into what people really perceive of public transport, in turn providing collective information that contributes to the impact that perception has on the built form. From most of the discussions it was identified that people who use a specific mode of public transport use it as it is the most efficient and cost effective means of mobility. The negative perceptions that interviewees had regarding other modes of public transport generally resulted from lack of access or due to the higher tariffs involved. The main outcome of the interviews gained were the fact that people are not satisfied by the current built environments and systems of public transport but frequent them daily as it is the only means of mobility beneficial to them.

9.3.2 Key Questionnaire Responses

Questionnaires were given to a wide spectrum of people to gain an understanding of people from all levels of society. This includes people who have cars and very rarely use public transport, people who use a mixture of both and people who use public transport as the only means of mobility.

The basis of the questionnaire was to gain an understanding of people's perceptions of public transport and ideas of how the public transport system and facilities can be improved to change these perceptions. The responses found were quite diverse, most of which showed that a change is required, while a few were happy with the current facilities and systems available. An example of a typical questionnaire used for this dissertation can be found in Appendix A. A summary of the questionnaire response can be found in Appendix B.

9.3.3 Discussions And Findings

The data gathered through interviews and discussions with the public have motivated the research problem that people's perceptions impact on built form. The quality of transport systems and facilities immensely influences the type of public transport that people use. From the qualitative research it has been found that these decisions are not personal choices but the only means of a person's mobility due the affordability, availability and access. The built environment also influences these decisions as it is found that most facilities that are unsafe are frequented less.

The findings from empirical research also provides sufficient information regarding the costs related to public transport to deduce that people often use the most efficient mode of transport even though the costs may be slightly higher.

According to the responses modern transport facilities still lack some important planning and design elements. While a lot of thought has been given to provide people with meaningful architecture the needs of the people are still left unattended to.

In the case of the Moses Mabhida Station, toilets are provided on the upper level concourse, far from the main waiting platforms at the lower level. Interviews conducted with the users of this station have all stated that toilets are needed closer to platforms

levels. These inputs gained through direct interaction with the public provide information that can assist in creating better environments for people and make transport facilities more user friendly, promoting the use of them. People also requested that some form of retail be incorporated into the station as transition periods often become extensive.

Findings from the research have also shown the need for a facility that incorporates or facilitates all modes of public transport into one hub. The effects of this are evident from interviews done at Park Station. Most people prefer to have a choice between the different modes of transport. The effects of grouping various public transport modes has positively influenced the use of the station as people feel the station is now a safer and more effective facility.

9.4 CONCLUSION

The information gained through direct engagement with public transport users have provided valuable insight to perceptions impacting on the built form. Through these direct engagements information gathered will be used as a tool for implementing these responses. The qualitative research has proved to substantiate the study and emphasise that perceptions do impact on public transport and on their related facilities.

CHAPTER TEN:
CONCLUSIONS AND RECOMMENDATIONS

10.1 SIGNIFICANCE OF THE FINDINGS

The issue of public transportation has been the focus in this study and it is evident that the decay of transport facilities has been significantly caused by the negative perceptions that public transport architecture confers on its users. As a result, most countries around the world have seen a decline in the use of public transport due to these perceptions.

This study has demonstrated that the segregation of transport systems in the built environment have negatively contributed to the perceptions that people have of the public transport. The lack of cohesion between the various modes of public transport fuels the issue of negative perceptions on public transport. It is this aspect that has led to the decline of the use of public transport such as the train and bus and their associated facilities. Due to this, public transport architecture has been perceived as unattractive destinations which have no relevance to needs of the public, hence these facilities in no way cater for enhancing the perceptions of people.

Through this development in the study, it has been established that perceptions are a fundamental design tool in architecture. Defining the impacts of perceptions on the built form has provided an understanding of the negative implications that are created by the lack of efforts to enhance a person's wellbeing in the built environment. This is an issue which has not been given enough recognition in the contemporary South African context. The architectural experience is the main source of enhancing the perception of people as it is through meaningful design that the wellbeing of an individual can be enhanced and the perceptions of that person towards that experience can be changed.

The principles of 'Genius Loci' and 'Image of the city' should be incorporated together with the issues discussed in the study in order to provide relevant meaningful architecture. Environments where people feel comfortable and have a sense of belonging need to be created. There is also a need for the architecture of transport facilities to incorporate a form of identity in the built environment by becoming icons and destinations. In doing so, this gives people feelings of change in the environment and brings order to the chaos that endorses negatively perceived built environments at present.

Issues like urbanization and globalization will continue to progress with the evolution of technology but the needs of the people and the environment need to be considered before

all prior efforts made by cities are destroyed. The lifestyles of the public need to be positively changed to guide them into understanding the various ways of living sustainably. This change can be brought about by architecture and urban environments which enhance the sensory experience of individuals and change the way people feel about these built environments.

Implementing these changes involve careful design of transport facilities and the urban environments in stimulating the sensory experience of its users by applying the principles of perception to the built form. This dissertation has highlighted a possible approach to altering the impact that negative perceptions have on public transport and its architecture.

This approach involves providing a transport facility that encompasses all modes of public transport into one entity, hence the introduction of the ‘Transport Interchange’. In a facility that promotes a ‘one entity’ concept it provides the opportunity of creating a building with significant architectural relevance to the aspects related to principles of perception.

10.2 CONCLUDING STATEMENTS

The theoretical information gained in this dissertation supports the initial hypotheses and objectives proposed. The study has shown the attitude of people towards public transport in South Africa and the factors that have impacted on this issue. This is clearly a problem that has been avoided in the past but has become a harsh reality at present. Through the research it has been shown that public transport architecture can create physical and psychological well-being to its users and promote positive change with regards to perceptions of people towards public transport.

On a physical level, the multisensory experience of people can be stimulated through the built form and engage all aspects of well-being. Through this, an environment where people feel comfortable and develop a sense of belonging is established. On a psychological level, architecture of public transport facilities poses the ability to enhance and revitalize the urban context, and provide an environment that promotes usability, walkability and ease of mobility to positively impact on the perceptions of the public.

10.3 RECOMMENDATIONS

As the concept of perceptions is a well-known issue in architecture today, there is still a great need for further research on the subject. This dissertation has shown that there exists a deep understanding of the sensory and cognitive perceptions in literature, yet there is still a lack of integrating it into modern architecture.

Multisensory and perceptive architecture, one that heightened all aspects of perceptions was evident in the eras prior to modern contemporary era. While this dissertation does not recommend the design of buildings that resort back to the methods of those times, it should rather focus at learning from the principles undertaken in those times to develop modern methods of applying them into modern architecture. In doing so, a new era can be established, one that combines modern contemporary architecture with the elements of perception.

With the design of such facilities, environments where people are provided with memorable experiences and a holistic journey are created. These environments enhance the overall holistic journey of individuals creating a memorable and meaningful experience. In this regard it leaves users with a sense of belonging and a desire to return, such that the built form becomes a positive symbol in the urban context one that people recognise as a positive place and it is this outcome that architects and designer's needs to strive to achieve.

With regards to the actual built form of a transport interchange, it should incorporate the elements outlined in this dissertation. The selection criterion for the development location should be formed from the theoretical framework outlined in the study in order to reinforce the purpose of the research.

Opportunities created through the introduction of transport nodes have the potential of revitalizing the surrounding urban environments. This is beneficial to altering the perceptions of people and theoretically reinforces what this study sets out to achieve. The site selection of the development should therefore ensure that it utilizes unused space which can be used to revitalize the urban surrounds.

A transport Interchange cannot function in isolation and therefore requires a close proximity to the surrounding context. The transport Interchange should be centrally

located within its surrounding context to ensure that it is accessible to large amounts of the public. As stated in the previous chapters, a transport facilities role in an urban context requires them to act as gateways into the city, therefore requiring them to be located at strategic positions affording the user the choice of travelling to numerous locations. Transport Interchanges also require a connection with various modes of the public transport network; as a result, the selection of the location for the development should consider the connection to the various transport systems within its urban context.

One of the main aspects with regard to transport interchanges is that it needs to be sited in such a way that it is highly noticeable and visible to the public. As such, transport interchanges need to be landmarks in the urban environment, a major aspect of legibility and creating imageability.

The particular focus in the design of such a facility should be on the movement of people between various modes of public transport and the services that are made available to the public transport users. The services would include all elements that enhance a person's well-being as well as those that contribute to the sensory and cognitive enhancement of people perceptions.

This dissertation has fulfilled its aim in investigating the information related to public transport and architecture, through the study of perceptions, however there is still a need for further research in this specific field. In particular, the importance of perceptions and how it can be integrated into the design of transport facilities to positively change the outlook of people towards public transport is an area of research found lacking.

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APPENDICES

Appendix A - Questionnaire



INFORMED CONSENT

Project title: THE IMPACT OF PERCEPTION ON BUILT FORM: Towards the design of a Transport Interchange for Durban

Project description: To establish the definition of perception and the impact on built form in order to gain an understanding of how to create a more appropriate built environment.

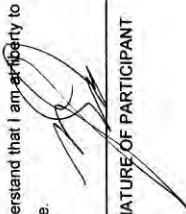
Researcher: Ahmed Olla
Email: ahmedolla@gmail.com
Contact number: 0722802444

Supervisor: Majahamhle N. Mthethwa (email: MthethwaM@ukzn.ac.za)

- The chosen subject was identified due to the fact there are negative perceptions from the public regarding the built environment with particular focus on public transport architecture.
- The questionnaire requires the interviewee to answer the questions to the best of their abilities.
- The research gathered from the questionnaires and interviews will provide an accurate understanding of the research problem and will assist in the achieving the objectives of the study.
- All efforts will be made to keep research confidential and will be kept by the UKZN for 5 years after the study.
- All participants are free to withdraw from the research at any time without any negative or undesirable consequences to themselves.

Declaration Yusuf S EIDMT (full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project.

I understand that I am entirely free to withdraw from the project at any time, should I so desire.


SIGNATURE OF PARTICIPANT

15/05/14
DATE

QUESTIONNAIRE

Take Note:

- This questionnaire is for academic purposes only.
- Confidentiality: All efforts will be made to keep your information confidential.
- Your name/identity will not be required for this questionnaire

NB: Please answer questions to the best of your ability. You do not have to answer all the questions, but it is preferred that you do. There is no right or wrong answers. Use your instinct.

1. Ethnicity
 Black White Indian Coloured Other: _____
2. Do you own a car?
 Yes No
3. Do you use public transport?
 Yes No
4. Do you feel safe using public transportation?
 Yes No
5. Do you feel comfortable using transport facilities?
 Yes No
6. Which type of public transport do you use the most?
 BUS

7. How often do you use public transport?
 Rare Occasions
8. What type of public transport do you feel is (efficient) in South Africa and Why?
~~1. Taxi~~
 Currently, taxis are more efficient as they get you to your destination as quickly as possible.

9. What do you think can be done to improve public transport in South Africa?

At bus-stops / taxi-ranks. There should be monitors to inform people when the next bus/taxi will be arriving. All buses and taxis should have GPS so that people in the central

city can pinpoint their location at any time.

10. What do you think can be done to improve transport facilities in South Africa?

Have websites / call-phone apps that enable people to learn the different routes available. We must cut-down on CO₂ emissions by using transport that does not affect our environment.

11. What do you think about minibus taxis in South Africa?

Minibus taxi drivers are the most dangerous drivers on the road. They cause the most amount of accidents and road rage / road related crime.

Appendix B – Analysis of Questionnaire

	YUSUF MAHOMED	GRAHAM MICHAEL	BONGANI MHLONGO	JENNIFER	YASIR ISMAIL	SIFISO	ZAMA
1	Ethnicity	Indian	Black	Black	Indian	Black	Black
2	Do you own a car?	Yes	No	No	Yes	No	No
3	Do you use public transport?	No	Yes	Yes	No	Yes	Yes
4	Do you feel safe using public transportation?	No	No	Yes	No	No	Yes
5	Do you feel comfortable using transport facilities?	No	No	Yes	No	No	No
6	Which type of public transport do you use the most?	None	Taxis	Train	Gautrain	Train	Train
7	How often do you use public transport?	Never	Daily	Daily	When in JHB	Daily	Daily
8	What type of public transport do you feel is efficient in SA and why?	Mynahy/Gautrain	Train - safest	Train-cheapest, quickest and safest (no accidents)	People mover bus	Minibus taxi - easiest and efficient	Train. Buses and taxis are quicker but too expensive
9	What do you think can be done to improve public transport in SA?	One interchange	Cheaper fares and 24 hour service	More trains	Safer vehicles	Better trains, better schedules	Better trains and buses
10	What do you think can be done to improve transport facilities in SA?	Security	Add shops and more security guards	It's fine the way it is	More security	Sheltered, toilet facilities, shops	Shelter, toilets, spaza shops
11	What do you think about minibus taxis in South Africa?	Worst mode of transport but efficient for low income earners	Everywhere you need them to be. More expensive	Dangerous, expensive	Best option for low income earners, terrible for others	Dangerous	Not efficient and expensive

	GAY	HOWES	YUSUF SALOOJEE	NOKUPHIWA SITHOLE	NTOBOKO PERFECT MQADI	SIYANDA MAKHATHINI	YUSUF	SEEDAT	MUHAMMED BASSA	GABI MSWELI
1	Ethnicity	White	Indian	Black	Black	Black	Indian	Indian	Indian	Black
2	Do you own a car?	Yes	Yes	No	No	No	Yes	Yes	Yes	No
3	Do you use public transport?	No	Yes	Yes	Yes	Yes	No	No	No	Yes
4	Do you feel safe using public transportation?	No	No	No	No	Yes	Yes	No	No	No
5	Do you feel comfortable using transport facilities?	No	Yes	No	No	No	Yes	No	No	No
6	Which type of public transport do you use the most?	Taxi cabs	Gautrain, Rea Vaya, Metrobus occasionally	Train	Taxi	Taxi	Bus	N/A	Bus	Bus
7	How often do you use public transport?	Rarely	On rare occasions	3 times a week	Daily	5 days a week	Rarely	Never	Never	Daily
8	What type of public transport do you feel is efficient in SA and why?	Better buses	Show and convince people that public transport is safe	Security to make it safer	Taxi, most convenient	Taxis. They cover more routes than other modes of transport	Taxis-more efficient and get you to your destination quickly	Taxi. If you in a hurry it comes quickly. Buses take long	Gautrain - safe	Drivers need to learn to drive properly
9	What do you think can be done to improve public transport in SA?	Better buses	Make them better with security and safety. Make them look European	Toilet facilities, good shelter, better lighting, shops	Improvement of safety and quality drivers	24 hour bus facilities	Implement mobile devices to display transport information and routes	Improvement of security	Improvement of safety and look better	Improvement of safety and look better
10	What do you think can be done to improve transport facilities in SA?	Dangerous and arrogant	They are problematic for other drivers. But, when using them they are effective	Efficient but rude	Dangerous	They get you where you need to be, no matter what	Dangerous, hazard to other drivers	They drive badly, no respect	Fast and convenient	Fast and convenient