UNIVERSITY OF THE WITWATERSRAND, SCHOOL OF ARCHITECTURE AND PLANNING

THE RELEVANCE OF THE CREATIVE PROCESS OF DESIGN IN LEADERSHIP-COMPETENCIES FOR SUSTAINABLE CITY TRANSITIONS

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A research report submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Architecture (Sustainable and Energy Efficient Cities)

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DECLARATION

I declare that this research report is my own unaided work. It is being submitted for the Degree of Master of Architecture in Sustainable and Energy Efficient Cities to the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to any other University.

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ABSTRACT

In order to address the challenge of leadership for sustainable city transitions, the creative process of design used by architects and the methods used by leaders were investigated. This was done in order to determine the extent of common ground and to shed light on whether the architectural creative process and the associated skills, competencies and attributes can inform the process of leadership. These processes were investigated within the framework of the four stages of the creative process - preparation, incubation, illumination and verification stages - backcasting and phenomenology, which also constituted a theoretical basis of the study.

To address the primary data requirements of the study, semi-structured interviews with an architect, a business and a sustainability leader were conducted. Secondary data were collected from writings and interviews of architects and biographies of leaders, together with other published material pertaining to leadership in the sustainable city arena. Data were then analysed based on critical attributes related to the creativity process in relation to leadership.

The key findings are that architects follow a specific design methodology, there is no explicit reference to the creative process in their explanations of their design process and their creative process correlates with the creative process as determined in psychology and neuroscience and as experienced phenomenologically. There are similarities in the manner in which architects and leaders envision new solutions, even though their methodologies are not the same. The study concludes that architects and leaders experience the process of creating and pursuing their visions similarly but they manifest differently across the two domains.

The findings and conclusions suggest that the well-developed methods used by architects could have relevance in the practice of leadership towards sustainable cities. These methods could be adapted towards developing leadership competencies in transioning cities to the sustainable city of the future.

Key words: architects' design process, creative process stages, leadership, sustainable city transitions, backcasting, phenomenology

DEDICATION

My parents, Eligio and Rosa Paschini,

their grandchildren,

Venanzio and Gessica Petrarolo,

Laura, Micaela and Alessandro Paschini,

and their future generations

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BRT – Bus Rapid Transit

EQ – Emotional Quotient (Intelligence)

HDI – Human Development Index

IAAP – International Association of Administrative Professionals

IQ – Intelligence Quotient

PFC – Prefrontal Cortex

POE – Post Occupancy Evaluation

SAIA – South African Institute of Architects

SWOT – Strengths, Weaknesses, Opportunities, Threats

UNCED – The United Nations Conference on Environment and Development

UNEP – United Nations Environment Programme

URBS – Urbanisation Company of Curitiba

CHAPTER 1

INTRODUCTION

1.1 Overview

The current state of most cities today is unsustainable because cities rely on resources that are not easily accessible and situated far from the cities, and the city's infrastructure and services are energy intensive. In order to bring about the necessary, albeit reluctant, changes for cities to reduce consumption of resources and, thereby, energy, strong leadership is required.

The slow pace at which cities are transitioning to more sustainable states indicates that there is a deficiency in this process. It is possible that the deficiency is due to an inability to find appropriate solutions and that there are insufficient protagonists to spearhead the necessary transitions. In order to assist individuals in this sector to achieve sustainability, it is proposed to foster creativity, not only to produce novel and innovative solutions, but also to enhance the leadership process.

It is the intention of this study to determine whether the creative process architects utilise can enhance leadership processes, particularly in the *sustainable city* sector. The study looks at the creative process architects use from the beginning of an architectural project to the end, when the building is complete. The process starts with the brief from the client from which the architect works to create and build a building. It entails the architect's creative process, including the project management of the construction of the building. This research report examines the creative process and the abilities and traits that enable the architect to achieve the vision of the constructed building.

Similarly, it investigates the leadership processes, and associated abilities and traits. In addition, it explores the processes used by leaders in the *sustainable city* sector. Through determining these processes and what is required to propel them forward, one can then identify whether there are any shared patterns between these processes. It is then possible to determine whether the

commonalities can further inform leadership processes at city sector level, in order to achieve transitions to *sustainable cities*.

The report studies how architects and leaders transition the gap between the current states of an undesirable present to the desirable future they envision. It explores whether the creative process with its four stages of *preparation*, *incubation*, *illumination* and *verification*, and *backcasting* as used by architects, can be applied by leaders in their processes in order to develop and implement their strategies to fulfil their visions. In addition, the creative process is examined from a neuroscientific viewpoint, and the tools and techniques used during this process are reviewed as part of the induction factor of creativity.

In terms of leadership, theories and styles, together with their impact on organisational climate, are discussed with regard to creativity and leadership. The context in which the report is applicable is the *sustainable city*. The sustainable and unsustainable city is examined in order to gain an understanding of what leaders in this sector are faced with, and to where they need to transition.

Finally, the study determines whether reliable and replicable approaches regarding leadership processes from the architect's process, are possible.

1.2 Background and Context

The city of Curitiba, Brazil is a role model for *sustainable city transitions*. In terms of the leadership that brought about the changes in this city, one would need to acknowledge the role of Jaime Lerner and his team. Lerner is an architect and became mayor of the city from 1995 to 2002 (Schwartz, 2004). His *sustainable city* transition leadership journey started when he objected to the proposed building of a major route through the centre of the city. He later took up the role of leading a team to bring forth sustainable solutions for Curitiba (*ibid*.). Lerner may have applied the methodology and skills learned as an architect together with his predisposed characteristics of leadership, to bring about these changes.

The successes achieved in Curitiba gained worldwide attention and revealed that innovative solutions to city-wide environmental problems are possible. The transition Curitiba made to a more *sustainable city* led to other cities taking up the challenge to become more sustainable. However, not many cities have been successful in their endeavours and there have not been significant numbers of cities transitioning to a more sustainable state. This may be due to a lack of the type of leadership experienced in Curitiba. The types of leadership models and methodologies appropriate for situations that are unprecedented, such as the challenges identified in *sustainable city transitions*, may be inadequate or non-existent.

Since architects are confronted regularly with new scenarios for which they need to develop novel and interesting solutions, their methodology for creating new artefacts, may contribute to leadership capacities and processes which deal with different and unprecedented circumstances, as is the case with sustainability concerns. In order to determine if this is possible, it is necessary to establish if there are commonalities between the two processes.

Therefore, the search for an intersection of the processes used by architects from creation to realisation of the project, the processes used by leaders to conceptualise and implement long term solutions, and their relevance to leadership in the *sustainable city* sector, is the subject of this study. See Figure 1.1 for the domain in which *sustainable city* solutions is to be found.

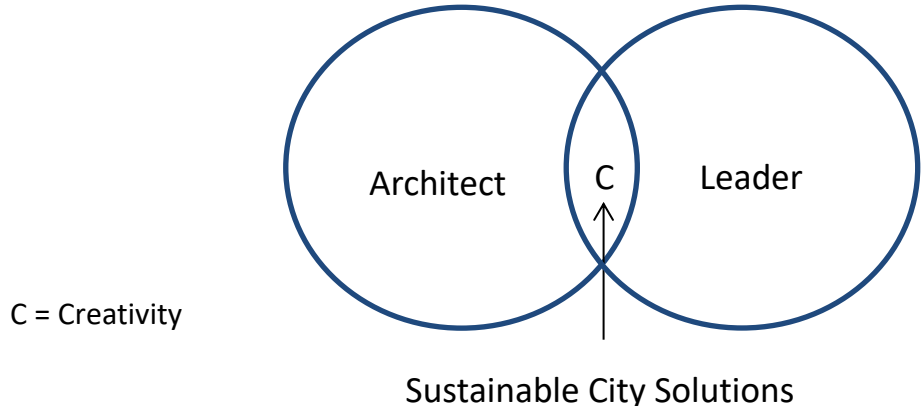


Figure 1.1: Domain in which sustainable solutions for cities may be found

1.3 Problem Statement and Rationale of the Study

Leadership in *sustainable city transitions* has struggled to gain a foothold and conventional leadership methods do not seem to address these challenges in a meaningful way. The failures could be due to several factors such as myopic outlooks, the application of only techno-centric solutions, the implementation of solutions that are not context driven and the nature of the problems faced are unprecedented.

Examples of such failures at the local level include the implementation of solar water heaters (SWHs) in the low cost housing sector in South Africa. SWHs were installed on these types of residential homes in Alexandra, Johannesburg without proper support structures or brackets to secure the SWHs, resulting in damage to the homes (Moola, 2013). In addition to these failures, poor installation of pipes and lack of monitoring by government officials and private contractors resulted in leaks and poor performance (*ibid*.).

Another example of the failure of sustainable solutions at building level that needed to be corrected occurred in 2014, when SWHs that had been imported from China and Spain were installed in the Northern Cape. Problems arose with these panels due to their unsuitability to this dry, arid region of South Africa (SABC News, 2014). The National Energy Department then pledged R12 million to maintain these SWHs (*ibid*.).

The many consequences of unsustainable practices have brought about apprehension about the planet's future and changed the way in which the world is viewed. Concerns with the effects of carbon emissions on the environment has motivated for a transformation in the manner in which the built environment is constructed and maintained and the means by which cities are managed.

The underlying causes of urban environmental degradation in cities, such as a lack of public awareness and participation, inadequate governance, poor policies and insufficient knowledge add to the problems leaders need to confront (Leitmann, 1999). In addition there are psychological factors that prevent people from making the choices that will help secure their and other's futures in *sustainable cities* and in the world.

These factors include that many people are inclined to resist change and favour the current or existing state of affairs (Henderson, 2016). This *status quo* bias accounts for people's unwillingness to make the changes necessary for sustainable lifestyles. They would rather continue with the *status quo* hoping that things will sort themselves out or that technology will come to the rescue, even if it means colonising another planet.

Research indicates that people feel the psychological pain of loss twice as much as they feel the pleasure from benefiting something of equal value (Kahneman and Tversky, 1992). This suggests that for a person to change direction from their current state of affairs, the perceived benefit of the alternative must be twice as much. This is one of the main challenges people need to confront when thinking about changing from the *status quo* to a new way of doing things. Understanding and being aware of status quo bias enables people to surmount it and change their behaviour. (Henderson, 2016). There has to be a willingness or buy-in for people to make the change and an understanding of the benefits.

Another challenge to leaders in the city is how to persuade people to understand that the resources from the planet need to be used in a manner that will benefit everyone and not just a few. This requires an understanding of sharing the commons and avoiding the related tragedy, as identified by Hardin (1968). He defines the commons as a natural resource shared by many individuals. Most natural resources such as the atmosphere and groundwater are examples of the commons (Ponce, no date).

With regard to the commons, individuals do not have a claim to any part of the resource, but they do have a right to the use of a portion of it for their own benefit. The rights of the individual terminate where the rights of the commons begin, and vice versa. Without regulation, individuals will have a tendency to exploit the commons to their own advantage, typically without limit. In this way, the commons becomes depleted and eventually ruined. This is known as the "tragedy of the commons" and at its root is the unrestrained self-interest of some individuals. (*ibid*.). See Figure 1.2 below for a depiction of the stages of the tragedy of the commons.

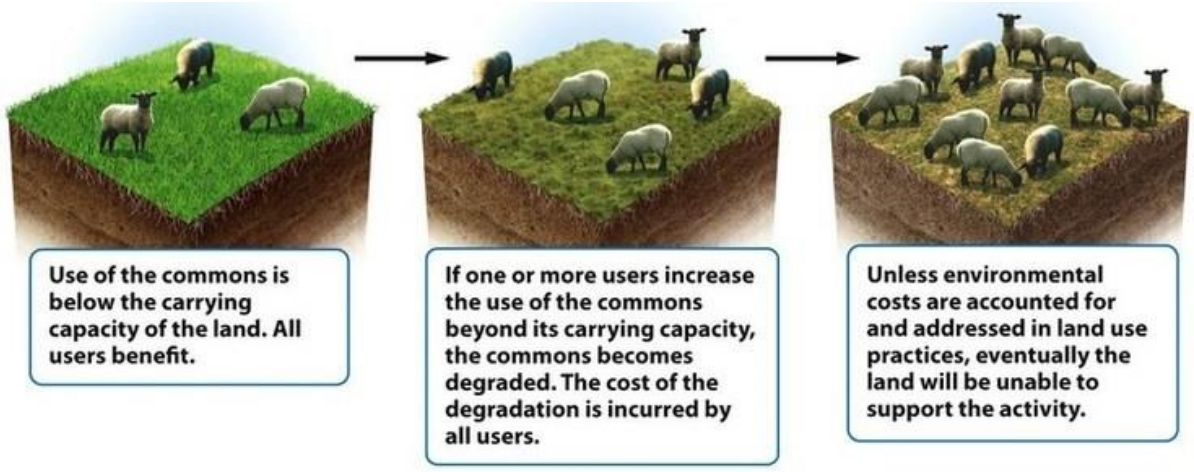


Figure 1.2: Tragedy of the commons (No author 2016)

Hardin (2001) explains why relying on an individual's conscience to do the right thing and not exploit the commons or to limit their progeny, puts the individual into a double bind situation. Individuals will feel condemned for not doing it and

if they do agree, then they feel condemned for being fools under the control of others.

When people are locked into seeing the benefit of the commons only for their own gain, the entire system fails. Although when the advantages of mutual co-operation are understood, the commons can be saved. (*ibid*.). Leaders will need to guide and persuade people on this aspect in the *sustainable city*, even though it is common sense that exploiting the commons will result in long-term ruin for everyone. Diamond (2011) explains in detail how past societies have exploited the commons, to the point where their civilisations ended as they were no longer *sustainable*.

One of the reasons that the tragedy of the commons occurs, is because people continue to make decisions that are detrimental to their future wellbeing despite being fully aware of the consequences of their actions. This phenomenon is known as wilful blindness. (Heffernan, 2011).

Heffernan (*ibid*.) looks at the relationship between money and wilful blindness and contends that it makes people act in ways contrary with what they believe their ethics to be, and frequently even with their own self-interest. Money makes us blind to the ethical, environmental or philanthropic significances of our decisions and actions. People live in societies where mutual support and co-operation is crucial, but money erodes the relationships required for beneficial, satisfying and joyful lives. When decision-makers see Nature merely as a source of money they are blinded to the moral consequences of their decisions. (*ibid*.).

In order to break the cycle of status quo bias, the tragedy of the commons, (and wilful blindness as it relates to sustainable cities), strong leadership is required. The change of behaviour that is to be initiated requires leaders to create new solutions that will be accepted and lead to the necessary changes.

The creative process is a driving force in the evolution of mankind (Neumeier, 2013) and is utilised by creative people to bring about innovation and change. An example of this is the practice of architecture which takes an idea and turns it into a reality, for the use of human beings on a physical, tangible and experiential level. It is one of the few creative practices that deal with a physical reality that can be used by others. The creative process followed by architects is studied in this report in order to understand its inner working mechanisms with the intention to better inform leadership processes.

Leadership in the business and *sustainable city* arenas are investigated with a view to discover the methods used by leaders in bringing about change, in order to determine a more viable and implementable leadership process to bring about changes at the city level to achieve *sustainability*. The architect or creative person as leader is explored as in the case of Jaime Lerner in order to understand the commonalities between the creative person's modus operandi and that of the leader within the same person.

By examining the methods used by architects and those used by leaders in their daily practice, it is possible to identify the similarities and differences between the two processes. This leads to the determination of whether there are sufficient commonalities for the architect's process to influence the leader's process in a more creative and systematic manner.

Although the processes used by architects and those used by leaders do not at first appear to have many similarities, there are a few that are evident. Both processes deal with the future, are collaborative in nature and have similar constraints.

Architects start each new project using a *backcasting* approach as opposed to forecasting. The latter entails looking at existing patterns and extrapolating them into the future as weathercasters do. *Backcasting* is when the desired future is

envisioned, such as the building the architect wishes to build, and subsequent actions are taken to attain that future or vision (Cuginotti, 2007). As this methodology is appropriate for future visions, it is investigated to determine whether leaders use this approach in formulating their plans for the future.

Owing to the nature of architectural projects and their multi-disciplinary nature, *collaboration* forms a key part of the process employed by architects. The leadership process, by its very nature, is collaborative and requires many people to implement initiatives within organisations to achieve the goals determined by the leader.

In addition to the above, the leader and the architect have similar constraints that need to be addressed, as Figure 1.3 below indicates. The problem that requires a solution must take into account the environment or context in which it is situated. Technology's limitations together with financial and time constraints frame further restrictions to the solutions as does the social factor and the needs of populations.

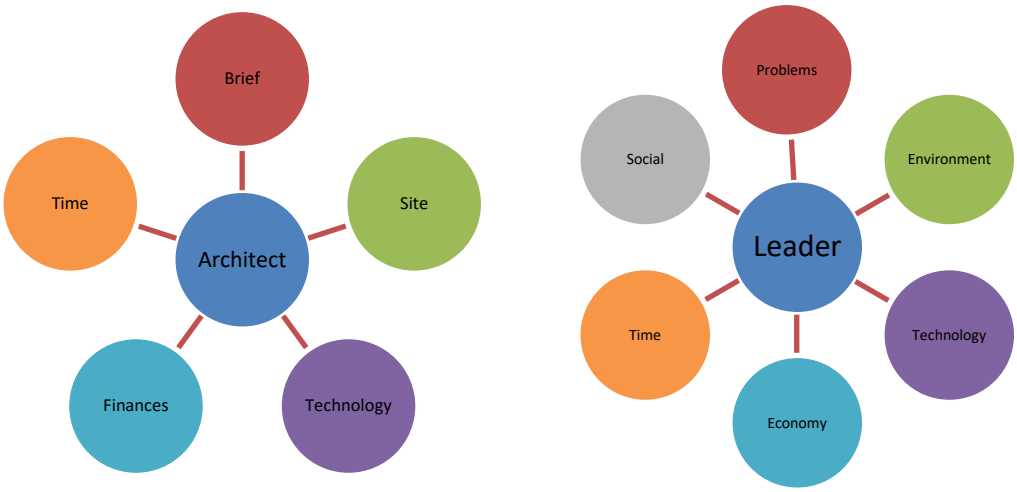


Figure 1.3: Constraints for architects and leaders

These commonalities indicate that with further investigation into the processes, a solution to the *sustainability* issues of cities lies within the scope of the methodologies and creative processes used by architects and leaders. When

leaders in this arena have the tools with which to bring about transforming and transitioning changes to the cityscape, the future of cities and thereby those who inhabit them and the environment will be steered away from their current self-destructive courses.

Leaders in *sustainable cities* need to persuade people that the commons must to be taken care of, for the benefit of themselves and others currently and into the future. Through the example of Jaime Lerner and Curitiba, this was done on a level of connecting to their sense of place and love for their city. The connection is on a much deeper emotional level rather than motivating from a financial stand point.

1.4 Research Questions

The topic of the research question explores whether a relationship exists between the creative processes employed by architects in their work and the methods employed by leaders in their initiatives. Their respective abilities and traits are also examined in order to determine how the processes are inducted.

The research question is as follows:

Can the working methods of architects be applied to leadership development for *sustainable city transitions*?

The first sub-question (which is explored in Chapter 4) is:

- What are the creative processes of architects and how are these inducted?

The second sub-question (which is addressed in Chapter 5) is:

- What are the leadership processes of business leaders and how are these inducted?

The third sub-question is examined in Chapter 6 is:

- What are the leadership processes of leaders in the sustainable city arena and how are these inducted?

The fourth and fifth sub-questions are discussed in the concluding Chapter 7 and are as follows:

- What is the extent of overlap in architecture and leadership processes and their induction?
- What is the potential of induction processes in architecture in induction processes of leadership in transitioning cities to sustainability?

1.5 Working Hypothesis

The working hypothesis is that the creative process utilised by architects to materialise their design-solutions and supervise their execution into actual buildings has strong parallels or resonance with the process by which leaders produce future-oriented visions and seek support in pursuit of the vision until its materialisation into a transformed state of an organisation. If the creative processes and mechanisms by which architects realise their visions have a strong relationship with the processes and mechanisms by which leadership operates, then it is likely that the methods used by architects can be adapted to develop and strengthen leadership competencies for those facing the complex and challenging task of leading cities from their current forms and transitioning them to the sustainable city of the future.

1.6 Conceptual Approach and Theoretical Framework

A qualitative case study approach which combines primary and secondary data guided by phenomenology in creativity is the key theoretical framework (see Figure 3.2). Creativity, leadership, and creativity and leadership form the secondary framework. The Architects' process, the creative stage of creativity, neuroscience, creative traits, skills and techniques, together with backcasting are key concepts to the creativity framework. Leadership, with its associated theories, styles, traits and skills as it affects and is affected by creativity is another secondary framework. *Sustainable city transitions* are the vehicle for exploring leadership and creativity in this study.

Figure 1.4 below indicates that potential for the architectural and leadership processes to contribute to competencies for *sustainable city transitions* as the central argument of this study.

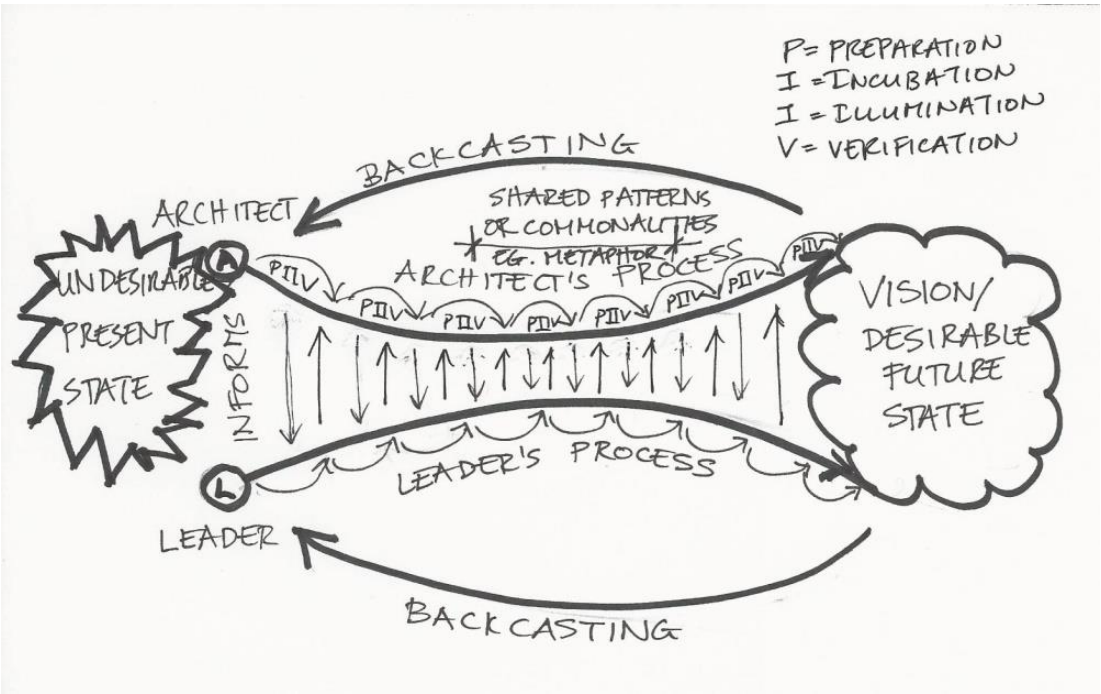


Figure 1.4: Potential for the architectural and leadership processes to contribute to competencies for *sustainable city transitions* (Boshoff and Paschini 2016).

1.7 Definition of Key Terms

Backcasting is a method of future thinking whereby a desirable future is envisioned and the steps required to attain it are mapped out working from the undesirable present to the desirable future.

Creative process stages are preparation, incubation, illumination and verification, as determined by Wallas (1926, 2014).

Leadership is the ability to lead followers on a journey that requires the transformation not only of the followers, but of the organisation from its current state to an improved future state. Leadership is by its very essence a transformation process which requires transitioning from the undesirable present state to the desirable future state.

Phenomenology is an approach that focusses on the experiences of human beings and their awareness thereof from a subjective or first person point of view.

Satisficing is the tendency to make decisions which are based on it being good enough at that point in time.

Sustainability acknowledges the dependence of human beings on nature and its ecosystems for their survival in the present and for future generations (US Environmental Protection Agency, 2016). This dependence must occur without compromising the health and vitality of our supporting ecosystems so that they can continue to regenerate the services required to fulfil survival needs and not diminish biological diversity (Morelli, 2011). A condition of balance, resilience, and interconnectedness between these entities constitutes the aspects that need to be sustained (*ibid*.).

Sustainable city transitions are the transition of cities from an unsustainable state to a sustainable state.

Sustainable development is defined in the Brundtland Report (WCED, 1987: 41) as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." This definition led to a new description of the social, economic and political goals within the framework of limiting or stopping the depletion of natural capital.

1.8 Delimitation of the Scope of the Study

The creative process that architects use is the focus of the research report. The motivation is that architects realise their vision into a tangible and physical reality that people use. The research does not touch on other forms of creativity and it does not focus on the leadership issues involved within the practice of architecture. The creative process is limited to the four stages as identified by

Wallas (1926, 2014), despite other authors categorising more stages in the process. This is because despite the identification of more stages, most authors on creativity acknowledge Wallas' work as the base from which they work and his four stages encompass the creative process sufficiently for the purposes of this study.

Due to the vast amounts of literature on leadership, an overview is given of leadership theories, without-in depth analysis and with a focus on the more appropriate theories for *sustainable city transitions*. Leadership styles are investigated as they relate to organisational climate and creativity. The main focus of the leadership study is to determine whether creativity is present. The issues relating to sustainability in cities are discussed as the context within which leadership transitioning to sustainable cities, occurs, however it is not central to the argument of the report.

1.9 Structure of the Study

The research report is structured into seven chapters as follows. *Chapter 1* establishes the background and context on the need for more systematic leadership competencies in *sustainable city transitions*. It introduces the potential for a correlation between the methodologies used in architecture versus the leadership processes and how the former could enhance leadership methods in general and in *sustainable city transitions* in particular. The motivation for the study stems from the failures at city level and the similar constraints facing architects and leaders. The research questions and the working hypothesis are presented as well as the limitations of the study. The theoretical framework and key concepts are outlined followed by the conceptual outline of the study.

Chapter 2 constitutes the appraisal of the relevant literature on the creative process used by architects and leadership processes, and as well as factors affecting *sustainable city transitions*. The creative process is appraised in terms of the four stages of creativity, neuroscientific evidence thereof, the core

attributes and skills required and backcasting as a component of creativity. This is followed by an appraisal of studies on the evolution of leadership theories, leadership styles and traits, their effect on leadership and organisational climate, and the relationship between creativity and leadership.

Chapter 3 describes the overall research design, methods and tools used in the study. The case study method was employed based on in-depth interviews for primary data collection. The interviews were undertaken with purposefully sampled respondents of whom one architect, a business leader and a leader in the sustainable city sector were interviewed. Phenomenologically guided self-observations by the researcher as architect were used to supplement the primary data. Secondary data was utilised to give additional substantiation of the research questions. This was followed by an overview on the data collected and the data analyses which led to the derivation of findings.

Chapter 4 presents the substantiation of the first research sub-question which investigates the core attributes in the creative act in architectural practice relative to the overall process of realising the ultimate outcome of a building as a manifested reality. An overview of the interview with the architect is given, which is followed by the analysis in terms of the four creative stages and related traits and attributes which allow the manifestation of a project from inception to reality. The resultant interpretations and findings are then discussed.

Chapter 5 presents analyses and sub-findings of the second sub-question in terms of the core attributes in vision-oriented practice of leadership in the broader socio-economic context, especially as understood in the business and organisational-leadership contexts are set out in *Chapter 5*. The interview with the business leader is discussed briefly after which the analysis in terms of the creative process and core traits and attributes as relating to leadership practices are analysed. Interpretations and findings of the business leader's analysed data are then presented.

Chapter 6 deals with the third sub-question relating to the leadership practices in the sustainable city sector. It follows the same format as the prior two chapters – the overview of the interview of the leader in the sustainable city sector, the analysis of the interview data and interpretations and sub-findings.

The main research question is answered in *Chapter 7*. This consolidates the key sub-findings into the overall findings relating to the relevance of the creative process of design in leadership-competencies for *sustainable city transitions*. Overall conclusions and recommendations in terms of this study are then derived and presented.

The final section of the research report lists the references, followed by the appendices which include additional information pertaining to the study.

CHAPTER 2

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

The literature review undertakes to determine the theoretical basis of the methods employed by architects and leaders from a framework of psychology, neuroscience and phenomenology. In addition, the context of sustainable cities and leadership in this sector are also evaluated.

The appraisal of the relevant literature includes the creative process used by architects and leadership processes, and as well as factors affecting *sustainable city transitions*. An overview of the working methods used by architects and the design process is described on a cognitive level with emphasis on the four stages of creativity. Creativity and its related neuroscientific studies are discussed. The core attributes and skills employed in the creative process are explored in relation to the first sub-question. These include the attributes of creative people and the *thinking styles* with which they normally engage, *metaphors*, *analogy* and *decision-making* as the core tools for the creative process, are appraised. In conclusion, the importance of creativity with its effect on futures-thinking and *backcasting* are discussed.

This is followed by an appraisal of studies on the evolution of leadership theories, as well as leadership styles and traits, and their effect on leadership and organisational climate. Key traits associated with emotional intelligence and wisdom, intelligence and creativity as core leadership attributes are discussed. The relationship between creativity and leadership as well as their potential overlapping processes are analysed with an emphasis on problem solving and change as the key linking factors. As an example of a creative leadership method, Theory U and its seven leadership capacities, is appraised in more detail.

The section on *sustainable city transitions* assesses the differences between sustainable and unsustainable cities and what is required for the transition to

sustainable cities with a focus on frameworks, governance and leadership. Finally, Curitiba is considered as an example of a sustainable city.

2.2. The Creative Process of Architectural Design

2.2.1 The architect's process

The architect's design process deals with many problems that are well-structured and ill-structured in nature (Goel, 2014). These types of problems are typically real world problems (*ibid*.) which are not easy to solve.

The design process in general is a multi-step process, is complex in nature and has been depicted in various models. There are generally three to five stages of activity - exploration, generation, comparison, selection and representation. All the design models have an *analysis*, *synthesis* and *evaluation* stage. These stages involve working out what to do, putting it together in a new way and determining whether it makes sense. (Plowright, 2014).

Design models

The early models indicated the various stages as being a linear process, such as Banfield's (Plowright, 2014), which started with identifying the problem, defining the goals, generating a series of options which are then analysed, in order that one option is refined into a design solution. However, design models evolved to include iterations, such as Markus and Maver's (*ibid*.) model, which had an iterative loop between *evaluation* and *synthesis* in each phase. The depiction of the process then developed into a spiral progression, an example of which is Asimow's model, with the spiral progressing from concept to actual (*ibid.*).

Boehm's (*ibid*.) model (see Figure 2.1 below) also depicts the design process as a spiral progression but with iterative loops through its three stages. These are, determine the objectives, identify and resolve risks, and develop and test the proposal. The stages result in the evolution of the product.

There are many models of the design process and they all include several stages or phases with many steps or activities within each stage. The process has a start and an end point with many iterative loops between stages and within the stages. It is a complex process dealing with complex issues. Plowright (*ibid*.) describes design methods as being generative as they generate something which is refined and organised, in a context with a purpose. He notes that all contemporary design methods need to be exploratory and critical because they are systems based (*ibid*.).

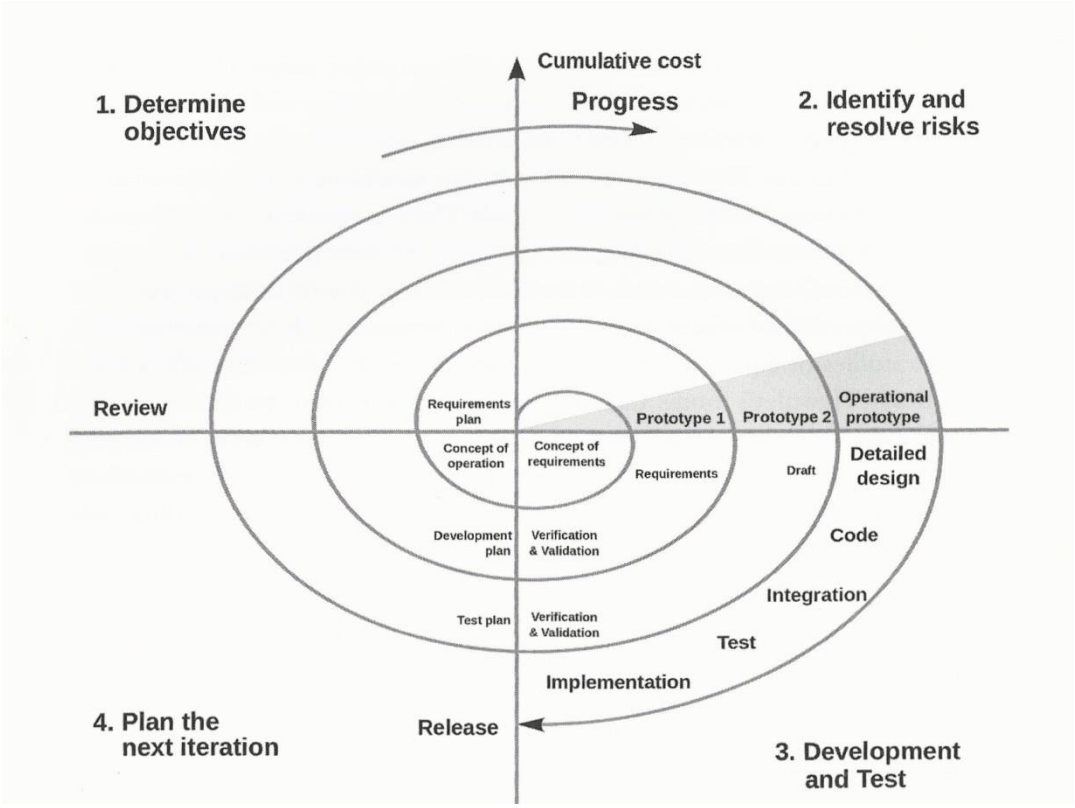


Figure 2.1: Boehm's spiral model (2000) of design (Plowright 2014: 76)

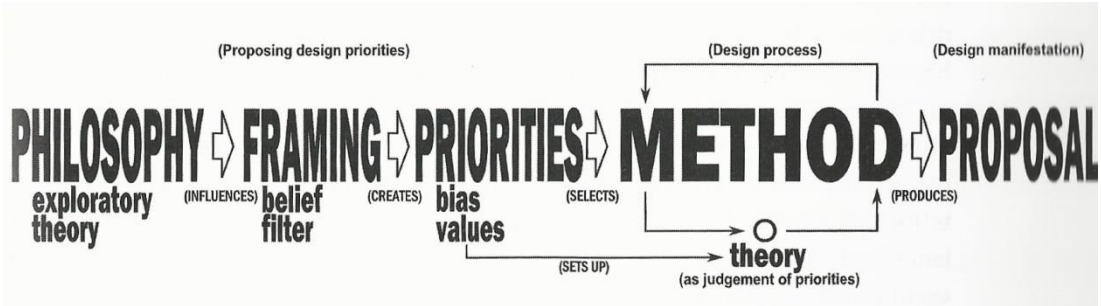


Figure 2.2 - Locating the relationship of philosophy and theory to design methodology (Plowright 2014: 61)

The creative architectural design process

The architectural design process is described as being complex and ill-structured in nature (Nalkaya, 2012) due to uncertainties and ambiguities that occur during the process. These uncertainties and ambiguities arise within the procedures, flow of process and nature of information to be analysed and creative thinking is required in order to solve different aspects of the problem and to integrate the parts of the solution. This process involves *analysis*, *synthesis*, *evaluation* and *decision-making* at each phase of the design process. It is not linear since the designer moves from unspecified and specified stages as the design develops. (Goel, 2014).

Thorneley (1963 cited in Plowright, 2014) developed the architectural design model which is used as a work process basis by the professional architectural institutes. This model examines the brief to explore meaning and find forms, after which the proposal is developed and refined. (*ibid*). However, Plowright (*ibid.*) explains architectural design as a three phase process, which comprises determining design priorities, the design process itself and the design *manifestation*.

At the beginning of the design process the designer is faced with a challenge that has many options available as solutions, but which are limited through philosophy and theory. Philosophy provides a framework within which the designer can filter options. Theory, however, provides a set of biases and a value system for the design process that helps to determine the priorities by which to propose and judge design. (*ibid*.). Figure 2.2 (above) shows the relationship of these two parameters to the design process.

Priorities are determined before or early in the method, whereas judgement priorities occur within the method. Judgement criteria connect the intentions and the proposal in the design process and enable *decision-making*. The criteria are usually in the form of general statements or principles. However, there also

needs to be relevance between the intentions and the outcome of those intentions, which occurs through *decision-making* during the design process. (*ibid*.).

The architectural design method starts once the intentions have been determined (*ibid*.). These are captured in the design brief after which the conceptual sketches are produced and then refined into detail drawings (Goel, 2014). The determination of the brief occurs during the "programming" stage as defined by Nalkaya (2012).

The "creative design solving process" consists of two categories of activity, *conceptualisation* and *realisation*, which entail five levels of *decision-making* (*ibid*.). The *conceptualisation* stage is when ideas are envisioned and schematics or conceptual sketches are used to develop design solutions. It is characterised by the collection, *analysis*, *synthesis* and *evaluation* of preliminary information pertaining to the project. This leads to the first level of *decision-making* which is *design concept development*. At this level, the designer may recollect, review and evaluate previous solutions. (Nalkaya, 2012). See Figure 2.3 which indicates the five levels of *decision-making* in architectural design.

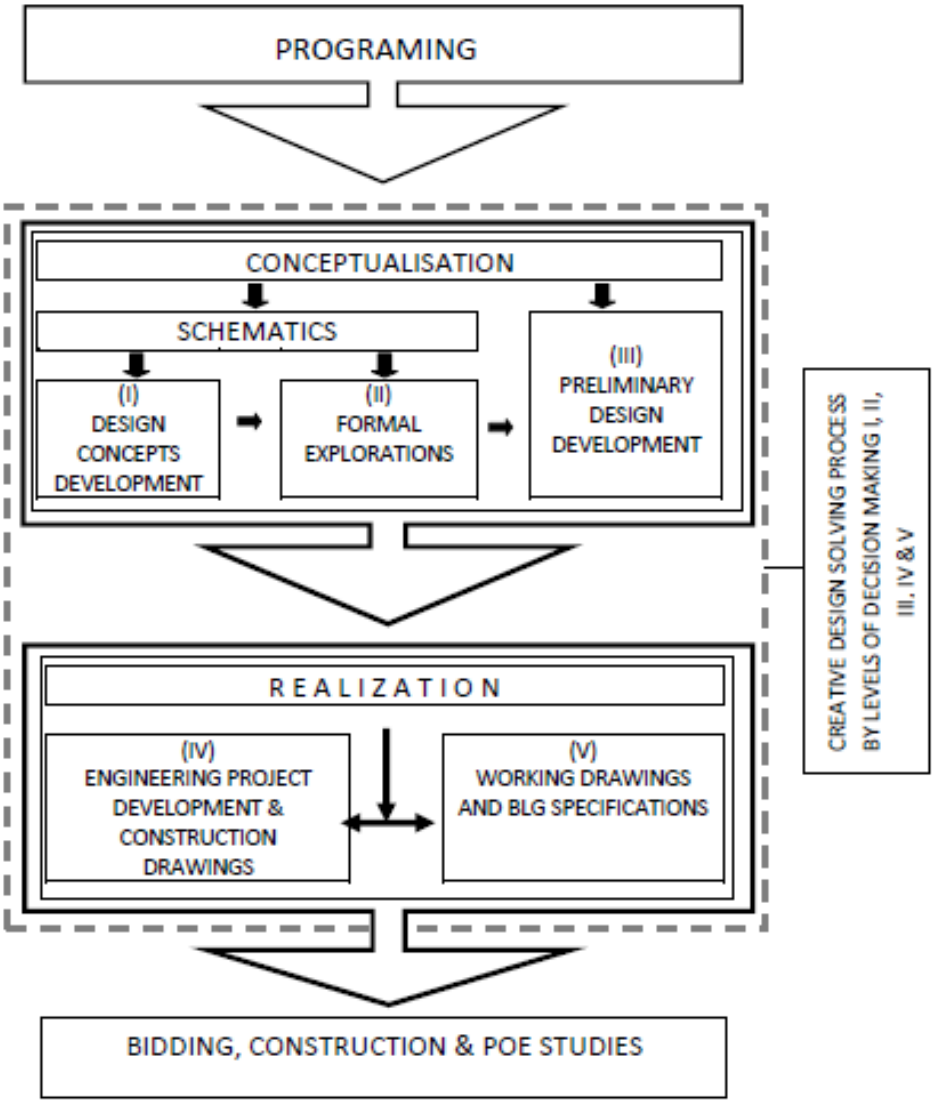


Figure 2.3: Levels of decision-making in architectural design (Nalkaya 2012: 3)

Goel (2014) considers the conceptual sketch as one of two types of symbols used by architects in their creative processes. These symbols are unclear, vague, abstract, ambiguous and unspecified and result from associations and abstractions which are *lateral or divergent* in nature and broaden the problem space. A *lateral transformation* is where ideas are developed from one idea to the next which are different from one another. (Goel, 2014).

The second level of *decision-making* is formal explorations. These lead to the transformation of spatial and functional compositions into artefacts. Preliminary

design development (third level of *decision-making*) follows the schematic stage but remains part of the *conceptualisation* activity. Various stakeholders such as the client, engineers, suppliers, manufacturers and others involved in the project, give input at this stage. (Nalkaya, 2012).

The *realisation* phase leads to the implementation of the artefact in the physical environment and constitutes two levels of *decision-making*. These are the development of the engineering project and construction drawings (level 4) and the finalisation of the working drawings and specifications (level 5). (*ibid*.). They are known as the contract documents and are the second type of symbols used by architects, as identified by Goel (2014). These drawings or symbols are very clear, concrete, unambiguous and specific, lead to *vertical or convergent transformations* and deepen the problem space (*ibid*.). A *vertical transformation* is where an idea is developed into a more detailed version (*ibid*.).

From this phase the design is then transformed into a building through the tendering and construction process (*ibid*.).

Plowright's (2014) model places emphasis on the factors influencing the design from the beginning of the process, whereas Nalkaya's (2012) emphasises the creative aspects where the design is developed. Neither Plowright (2014) nor Nalkaya (2012) discuss the design brief in any depth, although most architects acknowledge that this is the starting point of design for them. Goel (2014) notes that the design brief is a language document that falls somewhere between the vague and clear symbols used by architects. The relationship between the design brief and the preliminary sketches indicates *divergent or lateral transformation* and a process of abstraction. The challenge in architecture arises from this relationship, where ideas need to be translated into form. (*ibid*.).

The construction process is not discussed as part of the creative design process, however it too forms an integral part of the process. This lack of

acknowledgment may be due to design being viewed as the specification of an artefact, as opposed to planning which requires a sequence of actions to be specified in order to make the artefact (*ibid*.). However, both processes are required for the *verification* or *manifestation* of the artefact.

2.2.2 Creativity

Creativity is an intrinsic part of the architect's design process which necessitates a more detailed understanding of creativity and the creative process. There is very little difference between creativity and design, since the difference may arise from creativity being defined in terms of creative output, which could be the result of the design process (Plowright, 2014).

Creativity is hard to define and quantify due to its complex nature (Wiggins and Bhattacharya, 2014), and its unpredictability which results mainly from the enormous complexity of the human mind (Boden, 2013 in Vartanian, Bristol and Kaufman op. cit.). It has, nonetheless, been expressed as "producing something new of value" (Goswami, 2004) or original and inventive (Kandel, 2012). The generally accepted definition of creativity is that it generates novel and useful products within a specific context (Boden, 2013, in Vartanian *et al*. op. cit.).

Csikszentmihalyi (citing Gardner, 2006 cited in Kandel, 2012) believes that creativity arises from the interaction of three components. These are the individual who has mastered a discipline, domain or practice, the cultural sphere in which an individual is working and the social field, which is the people and organisations that give them access to the relevant educational experiences and opportunities to accomplish their goals. Wiggins and Bhattacharya (2014), on the other hand, see creativity as a property of a process, the creative act, and that the perception of creativity is relative to the actions of the creator, the observer and their social context.

Goel (2014), however, proposes that creativity is probably not a unitary concept to be identified and exposed, but is perhaps a by-product of real-world problem solving. Fuster (2013) describes creative innovation as the capacity to construct the novel and to remodel the old, for the advantage of oneself and others. The two aspects that arise with Fuster's (*ibid*.) viewpoint are the social aspect of creativity and its purpose or goal. Goswami (2004), however, notes that all creative acts regardless of the manner in which they are conceived share one feature, which is that they are goal-directed.

Creativity requires *conscious* and *unconscious* processing in the brain. Consciousness involves the fundamental power of consciousness to choose from quantum possibilities (Goswami, 2014). This means that choices are the ultimate acts of creativity (Goswami, 2004). *Unconscious* processing can also free people from *conscious* processing and aid creativity (*ibid*.). This is when a discontinuous quantum leap occurs and an idea appears apparently out of nowhere. An example of this is Archimedes' solution to the problem which arrived via a discontinuous quantum leap. (*ibid*.).

Goswami (2014) notes that "new" is defined as either a new meaning in a new context or a new meaning in an old context or a combination of contexts. Step-by-step thinking does not lead to new meaning in a new context. It requires a jump to a new pattern of thinking. The new meaning and its new context need to be seen. Only *unconscious* processing which is processing without collapsing every new thought into consciousness, can lead to a proliferation of possibilities in a new context. (*ibid*.).

The *unconscious* plays an important role in the *conceptualisation* stage of creativity. Wiggins and Bhattacharya (2014) propose that pre-conscious creativity occurs before conscious creativity.

2.2.3 The creative process

Creativity is characterised by four stages of the mental process, as ascertained by Wallas (in Wiggins and Bhattacharya, 2014 and Goswami, 2014). These stages are *preparation*, *incubation*, *illumination* and *verification*.

Preparation

The first stage of the creative process is *preparation* which starts with an intuition about a vague answer to a possible problem (Goswami, 2014). There is a questioning but it is not at burning point. The creative person thinks about the problem and collects facts and existing ideas pertaining to the problem. This may include speaking to experts, doing surveys and attending workshops. These investigations lead to the creative person becoming familiar with what is possible. (Goswami, 2014).

This is followed by a questioning of what has been learned and the awareness that existing ideas, programmes and contexts are not satisfactory. The questions are persistently on the mind of the creative and reach a burning point as existing belief systems are dismantled. All ideas are investigated and, with an open mind, the imagination is allowed to consider many possibilities. Urgency develops as the breakthrough appears to be approaching. At this point the mind is open to unlimited possibilities which allow consciousness to access the limitless state of possibilities. (*ibid*.).

Preparation is active work (*ibid*.) and requires *conscious* focus (Kandel, 2012). It occurs before creative insight and the development of the idea (*ibid*.), and fuels the momentum needed for insight (Goswami, 2014).

For architects the *preparation* phase starts with consultations with the client, the development of the brief, followed by an investigation of all relevant information which includes examining the context or site of the building. Analyses are performed with regard to all this information and with a particular emphasis on

familiarisation of the client's needs. It is a time consuming process which gives direction to the next stages. These activities occur during Nalkaya's (2012) programming stage. Plowright (2014) does not include this aspect in his model. This may be due to his examination of only the internal factors affecting the architect during the design process.

Incubation

The *incubation* stage follows the *preparation* stage. It starts when the creative self is waiting for quantum consciousness to choose the new and the quantum self to communicate it to the ego (Goswami, 2014).

During this stage, the problem is not being resolved. While contemplating the problem, the creative engages in activities to relax such as showering, exercising or watching a movie (*ibid*.). This is when the *unconscious* mental processes are active (Wallas in Goswami, 2014). A two-step process exists when using the *unconscious* for creative problem solving tasks. The first step is when creative ideas are generated by deep cognitive thought and occurs during the *incubation* stage. The second step occurs during the *illumination* stage, when the idea is transferred from the *unconscious* to the *conscious*. (Wiggins and Bhattacharya, 2014).

The *incubation* stage is characterised by alternating work and relaxation (do-be-do-be-do). In order to access the *unconscious*, relaxation needs to occur and not work. (Goswami, 2004). Many creative people participate in a range of activities (Gruber, no date in Goswami, 2014) which enables them to unconsciously process one problem while consciously working on another. Studies have shown that *incubation* is most likely to occur when the time is filled with an undemanding task, as compared to a demanding task or no task at all. It is a resource intensive process despite appearing to be spontaneous, and the beneficial effect is only for the previously presented task and not for new ones. (Wiggins and Bhattacharya, 2014).

Kris (1952 cited in Kandel, 2012) proposed that creative people have moments in which they experience relatively free communication between their *unconscious* and *conscious* selves. This occurs in a fairly controlled manner. *Unconscious* mental processes are typified by primary-process thinking which is analogical, freely associative, characterised by tangible images and directed by the pleasure principle (Kandel, 2012). Primary process thinking is believed to expedite the appearance of moments of creativity (*ibid*.).

Dijkesterhuis and Meurs (2006 cited in Kandel, 2012) explored how *unconscious* thought leads to creativity and found, through their experiments, that people in the *incubation* group arrived at solutions that later proved to be more satisfactory to them. If thinking about the problem is suspended and the individual is distracted for a time, *set shifting* takes place (Kandel, 2012). *Set shifting* is a transition from a rigid, convergent perspective to an associative, *divergent* perspective (*ibid*.) which leads to more creative solutions. It is also noted that distraction, not only allows the mind to wander and encourage *unconscious* or bottom up thought, but also allows a new top down process from memory storage which is indicated by the arrival of a new solution. (*ibid*.).

As a result, the *unconscious* is thought to play a significant role in creativity. Kandel (2012) postulates that the *unconscious* contributes significantly to creativity, because it can manage a greater number of operations than the *conscious* brain. This is the stage when all the information gathered in the *preparation* stage is assimilated and synthesised. The architect ponders all the requirements and constraints affecting the proposed project, until an overriding concept appears.

The *incubation* stage occurs during Nalkaya's (2012) *conceptualisation* stage. This is the stage where *lateral* or *divergent thinking* takes place and many possibilities are examined, which he does note. Plowright (2014) describes these as the thinking styles that architects use and articulates that contemporary architects

formulate a concept which directs the development of the project. Nalkaya (2012) and Plowright (2014) are aware of these activities but they are not designated to a specific creative process stage, nor do they describe a relaxation period that occurs before ideas manifest.

Illumination

Sudden insight occurs in the third stage of the creative process and occurs unexpectedly. This sudden *illumination* is the symbol of discontinuity and is the transition from *unconscious* possibilities to *conscious* insight. (Goswami, 2004).

The moment of *illumination* is the point of transition from spontaneous creativity to creative reasoning. In terms of Global Workspace Theory (Baars, 1997 cited in Kandel, 2012), it is the moment when the idea enters into the global workspace of the brain and the winning ideas penetrate into consciousness and may be visible in spontaneous neuronal activity – the resting state brain activity. This indicates that short periods of rest or disengagement as they occur during the *incubation* stage, may increase the occurrence of a flash of insight (Wiggins and Bhattacharya, 2014), known as creative insight or the 'Aha!' moment (Kandel, 2012).

The average person has the ability for this type of inspiration but may encounter difficulties when faced with complex or difficult problems that require creative acumen. This may cause a state where the individual is stuck and does not know what to do next. A sudden insight can release this stalemate and lead to the solution of the problem. It occurs when unnecessary assumptions are dropped and new task related associations are made between existing concepts or skills. (*ibid*.).

This type of insight occurs when there is a discontinuity, which is a fundamental feature of a paradigm shift. It is the illogical, nonlinear gap between the old

paradigm and the new, and occurs when there is a quantum leap in cognitive processing. (Goswami, 2004).

At this stage the idea, concept or vision appears to the individual. It is still part of the *conceptualisation* stage and guides the steps that follow, until the *vision* is realised. As Goswami (*ibid*.) notes, the primary law of creativity is grand *vision*. The ability of the architect to envision what the building will look like in the future is at the core of the architect's creative process. For Nalkaya (2012) it occurs in the *conceptualisation* phase and for Plowright (2014) during the design process.

Verification

During the fourth stage, the *verification* of the idea occurs when it is checked and *evaluated* and something novel is produced (Goswami, 2004).

The *verification* stage is when the transition of idea to form takes place. Realising form in the real world is difficult and even Einstein had trouble making the transition from idea to form. The creative struggle between ego and quantum consciousness can bring agony but it ultimately gives way to the play of form and idea. The result is what we experience as *flow*. (*ibid*.). *Flow* is discussed further under the "Phenomenology" section.

An important aspect that occurs throughout the creative process and in this stage, in particular, is feedback. It is used at every stage to fine-tune each intermediate result relative to the original concept of the design. It is crucial for the *verification* or correction of results for any decision or plan of action. (Fuster, 2013). Feedback leads to *iterations* of the design in an effort to improve upon the previous *iteration*.

This stage is characterised by *conscious* mental processes which are controlled by secondary-process thinking. This type of thinking is abstract, logical and driven by

reality-oriented concerns and is needed for developing the creative *vision* into reality. (Kandel, 2012). Without conscious top down processing, the ability to improve and revise the cognitive skills required for decisions and for creative acts, would not be possible (Dijksterhuis, 2006 cited in Kandel, 2012).

In Nalkaya's (2012) model the *realisation* phase can be interpreted as correlating to the *verification* phase of the creative process as discussed above. It incorporates level four and five *decision-making*, where the engineering and architectural working drawings are produced, and does not seem to include the construction phase. For Plowright (2014) the *manifestation* or *verification* phase starts with the proposal of the project.

However, the transition from idea to form for the architect starts after the idea or concept has appeared in the architect's mind and when the architect starts to draw what is being envisioned. This occurs at design concept development stage or level one *decision-making* (Nalkaya, 2012) or at Plowright's (2014) design method or process stage. The *verification* stage also includes the construction stage and forms a vital part of the creative process. *Iterations* occur during this phase which requires adjustments to the drawings produced. Only once the building is constructed, is the creative process concluded.

Nalkaya (2012) and Plowright (2014) mention the contribution of other stakeholders at this stage, however this is not emphasised or explored in detail. The *verification* stage is a resource intensive process particularly with regard to the number of people required to realise the building. Architects liaise with many of these individuals and groups in order to achieve their vision.

2.2.4 The neuroscience of creativity

Neuroscience has endeavoured to understand how creativity works in the brain which substantiates the processes, skills and experience required for creativity.

The manner in which information is processed by the brain during creative events brings forth a better understanding of how it manifests in the brain.

The location of creativity in the brain to one or a few brain regions has not been determined (Wiggins and Bhattacharya, 2014). Studies have, however, shown that a variety of brain regions become active. This suggests that creativity could be considered as a product of the complex interplay between ordinary cognitive processes like memory, attention, executive function, emotion and problem solving (Ward *et al*., 1999; Weisberg, 2006 cited in Wiggins and Bhattacharya, 2014). This interplay appears to occur between multiple and distant brain regions which form a network that may be associated with creative cognition (Wiggins and Bhattacharya, 2014).

Neural connectivity is thought to be a critical component of the creative process. Fleming and associates (Zadiel, 2013 in Vartanian *et al*. op. cit.) confirmed the existence of a neuronal circuit which involves the prefrontal cortex (PFC) and basal ganglia in *status quo* rejection. The implication is that this pathway is involved in the creative process because creativity consists of going beyond conventional and common knowledge which entails overcoming the *status quo*. However, it remains to be determined if creative and innovative ideas are connectivity or region dependent. (Zadiel, 2013 in Vartanian *et al*. op. cit.).

The limbic system is also thought to play a role in creativity. It is the emotional centre of the brain, is situated deep within the brain, is the source of internal drive and comprises the emotional energiser of creativity or the “creative fury” (Marina, 1993 cited in Fuster, 2013).

The cerebral cortex is where all major cognitive functions such as attention, perception, memory, language and intelligence operate (Fuster, 2013). Preliminary studies suggest that certain aspects of creativity are more probable to occur in association areas of the cortex (Kandel, 2012). Creative individuals

have a flatter associative hierarchy than those who are less creative (Mednick, 1962 cited in Hellman, Nadeau and Beversdorf, 2003), which means that more creative people have the capacity to activate more highly distributed networks. This connectionist architecture of the brain may account for creativity by two means. Selected units are triggered by something in the environment which leads to new patterns of activation and novel concepts may be produced. The other manner in which creativity may be accomplished is through networks that represent knowledge in one domain and assist in organising a different domain that shares some attributes. This is a type of creativity by *metaphor*. (Hellman, Nadeau and Beversdorf, 2003).

Interhemispheric communication might be important for merging the knowledge and skills that are important for creative innovation (*ibid*.). This type of communication is thought to allow the hemispheres to be independent and thinking to be *lateral*, which is important for the *incubation* of ideas. A brief interruption of this limited independence may be responsible for *illumination* but it is not known what causes this interruption (Bogen and Bogen, 1988 cited in Hellman *et al*., *ibid*.). It is possible that the cerebral connectivity important for creativity might not only be inter-hemispheric but also intra-hemispheric. The representations of ideas that were previously isolated may be combined by creative people through this wide spread network. (Hellman *et al., ibid*.).

The default network is a collection of neural regions across the brain which is activated when people are at rest or for conceptual tasks that occur in the *conscious* rest state. It is deactivated when demanding or perceptual tasks are performed. *Mind wandering* is associated with activity in the default network. It occurs during the *incubation* stage and thought processes are decoupled from a task. This indicates that there is a link between the generation of ideas and the resting mind. (Wiggins and Bhattacharya, 2014).

Studies have led to the idea that the frontal lobes play a role in creativity (Zadiel, 2013 in Vartanian *et al*. op. cit.). These lobes perform a major role in planning ahead, working memory and mental flexibility (*ibid*.) and are part of a network that is responsible for seeking and detecting novelty, a process that is fundamental to creativity (Kandel, 2012). They may also be responsible for the ability to disengage and develop alternative solutions which are two components of *divergent thinking*. Their connection to the polymodal and supramodal regions of the temporal and parietal lobes (Pandya and Kuypers, 1969 cited in Hellman *et al*., 2003), may limit the networks that collect semantically similar information and activate the semantic conceptual networks that are weakly or not stimulated at all. This activation of remote systems may be responsible for the generation of the novel ideas which are integral to *divergent thinking*. (Hellman *et al*., 2003).

The now popularised division of functions between the left and right hemispheres has been shown to be an oversimplification. *Lateral transformations* are supported by the right prefrontal cortex (PFC) of the brain and the left PFC supports *vertical transformations* by preventing premature interpretations produced by the left PFC (Goel, 2014). Brain imaging studies show that the PFC is active during visual perception and imagery and that activity in both sides occur during creativity. The activity in the right PFC seems to exceed the inhibitory capacity of the left side. It is, therefore, deduced that the interface between the right and left PFC may contribute to the production or inhibition of originality and creativity. The connections between both sides are reconfigured as artistic skill increases. (Kandel, 2012). Goel (2014) asserts that the interaction between left and right PFC may be critical for good design solutions.

The PFC which is the enabler or executive of the brain has a major role in the ability to predict the future and to construct suitable actions (Fuster, 2013). It is also the neural agent of the highest connections between individuals and their internal and external environments. Due to this direct connection to the future,

the PFC has a crucial impact on freedom and creativity. It allows the human brain the freedom to set goals and intentions which enables the ability to shape the future. The cortex's ability to select between memory and action networks in the pursuit of chosen goals, allows the freedom to create the future and realise it in the present. This freedom to invent the future is as a result of the brain's immense plasticity, which allows the brain to use a large amount of information stored in memory in order to take different actions. The capability of the cortex to utilise memory and drive it into the future in a novel way leads to creative innovation. (*ibid*.).

Neuroscience has not yet established exactly how creativity works in the brain but it has determined the regions or areas that are activated during the creative process. It has shown that it is a complex activity and involves many areas of the brain and the neuronal links between these areas. It does indicate that *lateral* and *vertical transformations* occur within specific regions and that a period of rest does contribute to the creative process. Neuroscience validates the stages of the creative process, indicating that different regions contribute to different activities and that *unconscious* processing form a large part of the creative process.

Types of creativity

Different types of creativity have been identified. Generally, they fall into two categories which are distinguished from where the ideas originate in the brain, either from *conscious* or *unconscious* processing.

The most common type of creativity uses *conscious* thought (Boden, 2013 in Vartanian *et al*. op. cit.) which is considered to have limited processing capacity (Wiggins and Bhattacharya, 2014) and is known as *combinational* creativity (Boden, 2013 in Vartanian *et al*. op. cit.). It occurs when unfamiliar combinations of familiar ideas lead to a "statistical" form of surprise. Associative thinking and relevance are key features of this type of creativity. Although Boden (*ibid*.)

identifies three types of creativity, two of her types fit into this category. *Exploratory* creativity is the other type and occurs when novel structures or ideas are generated from existing stylistic rules and lead to new structures or ideas that are acceptable and unexpected (*ibid*.). *Creative reasoning* (Wiggins and Bhattacharya, 2014), *situational* (Goswami, 2004) and the *'select and combine'* method (Goel, 2014) are all forms of this type of creativity.

The second category of creativity is manifested through *unconscious* thought. It may process much information especially while being distracted and performing an undemanding task, however, this applies only for complex decisions. (Wiggins and Bhattacharya, 2014). *Transformational* creativity changes the *status quo* by producing ideas that are not only new but impossible and is a rather rare type of creativity (Boden, 2013 in Vartanian *et al*. op. cit.). It has been described as the *ex nihilo* method, creating something out of nothing with the help of God (Goel, 2014) or the 'Aha!' moment (Wallas, 1926 cited in Wiggins and Bhattacharya, 2014), the moment of *illumination* or cognitive insight. The idea suddenly appears seemingly out of nowhere. It is also known as *spontaneous* creativity (Wiggins and Bhattacharya, 2014) or *fundamental* creativity which occurs when a quantum leap is experienced (Goswami, 2004).

Conscious creativity is more predominant than *unconscious* creativity, however an idea may encompass more than one type (Boden, 2013 in Vartanian *et al*. op. cit.) and can occur in combinations (Wiggins and Bhattacharya, 2014). Imagination plays a role in both types creativity because it is new thought that moves out of known contextual boundaries. (Goswami, 2004).

The different types of creativity indicate that *conscious* and *unconscious* processing contributes to the creative process. Although it may appear that they can occur independently it is more likely that they occur within the same overall process.

2.2.5 Creativity traits

The creative process is inducted through the many traits that are thought to contribute to creativity. These include intelligence, motivation, knowledge, personality and cognition.

The relationship between intelligence and creativity is somewhat tenuous, with some proposing that a moderate level of intelligence is required for creativity (Zadiel, 2013 in Vartanian *et al*. op. cit.) and others that a high level of general intelligence is necessary although insufficient for creative innovation (Hellman *et al*., 2003).

However, a weak relationship was observed between the creativity and the intelligence quotient (IQ) of architects (Barron and Harrington, 1981 cited in Hellman *et al*., 2003). They discovered that above an IQ of about 120, creativity cannot be predicted as much as when the IQ is below 120. This led to the theory that there is an IQ threshold, which means that a person needs to be above this threshold to learn and gain sufficient knowledge in their particular creative domain (Hellman *et al*., 2003). For architects, this threshold is 120 but there may be different thresholds for different domains (*ibid*.).

Further studies have led to the premise that after a threshold is reached there is no direct relationship between creativity and IQ (*ibid*.). Simonton (1994) and Herr *et al*. (1965) (cited in Hellman *et al*., 2003) found that the correlation between creativity and IQ is weak. This led to the understanding that intelligence is a necessary but insufficient 'condition' for creativity. (Hellman *et al.*, 2003).

Artistic talent is an innate ability to illustrate ideas in a representational way. Research has shown that there is no connection between inherited talent from highly talented artists to their children and their grandchildren. This means that the inheritance of talent is non-linear. It is proposed that the same principle applies to creativity. (Zadiel, 2013 in Vartanian *et al*. op. cit.).

Studies have found that the expression of artistic talent in general, is related to reducing inhibitions for *novelty seeking*. *Novelty seeking* is characterised by the capacity to think unconventionally and to use *divergent thinking* to embrace new experiences, and is a process that is essential to creativity (Kandel, 2012). It is connected to the strongest and most essential personality trait for creative realisation, openness to experience (Kaufman and Gregoire, 2016). *Novelty seeking* and openness to experience is linked to the removal of inhibition which is a reduced ability in creative people as is latent inhibition. They take in more information, are more easily distracted and more sensitive to noise. (*ibid*.).

Positive constructive *daydreaming* is linked with openness to experience (Wiggins and Bhattacharya, 2014) and thereby to creativity. *Mind wandering* enables creative insight (Schooler, 1993 cited in Kandel, 2012) which makes it an important trait for creativity.

MacKinnon (1962 cited Goswami, 2014) studied a group of forty of the most creative architects in the US in terms of personality traits compared to less creative architects. The creative architects scored much higher on appreciation of aesthetics and higher in terms of their sensitivity to feelings, however, much lower on the appreciation of economics and they were considerably less social. The most significant difference was that the associates all lacked an appreciation of aesthetics (Goswami, 2004).

Creative people are generally individualistic, insightful, eclectic, reflective, resourceful and unconventional. Conscientiousness, extraversion, agreeableness and neuroticism are also creativity characteristics (Kaufman and Gregoire, 2016). They also score high on traits of ego-strength and ego-weakness which is an apparent paradox that has been noted (Frank Barron, no date cited in Goswami, 2004). The ego-weakness reflects the breaking down of their conceptual world and their strength allows them to access the new, by coping with setbacks which may include neurosis and anxiety. (Goswami, 2004).

Many of these traits are apparent in creative people and architects. It enables them to formulate new ideas.

2.2.6 Tools/ skills of creativity

Creative people acquire specific knowledge and skills which are thought to be a factor of intelligence (Hellman *et al*., 2003). Domain-specific knowledge is a pre-requisite for creativity (Weisberg, 1999 cited in Hellman *et al*., 2003). Architects gain domain knowledge and technical skills through their education at architectural schools and this attainment continues through work experience. Thinking styles however are innate to the designer and are developed throughout the designer's career.

The creative mind set is normally domain-specific rather than generalised. Weisberg (*ibid*.) concluded from his research that domain-specific knowledge is a pre-requisite for creativity and together with special skills are necessary mechanisms for creativity. Creative people may have the ability to store much specialised knowledge in their memories, be capable of *divergent thinking* and have the unique ability to discover novel systematic relationships. (Hellman *et al*., 2003).

Thinking styles

The active thinking of the designer is at the centre of all design and is its intellectual structure (Plowright, 2014). As discussed in an earlier section, there are two types of thinking styles that architects use during the design process. These are *divergent* and *convergent thinking* styles. They are integral to the architectural design process, are complementary and are used within the same process, in order to accomplish the desired result or outcome. (*ibid*.).

Architectural design requires exploration which requires selection, which in turn requires relevance. Through exploratory or *divergent thinking*, possible solutions are explored in order create new possibilities and bring about new systems of

association. Judgement is always postponed at this stage so that ideas can be investigated without constraints and are captured for evaluation later. (*ibid*.).

Divergent thinking tasks are a subset of ill-structured problems, where the start and goal states are incompletely specified (Goel, 2014). They involve continuous *divergent transformations* which result in solutions being developed and there is no "aha" experience in finding the goal state (*ibid*.). *Divergent thinking* is critical for design but is inadequate because *convergent thinking* is needed to refine and detail the solution.

Insight problems, on the other hand, are a special subset of well-structured problems which have specified start and goal states, however they are different from other forms of well-structured problems in that the goal state lies outside the current state of the problem solver. When the problem solver experiences a reconceptualization through a phenomenological experience, the goal state can be accessed through *convergent thinking*. (*ibid*.).

Convergent thinking is reductive, evaluative or diagnostic (Plowright, 2014). This type of thinking reduces the number of options generated during *divergent thinking* through *decision making*. (*ibid*.).

Figure 2.4 shows the *divergence*, *transformation* and *convergence* stages of the design process.

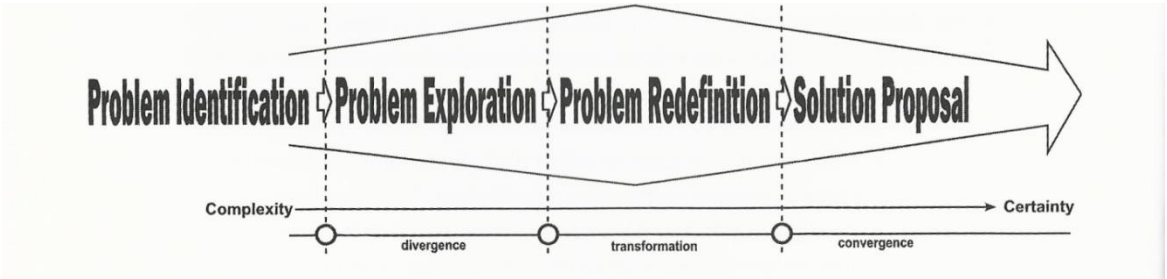


Figure 2.4: A first generation design method based on J. Christopher Jones. (Plowright 2014: 24)

Divergent thinking followed by *convergent thinking* (Guildford, 1967 cited in Wiggins and Bhattacharya, 2014) occurs throughout the creative process and are skills that can be developed by the creative person.

Metaphors and analogy

Creativity requires transitioning from one idea to another and observing previously unnoticed combinations of elements (James, 1890 cited in Hellman *et al*., 2003). These associations are made using skills like *metaphor*, reconsidering information, resolving incongruities and removing randomness (Kandel, 2012).

Contemporary architects use the concept-based framework to structure their response to the design brief (Plowright, 2014). Methods arising from this framework use *metaphors*, *analogies*, questions and the central idea. The latter is used to organise the parts of the design proposal into a comprehensive whole, visually and intellectually. The outcome is judged against this central idea or concept which is used to create a final proposal that must be relevant and relate to its context. (*ibid*.).

Analogy is a type of metaphor and is used to locate architecture's position in the world. The main analogies used in architecture are the human body, nature and the machine. (*ibid*.). *Analogies* and *metaphors* give designers a philosophical position from which to work (*ibid*.) or a theoretical orientation (Nalkaya, 2012), which helps them to organise their initial priorities and choices (Plowright, 2014).

The phenomenological experience is another methodology or theory resulting from the concept-based framework (*ibid*.). The source material for this type of framework may either be from inside or outside the discipline. If it is from outside the discipline it will more likely lead to something different and unexpected. This type of *metaphor* or *analogy* where the core information is preserved and most of the non-essential qualities are cast aside, but the essential relationships remain, is termed domain-to-domain mapping (*ibid*.).

Bisociation (Koestler, no date cited in Goswami, 2014), which is the interconnection of two previously unrelated ideas (Goswami, 2014; Wiggins and Bhattacharya, 2014) aids the creative process. The more startling the *bisociation*, the more striking and novel is the act of creativity (Goswami, 2014).

Decision-making

Decision-making forms an essential part of the architectural design process and the designer needs to be aware of how, why, when and which decisions need to be made. Good *decision-making* can result from defining the criteria of what is required and occurs within the boundary of domain knowledge. It also connects the thinking styles. (Plowright, 2014).

There are two stages to the *decision-making* process. Firstly, possibilities of action are considered with regard to probability of success, outcome and consequences. Secondly, a selection of actions related to the decision is made. (Fuster, 2013).

In architectural design, *decision-making* is based on heuristics rather than logic, and on *satisficing*. Judgmental heuristics include rules-of-thumb, trial and error, educated guesses and common sense, while *satisficing* means that decisions made are based on it being good enough at that point in time. Stopping rules based on the framing bias are created to aid the selection of the most relevant option. These methods permit designers to make decisions in complex situations where it is impossible to know all the consequences of every decision. (Plowright, 2014).

Decisions in the architectural design process are made on a temporary basis until they are supported by other decisions. When a more applicable element is selected in another part of the design which makes the previous choice irrelevant, the designer changes the selection. If it is not possible, then more

ideas are investigated or the stopping rule is adjusted. The iterative nature of design occurs due to the many stopping rules created within the process. The design process is achieved within a realistic timeframe with the use of these rules which also strengthen the coherence of the overall design. (ibid.).

Conscious and *unconscious* thought occur during *decision-making* and differ in important ways. Consciousness recruits attention and can only examine a small number of potentials, generally one at a time whereas *unconscious* thought covers a huge web of autonomous, specialized networks throughout the brain that are capable of dealing with many processes independently. It is thought that *unconscious* thought is superior for decisions that require comparing many alternatives simultaneously. *Conscious* thought works from the top down and is guided by expectations and internal models and is hierarchical. *Unconscious* thought works from the bottom up or non-hierarchically, and may allow more flexibility in finding new combinations and permutations of ideas. (Dijksterhuis, 2006 in Kandel, 2012).

In *unconscious* processing none of the parts of the whole are discarded early as they would be in *conscious* processing if they had no obvious use (Goswami, 2004). Consciousness is, therefore, a part of the creative process but is not an absolutely indispensable requirement. It is also not the sole cause of creativity. (Fuster, 2013).

2.2.7 Techniques used in the creative process

There are various *divergent thinking* techniques. These include brainstorming which uses mind-mapping as a diagrammatic technique. The trigger method, variable brainstorming, questioning, the challenge technique, escape thinking, questioning as the other and SWOT (strengths, weaknesses, opportunities and threats) analysis are also utilised during this stage of the creative process. (Plowright, 2014).

Graphic and physical techniques that are applied are delaying decisions, trial-and-error models, sketching, doodling, collage, montage, narratives, reverse massing and unexpected combinations. All these activities open the amount of possibilities which will be appraised during the *convergent* phase. (*ibid*.).

The techniques used in the second phase categorise, examine and illuminate the content from the *divergent* phase. The main tools to organise this quantity of information are based on clustering which catalogues it into groups and categories. Some tools for clustering are the snowball technique, affinity diagramming and highlighting. (Plowright, 2014).

"Chunking" is used in the snowball technique to organise like-with-like information. Items that are similar are grouped together as a category which can be titled once a theme is identified. This emergent process is known as "titling". Categories are analysed for patterns and relationships, are weighed for strength and graded hierarchically. The strongest category is chosen in relation to the intentions of the designer, after which *decision-making* and selection occur. This content is then used to set the priorities and judgement criteria for the next phase of the design method. (*ibid*.).

Affinity diagramming or the K-J Method uses nested categories rather than hierarchy. Highlighting, on the other hand, screens ideas and collects the best out of a large group of options. This is done through judgment of the results. Groups are created out of ideas that seem interesting or intriguing and are known as "hotspots". A more detailed technique such as a SWOT analysis may be required after a clustering technique. (*ibid*.).

2.2.8 Phenomenology of creativity

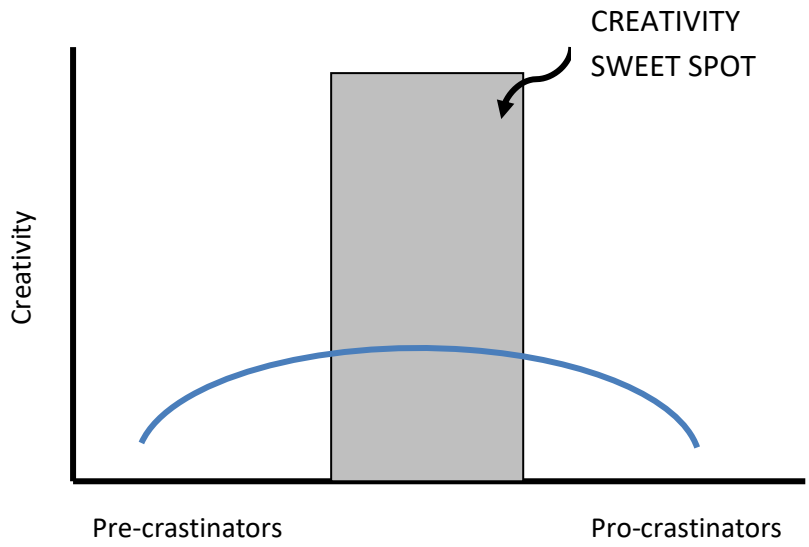
Many emotions are experienced by architects during the creative process of design. These emotions range from elation to anxiety which is why the creative process is described as the agony and the ecstasy of creativity.

A movement of vital energy is experienced during creative thought (Goswami, 2004). When ideas are flowing and the creative person is producing and developing many ideas, they are said to be in a state of *flow* (Getzels and Csikszentmihalyi, 1976 cited in Wiggins and Bhattacharya, 2014).

Flow is described as a mental state when the creative person is completely present and totally absorbed in the creative act. The act of doing for its own sake transpires and time becomes immaterial. All ideas and actions flow from the preceding one and the creative's whole presence and abilities are completely committed to the process. This experience is essential to the designer. (Kaufman and Gregoire, 2016). It is a spontaneous experience, is where creative freedom occurs and where spontaneity supersedes deliberation and preconceptions (Goswami, 2004).

Another experience that is important for the "Aha" phenomenon of creativity, is relaxation (Jung-Beeman, 2005 cited in Kandel, 2012). When the idea penetrates into consciousness and *illumination* occurs, surprise, delight and certainty are experienced. The creative person has to have the ego-strength to handle the anxiety caused by the quantum jump into new insights. (Goswami, 2004). Anxiety is a sign of the creative struggle.

Ego-weakness may lead to doubt. There are two types of doubt during the creative process, self-doubt and idea doubt (Grant, 2016). Self-doubt produces paralysis or an inability to continue, whereas idea doubt increases energy which leads to attempting, investigating and improving. It is essential to avoid the self-doubt stage in the creative process. Doubt leads to procrastination. Original thinkers are quick to start a project but slow to finish. During the procrastination period they take time to *incubate* ideas. However, the key is to not procrastinate too long because the level of creativity diminishes the longer one procrastinates. (*ibid*.). Graph 2.1 below indicates the creativity sweet spot during the procrastination period.



Graph 2.1: Procrastination graph. (Grant 2016).

When one is aware of the dangers of self-doubt and the potential benefits or disadvantages of procrastination, one should consciously avoid the negative experiences and embrace the positives, which will lead to *illumination* and then to *verification* of the idea. When the architect no longer has self-doubt and the idea manages to break through, the concept or *vision* for the building is clarified through drawings or sketches.

2.2.9 Creativity and the future

Creativity, freedom and the future

Human beings have the ability to attempt to predict the future and construct appropriate actions to attain that future (Fuster, 2013). The ability to select experience from the past and to create the future based on the selected past are the two main components of human freedom (*ibid*.).

Autonoetic consciousness is the human ability to place oneself in a different time frame such as the past or the future or other imaginary situation and to analyse our thoughts (Markowitzsch and Staniliou, 2014). This capability to build different mental models and to imagine future circumstances is believed to assist with real-life problem solving and creativity (Wiggins and Bhattacharya, 2014).

Creativity is fundamental to the envisioning and attaining of the desired future. It is essential to freedom as a result of the ability of the cortex to choose between memory and action networks in order to achieve desired goals. (*ibid*.).

The process starts with attention which chooses certain perceptions, memories, motivation and actions at the expense of all others and should be thought of as the mother of all cognitive functions. Selection, particularly selective attention, extends into the future. (Fuster, 2013.).

The perception-action cycle allows people to prepare for future situations and to implement these in their physical and social environments. In this way it is a pre-adaptive trait in humans. Feedback in the cycle from the changing environment allows one to change one's thinking and choose between alternatives. This results in new patterns of reaction leading to the adaptation of new conditions. This variance is an essential requirement for plasticity in the brain, progress and materialisation of new purpose. (*ibid*.).

Forecasting and backcasting

Future studies are used to assist *decision-making* under uncertain conditions (Miola, 2008). If the context is simple, predictable and largely controllable then forecasting and extrapolation, which are examples of *probable futures* (Banister and Stead, 2004 cited in Miola, 2008), is appropriate (Chatterjee and Gordon, 2006 cited in Miola, 2008). However, when more complex, unpredictable circumstances occur, scenario planning (*ibid*.), as an example of *possible futures*, is more appropriate (Banister and Stead, 2004 cited in Miola, 2008).

Backcasting as an example of *preferable futures*, is particularly suitable to complex problems that require major change (Dreborg, 1996 cited in Miola, 2008), such as sustainability issues. This approach starts when a protagonist perceives an undesirable state in the environment or context which is not acceptable. This person cannot reconcile between what is seen and what ought

to be. At some point the understanding manifests that something needs to change and that they need to be the one to bring about the change. The idea or vision emerges for the future state they would like to see and they start to formulate ways in which to achieve this vision. The verification of the *vision* entails persuading others to understand and believe in the vision and to assist in achieving the end result, which is the desirable future. (Miola, 2008).

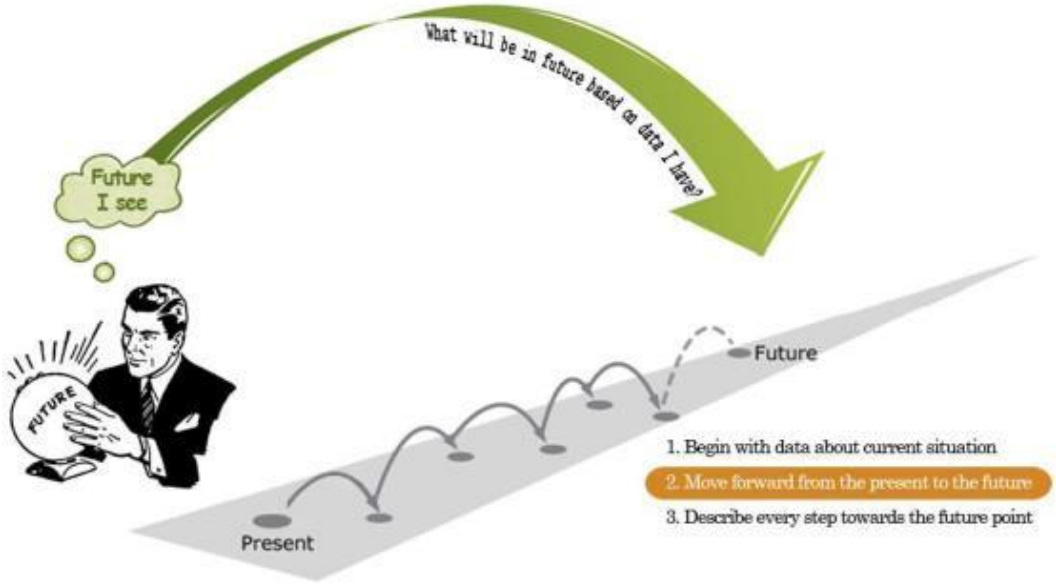


Figure 2.5: Forecasting illustration. (The Natural Step 2009)

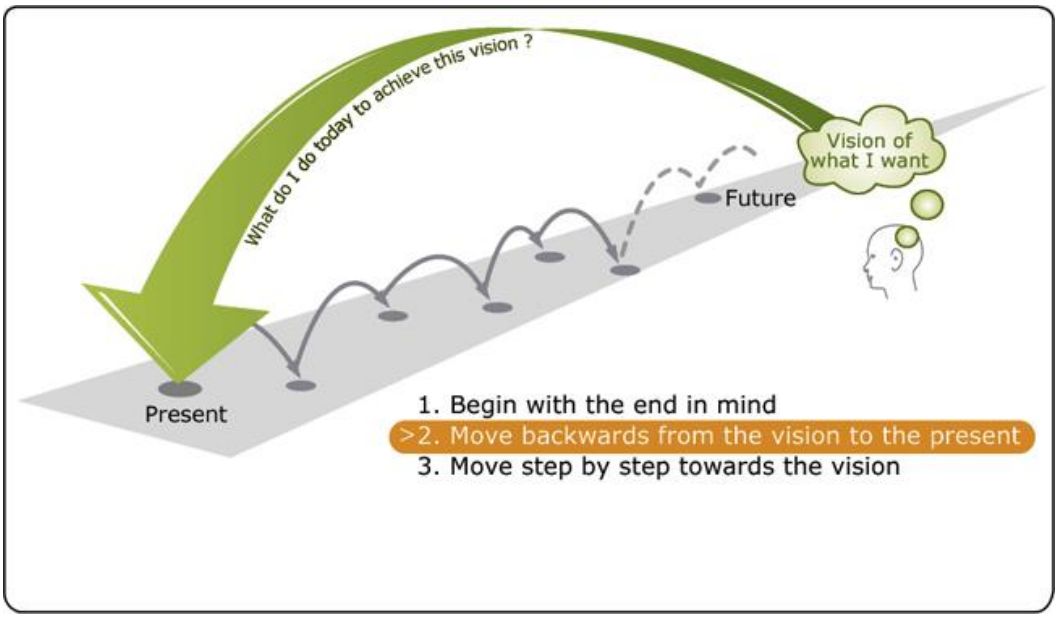


Figure 2.6: Back-casting illustration. (The Natural Step 2016)

The reason that *backcasting* is more suitable for sustainability purposes is because it can take the desirable sustainable future as the starting point and determine its feasibility, and the potential and manner in which to attain it (Miola, 2008). It can also be useful to determine the degree to which undesirable futures can be avoided or responded to (Robinson, 1990 cited in Miola, 2008).

2.3 Leadership and Creativity

2.3.1 Leadership theories – the evolution of leadership becoming a process

Leaders and creators are thought to be similar with regard to production processes, but not in the context and character of their productive activities. These similarities suggest that creativity and leadership are more closely related than initially thought. (Mumford and Connelly, 1991).

The development of leadership theories from conventional to contemporary perspectives is characterised by a post-industrial paradigm shift (citing Rost, 1991 in Goertzen, 2013 in Foster *et al.* op. cit.), from viewing leadership as a position held by a leader, to a process involving the leader and followers in the organisational context. This shift was shown to occur when Burns (1978 cited in Goertzen, 2013 in Foster *et al.* op. cit.) published his transforming leadership theory where leadership was reconceptualised as a relational, ethical process, focussed on follower development and achieving the end goal (Komives and Dugan, 2010 in Couto op. cit.; Goertzen, 2013 in Foster *et al.* op. cit.). Similarly, the understanding of the organisation changed from closed, hierarchical units to open, dynamic, rapidly changing, and inter-connected systems (Komives and Dugan, 2010 in Couto op. cit.). Table2.1 below contrasts some elements of conventional and contemporary views of leadership.

Table 2.1: Contrasting leadership paradigms. (Komives and Dugan 2010: 113)

Conventional View	*Contemporary View*
Hierarchical orientation; siloed structures	Systems orientation: networks; webs; communities of learning
Closed systems	Open systems
Parts perspective	Whole perspective
Fragmented and isolated	Connected and independent
Leader role: authority, decider	Leading role: meaning maker, facilitator
Followers to be led	Followers as leaders themselves; valuing non-positional leadership
Leader-led organization	Leader-full organization
Control	Shape
Power over	Power with, empowerment
Leadership as behavior of positional leader	Leadership as the process of the group
Personal vision	Shared vision
Efficiency and effectiveness	Socially just
Discussion	Dialogue
Permanent	Temporary
Share information	Create knowledge
Providers	Partners
Receiving	Reflecting
Goals and bottom line	Core values and vision
Self-protection	Trust
Balance	Disequilibrium-confusion
Linear causality	Adaptive solutions
Change initiated from top	Change initiated from anywhere
Incremental change	Dynamic flux
Either-or thinking	Both-and thinking

Key contemporary leadership theories such as servant (citing Greenleaf, 1977 in Goertzen, 2013 in Foster *et al.* op. cit.), transformational (citing Bass, 1985; Bass and Riggio, 2006 in Komives and Dugan, 2010 in Couto op. cit.), complexity (citing Uhl-Bien and Marion, 2001 in Komives and Dugan, 2010 in Couto op. cit.), and authentic (citing Avolio and Gardner, 2005 in Komives and Dugan, 2010 in Couto op. cit.) theories evolved from Burns' ideas (Komives and Dugan, 2010 in Couto op. cit.; Goertzen, 2013 in Foster *et al. op. cit*.). Conventional theories such as trait, behavioural and industrial theories thus re-emerged and were reconceptualised in the orientation to leadership as a process (Komives and Dugan, 2010 in Couto op. cit.). The social change model (SCM) of leadership development (citing Astin, mid-1990s in Komives and Dugan, 2010 in Couto op. cit.) and the transformational leadership theories are particularly relevant to *sustainable city transitions* because they are suited to public and civic arenas.

Self-awareness, ethics, morality, social responsibility and a redistribution of power between the leader and followers are predominant themes in leadership literature today (Komives and Dugan, 2010 in Couto op. cit.). The role of the follower is at the forefront of these theories and leadership is thus seen as a social process Goertzen, 2013 in Foster *et al*. op. cit.), within an underlying value system with which the leader needs to approach these relationships. These theories are deemed to apply to all organisations and not only those in the public and civic arena. The process itself, however, is not scrutinized and does not encompass all the skills/competencies leaders display towards attaining their goals.

Since the contemporary view is that leadership is a learned process (Komives and Dugan, 2010 in Couto op. cit.), it is important to understand the process and how it is inducted. As suggested by Komives and Dugan (*ibid*.) an integrated and interdisciplinary approach, that takes into account the context within which leadership occurs, is required. Leadership is dependent on the relationships the leader has with the self and followers, as they pursue their mutual goals within their particular context, and especially in view of related constraints.

As a result of the contemporary view that leadership is a dynamic and reciprocal process (*ibid*.), it is then possible to investigate it as such, in order to determine whether there are any commonalities with the process used by architects to create designs.

2.3.2 Leadership styles

One of the ways in which leaders affect their role is through their leadership style because it influences the organisational climate which in turn affects the organisation's performance (Goleman, 2000). By identifying the most effective styles, it is possible to help leaders harness the underlying emotional intelligence (EQ) competencies of these styles, in order to achieve their goals and to reflect on the process they follow (*ibid*.). (See Section 2.3.3 below for a more detailed explanation of EQ competencies).

Based on EQ competencies, six basic leadership styles have been identified. These are *coercive*, *authoritative*, *affiliative*, *democratic*, *pacesetting* and *coaching* styles (see Table 2.2 below) (*ibid*.). The most effective styles are the *authoritative*, *democratic*, *affiliative* and *coaching* styles. Since each style affects the organisational climate differently, leaders need to master as many styles as possible so that they can choose the most appropriate one for the different circumstances they face. The ability to switch styles effortlessly, as the situation arises, results in leaders being more effective due to their greater adaptability which is important in continuously changing circumstances, as may occur in *sustainable city transitions*. (*ibid*.).

Table 2.2: The six leadership styles at a glance. (Goleman 2000: 82)

	Coercive	**Authoritative**	**Affiliative**	**Democratic**	**Pacesetting**	**Coaching**
The leader's modus operandi	Demands immediate compliance	Mobilizes people toward a vision	Creates harmony and builds emotional bonds	Forges consensus through participation	Sets high standards for performance	Develops people for the future
The style in a phrase	"Do what I tell you."	"Come with me."	"People come first."	"What do you think?"	"Do as I do, now."	"Try this."
Underlying emotional intelligence competencies	Drive to achieve, initiative, self-control	Self-confidence, empathy, change catalyst	Empathy, building relationships, communication	Collaboration, team leadership, communication	Conscientiousness, drive to achieve, initiative	Developing others, empathy, self-awareness
When the style works best	In a crisis, to kick start a turnaround, or with problem employees	When changes require a new vision, or when a clear direction is needed	To heal rifts in a team or to motivate people during stressful circumstances	To build buy-in or consensus, or to get input from valuable employees	To get quick results from a highly motivated and competent team	To help an employee improve performance or develop long-term strengths
Overall impact on climate	Negative	Most strongly positive	Positive	Positive	Negative	Positive

The style most suited to leadership for *sustainable city transitions* is most probably the *authoritative* style because it is visionary and it encourages creativity. One of the leader's main roles is to motivate people and to clarify how their work fits into the larger vision of the organisation and this is a strong characteristic of the authoritative style. When this style is used, the vision is stated, standards are set and feedback is based on the furthering of the vision. Authoritative leaders foster a context where people are given the freedom to innovate, experiment and take calculated risks. It is the most effective of the styles and increases every aspect of organisational climate. (*ibid*.).

Together with the *authoritative* style, leaders should use the caring and nurturing approach of the *affiliative* style where relationships with employees are the main priority. This style improves flexibility in the organisation. Through the *democratic* style, leaders spend time obtaining people's ideas and buy-in in order to build trust, respect and commitment. It contributes to generating fresh ideas for executing the leader's strong *vision*. The *coaching* style requires constant dialogue and, in addition, has a positive effect on organisational climate. It ensures the transferring of skills which embeds the long-term sustainability of the organisation and its *vision*. (Goleman, 2000). A combination of these styles aids the process of generating ideas and thereby creativity, and the resultant implementation of the styles as they relate to the overall vision of the organisation.

2.3.3 Creative leadership traits

Leadership is complex by nature and requires many traits and skills for its successful implementation. Trait and behavioural theories detail the traits used by effective leaders. In this study, the emphasis is on those required by leaders in order to implement creative solutions. These are wisdom, intelligence and knowledge, creativity, emotional intelligence and authenticity.

Wisdom, intelligence and creativity (WIC Systems model of leadership) and their interrelationships have been identified as modifiable dispositions and skills for

effective leadership (Sternberg, 2007). Sternberg (*ibid*.) does not refer to them as traits because he views traits as being non-modifiable, and skills and dispositions as being modifiable. He also describes dispositions as attitudes but these are more than just attitudes. In this study, these factors are referred to as traits, despite the term being seen as improving inherent characteristics of individuals. This use of the term is in recognition that as individuals gain experience, their traits are improved and are thus modified towards ensuring better performance.

Creativity is important for leadership (Mumford and Connelly, 1991) and therefore constitutes the central disposition in the WICS model as it generates innovative ideas on which others can act. Intelligence plays a role in all aspects of leadership and creativity. Leaders need to constantly recall information that is applicable to their decisions and must *analyse* and *evaluate* alternative routes of action (*ibid*.). The relationship of intelligence to leadership performance increases with movement up the organisational ladder (Kanter, 1977 and Pelz, 1953 cited in Mumford and Connelly, 1991).

Academic or analytic intelligence serves creativity through the *evaluation* of ideas, whereas *practical intelligence* aids creativity through the implementation of ideas and persuading others of their validity. *Academic intelligence* is related to memory and analytical skills for recall, recognition, *analysis*, *evaluation* and information judgment, whereas *practical intelligence* solves everyday problems using knowledge gained from experience. *Analytical intelligence* is essential to distinguish between good and bad ideas. Without adequate *practical intelligence* a leader may fail to execute his ideas or to persuade others of their value. Without wisdom leaders may do things that benefit only themselves or their preferred in-group. (Sternberg, 2007)

A leader who is strong in memory, *analytical* and practical skills is most likely to be effective in influencing others (Sternberg, 2007). As an aspect of intelligence and creativity, *divergent thinking* (James, 1890 cited in Hellman *et al*., 2003) is positively correlated to leadership success. (Sternberg, 2007). Adverse conditions such as stress may reduce the effective deployment of intelligence resources. However, attributes such as dominance, self-confidence, performance standards, high task or

organisational commitment, resistance to stress and social adroitness may play an significant part in leadership, by enabling leaders to utilise their intellectual abilites better under difficult circumstances. Persuasiveness, persistence, energy levels, negotiating skills and social adeptness may all further influence leadership performance. (Mumford and Connelly, 1991).

Knowledge, as a key component of intelligence, is important in creative problem solving, which is one of the tools leaders constantly use (Mumford and Connelly, 1991). There is a curvilinear relationship between knowledge and creativity (Simonton, 1984 and Sternberg, 1988 cited in Mumford and Connelly, 1991), which indicates that very high levels of specialisation tend to limit creativity due to the focus it creates (Mumford and Gustafson, 1988 cited in Mumford and Connelly, 1991). Different types of knowledge, such as, factual, procedural, contextual, relativity and uncertainty knowledge, all influence wisdom. Wisdom uses *analytic and practical intelligence* (together known as successful intelligence), creativity and knowledge to take into account and weigh the interests of all parties and safeguard that the actions of the leaders pursue a common good. However, intelligence and creativity do not automatically guarantee wisdom. (Sternberg, 2007).

Although there are multiple intelligences as described by Gardner (1983), which include musical-rhythmic and harmonic, visual-spatial, verbal-linguistic, logical-mathematical, bodily-kinesthetic, interpersonal, intrapersonal, naturalistic and existential intelligences, the focus here is on *academic* and *practical intelligence* as they relate to leadership traits.

One feature of *practical intelligence* is emotional intelligence, which is argued to be a positive forecaster of leadership (Sternberg, 2007). The four fundamental capabilities of emotional intelligence are *self-awareness*, *self-management, social awareness* and *social skills* (Goleman, 2000). Each capability has a set of competencies (see Table 2.3 below). McClelland (no date cited in Goleman, 2000) found that leaders who had strengths along six or more emotional intelligence competencies demonstrated more effective performance, than those who had

fewer competencies. *Social skills* are of particular importance to *sustainable city transitions* because these skills are required in pursuing and dealing with change.

Negative traits of creativity such as anxiety, as relating to leadership are not discussed in the literature under review. Sternberg (2007) notes the negative aspects of wisdom when leaders no longer take into account the common good aspects of their role. He also describes tacit knowledge as an element of *practical intelligence*. However in his definition, they appear to be the same. For the purposes of the report a distinction is not necessary. All the traits discussed above indicate that leadership is a developmental process as it relates to leaders and those with whom they interact.

Table 2.3: Emotional intelligence: A primer. Capabilities, competencies and traits. (Goleman 2000: 80)

Self-Awareness	**Self-Management**	**Social Awareness**	**Social Skill**
• *Emotional self-awareness:* the ability to read and understand your emotions as well as recognize their impact on work performance, relationships, and like. • *Accurate self-assessment*: a realistic evaluation of your strengths and limitations. • *Self-confidence*: a strong and positive sense of self-worth.	▪ *Self-control*: the ability to keep disruptive emotions and impulses under control. ▪ *Trustworthiness*: a consistent display of honesty and integrity. ▪ *Conscientiousness*: the ability to manage yourself and your responsibilities. ▪ *Adaptability*: skill at adjusting to changing situations and overcoming obstacles. ▪ *Achievement orientation*: the drive to meet an internal standard of excellence. ▪ *Initiative*: a readiness to seize opportunities.	▪ *Empathy:* skill at sensing other people's emotions, understanding their perspective, and taking an active interest in their concerns. ▪ *Organizational awareness:* the ability to read the currents of organizational life, build decision networks, and navigate politics. ▪ *Service orientation:* the ability to recognize and meet customers' needs.	▪ *Visionary leadership:* the ability to take charge and inspire with a compelling vision. ▪ *Influence:* the ability to wield a range of persuasive tactics. ▪ *Developing others:* the propensity to bolster the abilities of others through feedback and guidance. ▪ *Communication:* skill at listening and at sending clear, convincing, and well-tuned messages. ▪ *Change catalyst:* proficiency in initiating new ideas and leading people in a new direction. ▪ *Conflict management:* the ability to de-escalate disagreements and orchestrate resolutions. ▪ *Building bonds*: proficiency at cultivating and maintaining a web of relationships. ▪ *Teamwork and collaboration*: competence at promoting cooperation and building teams.

2.3.4 Leadership skills and capabilities

Leaders require a complex set of skills in order to discern what is required within a given context and to choose and implement a solution towards the pursuit of their vision. Although the prevailing view is that leadership can be learnt as opposed to being an inherent quality (Komives and Dugan, 2010), there is not a single cognitive capacity that enables individuals to function effectively in various leadership roles (Mumford and Connelly, 1991).

The layered (strata) and segmented (plex) integrative model of leadership requirements known as a strataplex (Mumford, Campion and Morgeson, 2007) (see Figure 2.7) highlights four skills categories. These are *cognitive*, *interpersonal*, *business* and *strategic* skills. Leaders require all these skills but at differing intensities dependent on the level in the organisation at which the leader operates. According to this model, *cognitive* skills and *interpersonal* skills are more necessary at any level compared to *business* and *strategic* skills. At the highest level of the organisation, *strategic* skills are most critical. The relationship between the level and the corresponding requirements is stronger for *strategic* and *business* skills than for *interpersonal* and *cognitive* skills. This model indicates that the nature of leadership changes quantitatively and qualitatively as individuals advance in the organisation's hierarchy. (*ibid*.).

Cognitive skills incorporate the fundamental skills used by leaders such as collecting, processing and disseminating information, oral and written communication, active listening, reading comprehension, active learning skills (learn and adapt), and critical thinking. The *interpersonal skills* are based on social capacity, social judgment, social complexity and differentiation, and human relationship skills. These include social perceptiveness, coordination of one's own actions, as well as those of others, negotiation and persuasion skills. *Business skills* relate to specific functional areas of the leader and include management of material, personnel and financial resources, and operations analysis. *Strategic skills* entail a systems perspective in order to understand complexity, cope with ambiguity and bring about change in the

organisation. These require visioning, problem identification, problem solving, solution appraisal and objective evaluation skills. (*ibid*.).

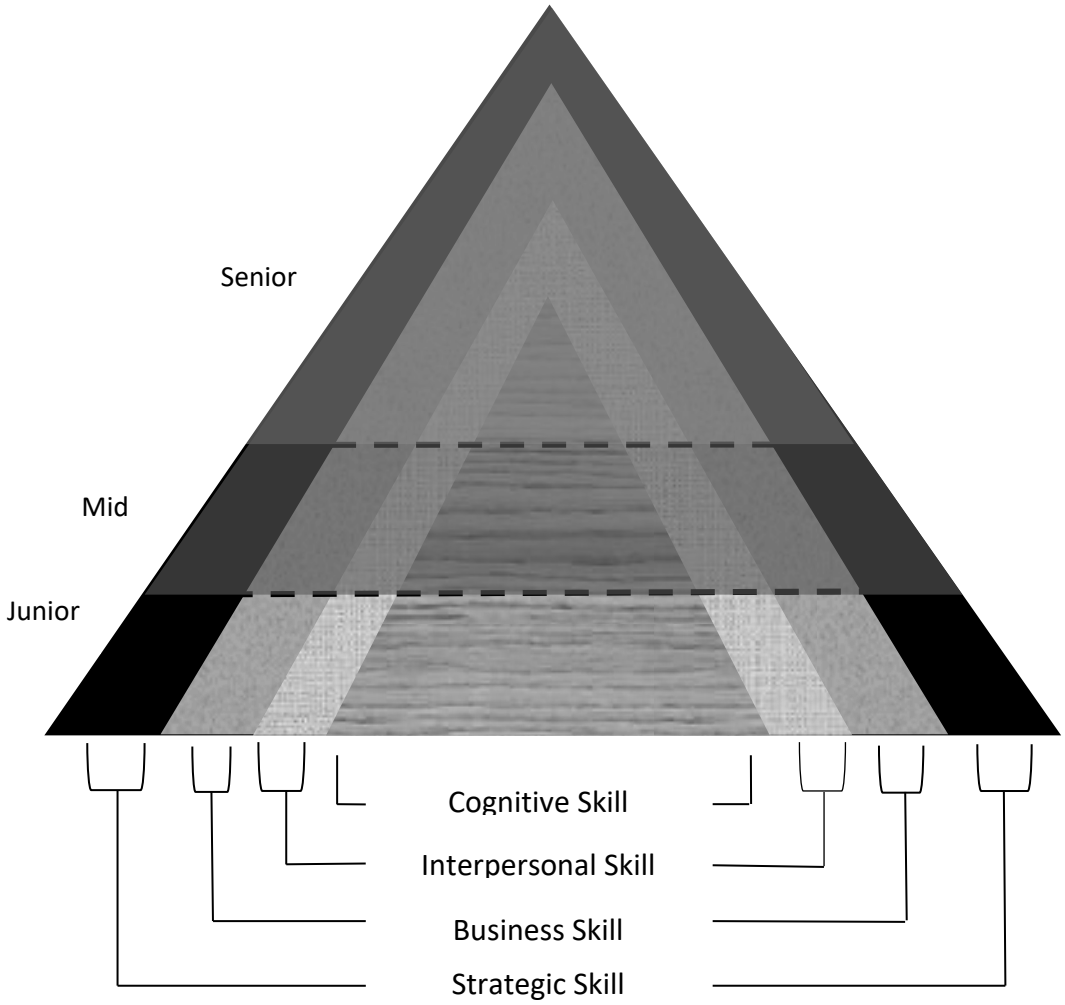


Figure 2.7: The leadership skill requirements strataplex.
(Mumford *et al*. 2007: 156)

Based on the model reviewed above, this report focusses on the *interpersonal* and *strategic* skills categories. *Interpersonal* skills are required by leaders in the sustainable city transition process in order to understand the environment within which they operate, including the people they need to influence in order to implement their *strategic* visions. Although the strataplex model does not identify a category of creative skills, it is most probably a key component of the

strategic skill category, which calls for visioning and capacity to enact change for transition.

Social perceptiveness (Zaccaro, Gilbert, Thor and Mumford, 1991 cited in Mumford *et al.*, 2000) of others and their reactions to proposed solutions, allow leaders to adjust their behaviours to deal with the perceived requirements of others. Other social skills that leaders need are communication, persuasion, negotiation, conflict management and coaching skills. Skills are dependent on knowledge and both develop as leaders gain experience. (Mumford *et al.*, 2000). Figure 2.8 below is a mediational model indicating that knowledge and skills have the most direct influence on leadership performance.

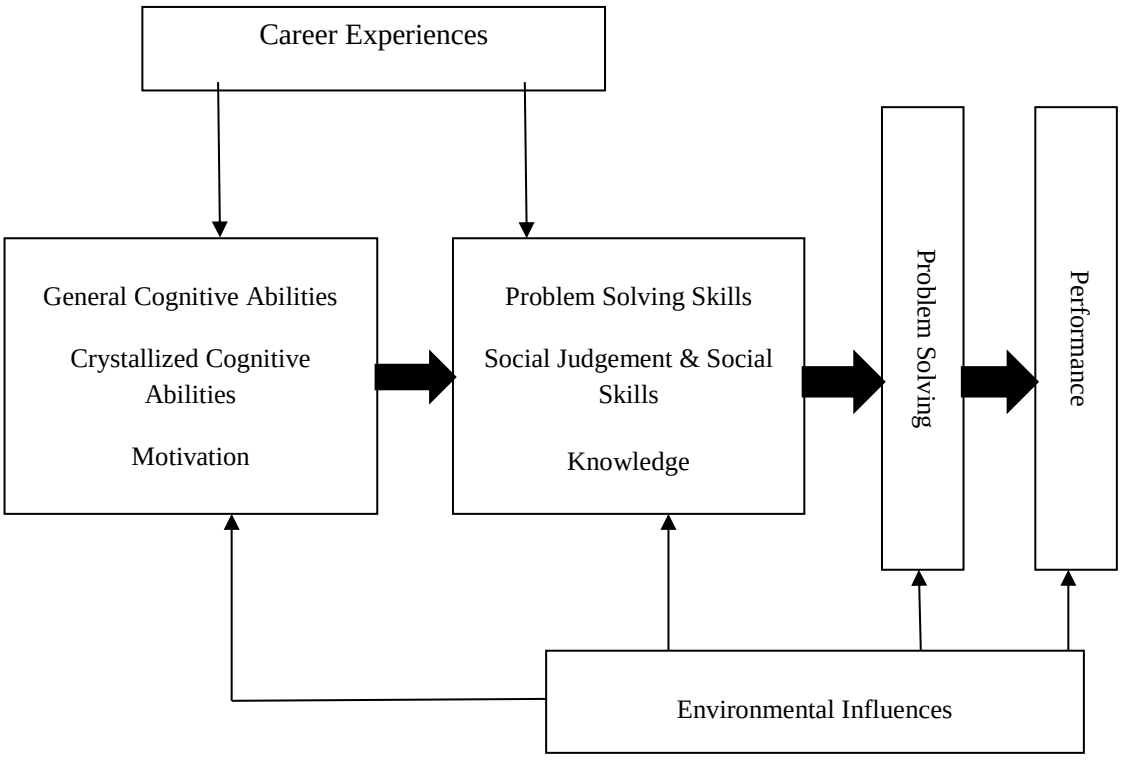


Figure 2.8: Influence of leader characteristics on leader performance.
(Mumford *et al*. 2000: 23)

Although it is uncertain if the skills required in public leadership roles are the same as those necessitated in business roles, it appears that separations between business

and political leadership are possibly disintegrating due to changes in organisations towards more collaborative and facilitative leadership. (Mumford *et al.*, 2007).

The seven leadership process stages under Theory U leadership model are, listening, observing, sensing, presencing, crystallizing, prototyping and performing (see Figure 2.9) (Scharmer, 2007). The three skills on the left side of the U process and presencing at the bottom of the U are *inter*- and intra-*personal* skills. The individual connects with oneself and others in order to determine what requires attention and what action or intention is needed to resolve the issues identified. *Self- awareness* is a key element. The skills on the right are implementation skills. The seven skills combine into a *strategic* skill for developing solutions for the emerging future. (*ibid*.).

The social or *interpersonal* skills together with *strategic* skills play significant roles in finding new solutions towards tackling novel and ill-defined problems, such as those found in cities in terms of sustainability transitioning.

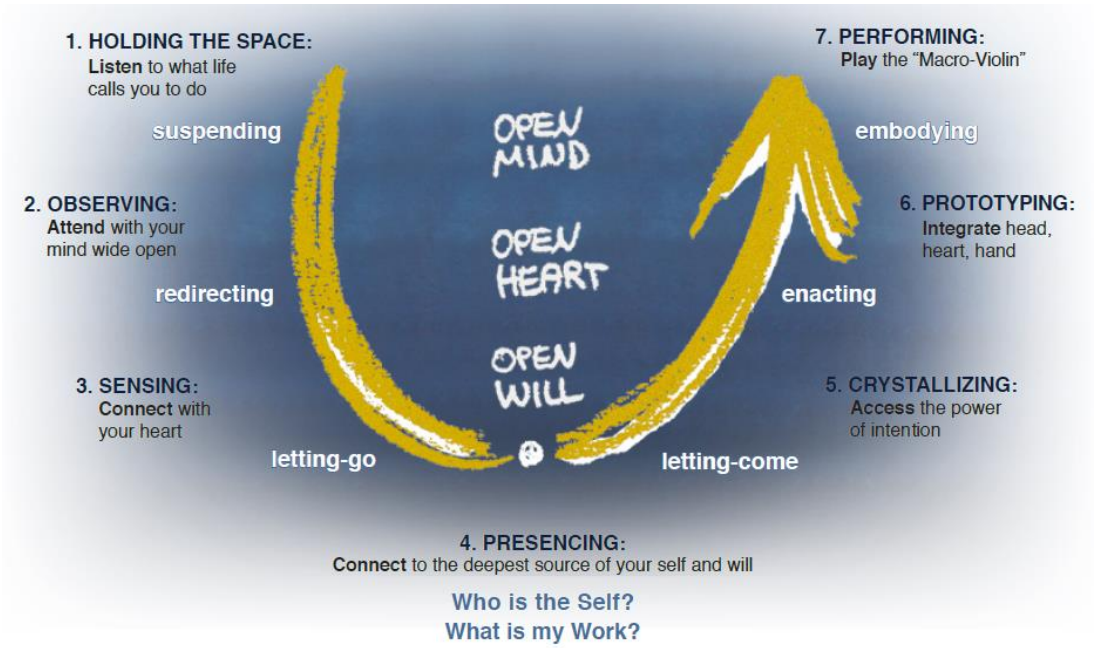


Figure 2.9: A new social technology with seven leadership capacities. (Scharmer 2009b: 12)

2.3.5 Organisational climate

Leadership occurs in a context, whether in the public, business or private sector arena. The related environmental or organisational climate exerts significant pressure and influence on leaders. The complex nature of organisations results in complex social problems that leaders need to manage. This understanding of organisations has influenced changes from closed, hierarchical units to open, dynamic, rapidly changing, interconnected systems, simultaneously with the shift of leadership to dynamic and reciprocal relational processes among people (Komives and Dugan, 2010).

Six key drivers influence an organisation's working environment or climate (see Table 2.4), (Goleman, 2000). These are flexibility, responsibility, standards, rewards, clarity and commitment. Employees' sense of responsibility to the organisation, the level of standards that people set, the sense of accuracy about performance feedback and aptness of rewards, the clarity people have about mission and values and the level of commitment to a common purpose (Litwin and Stringer, no date cited in Goleman, 2000), together with flexibility are affected by leadership style which in turn affect employee performance.

Table 2.4: Getting molecular: The impact of leadership styles on drivers of climate. (Goleman 2000: 81)

	Coercive	Authoritati	Affiliative	Democratic	Pacesetting	Coaching
Flexibility	-.28	.32	.27	.28	-.07	.17
Responsibility	-.37	.21	.16	.23	.04	.08
Standards	.02	.38	.31	.22	-.27	.39
Rewards	-.08	.54	.48	.42	-.29	.43
Clarity	-.11	.44	.37	.35	-.28	.38
Commitment	-.13	.35	.34	.26	-.20	.27
Overall impact on climate	-.26	.54	.46	.43	-.25	.42

These drivers also affect the level of creativity within the organisation. If the climate is conducive for creativity, then it will be used to develop novel ideas, whereas if the environment is not supportive, despite a person possessing the internal attributes for creativity, these attributes may never manifest (Sternberg, 2007). The driver that correlates most to creativity is flexibility. It refers to how free employees feel with regards to innovation without undue restrictions by company rules (*ibid*.). Flexibility allows for innovation, learning and creativity to be encouraged within the organisation. The leadership style which most affects flexibility is the authoritative style. It is also the leadership style with the most constructive effect on climate. The affiliative, democratic, and coaching also have positive effects on organization climate. However, leaders should not rely on only one style as each style has a particular use.

Although the contexts within which business and political leaders function are converging, it is most probable that public leaders are more deeply affected by and therefore more responsive to political influences, as well as the requirements of varied participants and a emphasis on *collaboration* (Crosby and Bryson, 2005; Kellerman and Webster, 2001 cited in Mumford *et al.*, 2007), compared to leaders in business settings. However, the factors affecting organisational climate are just as applicable to this context.

2.3.6 Creativity as part of the leadership process

In most of the literature today leadership is still generally not viewed or understood as a systematic process. Instead the behaviour, as well as traits and styles of leaders remain the primary understanding of leadership. Even though actions by leaders have been observed and many models have been developed, leadership has not yet been understood as a formalised systematic process similar to the understanding which prevails in most professions, such as architecture.

Change is at the core of leadership (Puccio, Murdock and Mance, 2007) which means that the leader's function is to identify goals, create feasible goal-paths and guide

people along the paths while addressing the unpredictable and changing socio-technical environments (Mumford and Connelly, 1991). Generally, leaders' actions are investigated in terms of problem solving and in the context of skills and capabilities. In the first phase, they identify and define the problem, devise ways in which to understand the problem and then develop the initial ideas and strategies for the solution (Mumford *et al*., 2000). They also need to evaluate the importance of the problem and whether the solution is viable before commencing its implementation (McCall and Kaplan, 1985 cited in Mumford *et al*., 2000).

In the second phase, leaders need to consider how others will react to an identified solution, recognise the constraints with which they are confronted, and then develop plans and foster support for implementation. Refinement of the initial ideas occurs in this phase. New cycles of problem solving may occur due to constraints or failures of earlier or initial actions or solutions. Working with constraints posed by time frames, resources, system demands, conflicting goals, organisational groups, stakeholders, contradictory problems in creating and realising potential solutions, may provoke leaders to innovate. (Mumford *et al*., 2000).

The third phase is when implementation of the solution occurs. Leaders need to convey the vision, set goals, check progress and inspire employees. Leaders develop and implement solutions based on agreement with others. They need to obtain information, frame and promote coherent actions as a part of the group. This is done through the communication of a common vision and goals. They need to monitor and motivate people and have flexibility in implementation. These three phases interact with one another. (*ibid*.).

Figure 2.10 below presents an overview of the key kinds of capabilities, knowledge and skills relevant to leaders' problem solving attempts but it also indicates the phases as described above.

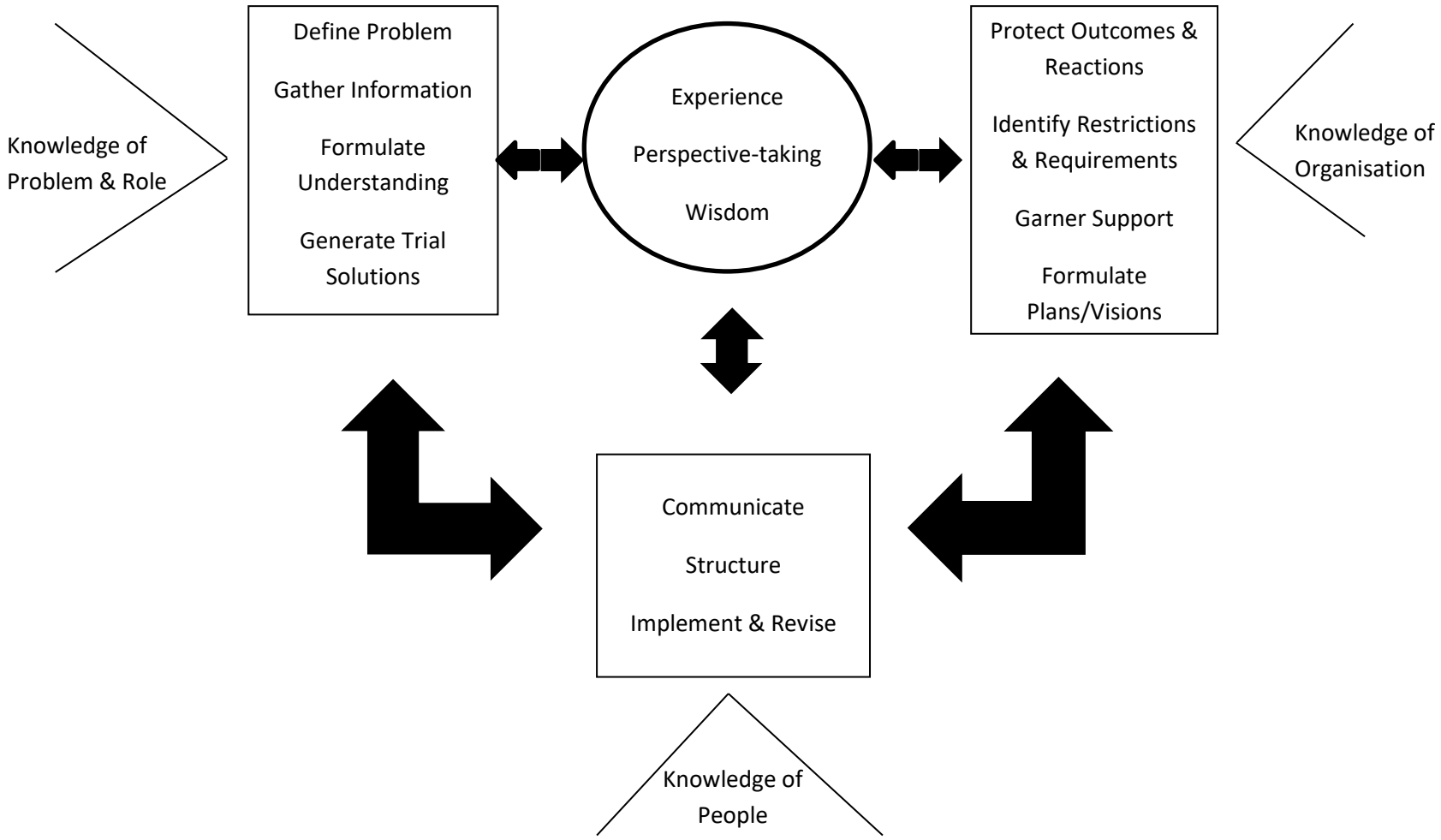


Figure 2.10: Model of leader problem solving (Mumford *et al*. 2000: 16)

This model does not include a feedback process. Leaders need to monitor progress and take cognisance of feedback in order to determine whether the solution is being implemented as envisaged, whether it appears to be successful and whether unforeseen consequences have appeared. The feedback and monitoring process is required due to the complex and dynamic nature of organisations (Mumford and Connelly, 1991), while allowing for revision of the strategy, and therefore playing a vital role in complex problem solving endeavours (Hayes and Flower, 1986 cited in Mumford and Connelly, 1991).

Sternberg (2007) argues for a systems view which sees leadership as a set of decision processes in which ideas are generated, followed by *analysis* and, ultimately the implementation of the ideas. Kouzes and Posner (2007 cited in Komives and Dugan, 2010) identified five leadership practices in which highly effective leaders engage. These are challenging the process, inspiring a shared vision, enabling others to act, modelling the way and encouraging heart. Puccio *et al.* (2007) believe that the principles and practices detailed by Kouzes and Posner (*ibid*.) are associated with the actions in which people engage when occupied in the creative process. These different models or views of leadership indicate that it can be seen as a systematic process which can then be taught to individuals in their journey to becoming leaders.

Given the unprecedented nature of the challenges facing humanity in our times, a new type of leadership is required. This deeper dimension of leadership for transformational change can be developed by accessing a core consciousness or source to which we are currently blind. This is due to what Scharmer (2007) refers to as our “blind spot”. The ability to facilitate the change to the inner place or source from which individuals work, so that they can start to function from a future space of possibility that they feel wants to materialise, is the core of the leadership being called for currently. This shift occurs through a heightened state of attention known as presencing (*ibid*.).

For leaders to be effective, they must first intimately connect with the structures of attention from which they are operating. These are thinking (micro/individual), meso conversing (group), macro structuring (institutions) and mundo ecosystem coordination (global systems). The way one is attentive to a situation, individually and collectively, controls the route the system takes and the resultant future that emerges. The single most important leadership challenge facing humanity currently, is to move from symptomatic reactive responses (fields 1 and 2) to generative responses that focus on systemic root issues (fields 3 and 4) (See Table 2.5) (*ibid*.).

Table 2.5: Structures of attention determine the path of social emergence. (Scharmer 2009b: 4)

	Field	**Mico:**	**Meso:**	**Macro:**	**Mundo:**
	Structure of Attention	**THINKING** (individual)	**CONVERSING** (group)	**STRUCTURING** (institutions)	**ECOSYSTEM COORDINATING** (global systems)
	Field 1: Operating from the old me-world	**Listening 1:** Downloading habits of thought	**Downloading:** Talking nice, politeness, rule-re-enacting	**Centralized:** Machine bureaucracy	**Hierarchy:** Central plan
	Field 2: Operating from the current it-world	**Listening 2:** Factual, object-focused	**Debate:** Talking tough Rule revealing	**Decentralized:** Divisionalized	**Market:** Competition
	Field 3: Operating from current you-world	**Listening 3:** Empathic listening	**Dialogue:** Inquiry Rule-reflecting	**Networked:** Rational	**Dialogue:** Mutual adjustment
	Field 4: Operating from the highest future possibility that is wanting to emerge	**Listening 4:** Generative listening	**Presencing:** Collective Creativity, flow Rule-generating	**Ecosystem:** Ba (Japanese word for a "place" or "field" – physical, social, mental and intentional place)	**Collective Presence:** Seeing from the emerging Whole

Scharmer's (2007) U process is about an inner journey that enables the transitioning from reactive to generative responses. It entails five stages as indicated in Figure 2.11. The left side of the U is about connecting with oneself, others and the context, in order to determine what requires change. This is done through all the senses including intuition or sensing. Judgment and cynicism are suspended and everything is looked at with openness – open mind, heart and will. At the bottom of the U, a threshold occurs where everything that is not essential is "let go". This "letting go" allows an opening up to new possibilities for the future. (*ibid*.).

Figure 2.11: The U as one process with five stages. (Scharmer 2009b: 6)

On the right hand side of the U, implementation of the new possibilities occurs through prototyping and the refinement of ideas. The most effective prototype is chosen and subjected to review by all stakeholders. The five movements of the U relate to the macro, meso and micro levels of interactions. (*ibid*.).

The U process is similar to the creative process (as reviewed in the previous section of this chapter), because it entails similar experiences of discovery through sensing,

in which one explores future possibilities by doing rather than by abstract thinking and reflecting as opposed to the conventional method where *analysis* occurs first, followed by blueprinting the design after which it is built. (*ibid*.).

Although the five stages reviewed above appear to be very different, upon closer analysis one notes that they mostly have phases that coincide with the creative process phases of *preparation*, *incubation*, *illumination* and *verification*. The *preparation* phase is typically when problems are identified, defined and analysed. *Incubation* occurs when ideas are explored and generated with *illumination* occurring when the best possible solution is identified and presented as the *vision*. Implementation corresponds with the *verification* phase when support is gathered and ideas are transformed into reality. Whereas the clarity of the phases as defined under the various models, do vary somewhat and may sometimes remain vague, they do indicate that a prevailing process is engaged, as part of a framework for action by leaders especially where transformational change is essential.

2.3.7 Leadership and creativity

There are several indicators that demonstrate that creativity may be related to leadership effectiveness (Mumford and Connelly, 1991).

Motivation

Creative people and leaders behave in similar ways. They want to change and improve the *status quo*. This they do through generating ideas and having a vision of the outcome they would like to achieve. Both have to deal with the uncertainty of how their ideas will be perceived as well as the uncertainty of how the future will unfold. They need to persuade others of the validity of their ideas in order to ensure *collaboration* for successful implementation.

Creativity can therefore be argued to be a core leadership competence because both leadership and creativity deal with change towards a future outcome, and the uncertainty with which it is associated (Puccio *et al*., 2007). Leaders initiate and

guide adaptive responses in order to effect the desired change (Tushman and Anderson, 1986 and Fiedler and Garcia, 1987 cited in Mumford and Connelly, 1991). Change implies novelty especially where old solutions are no longer useful in view of new problems. Given that new solutions require novel approaches, which can only be accessed through the reorganisation of existing knowledge structures, the process demonstrates a pattern which is typical in the creative process.

Processes

From the previous reviews, it is evident that creative people and leaders imagine a new future and work towards the implementation of their ideas in order to realise that new future or vision. (Puccio *et al*., 2007). In the WICS model, creativity is linked directly to leadership in that it is used to generate ideas, which are then analysed and implemented for the common good. Creativity enables leaders to deal with novel and difficult situations (Sternberg, 2007) that may never have arisen before.

Leadership problems are ill-defined due to the complexity, conflict and change characteristics of organisations. (Mumford and Connelly, 1991). Given that creativity is crucial in solving problems within ill-defined domains, leaders and creators resort to creative problem solving (CPS) (*ibid*.) in order to solve problems, innovate and inspire a vision. Puccio *et al*. (2007) advocate a three stage conceptual model of Creative Problem Solving (CPS), which has three conceptual stages with two processes per stage. The three stages are clarification when the problem is understood, transformation when the best solution is selected and developed and implementation when a plan is actioned. *Divergent* and *convergent thinking* occurs in all the steps of the process (see Figure 2.12). (*ibid*.).

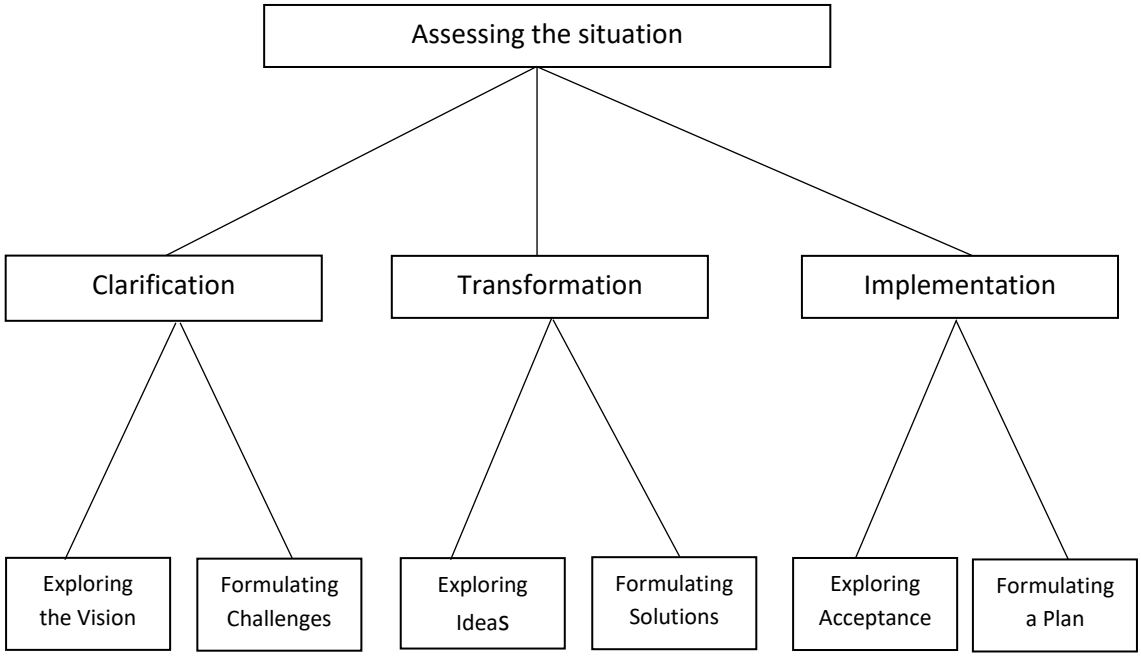


Figure 2.12: Creative Problem Solving (CPS) model (Puccio *et al*. 2007: 47)

CPS is different from standard problem solving in a number of ways because it occurs in ill-defined domains where problems are not quantified and must be produced by the individual (Mumford *et al*., 1991 cited in Mumford and Connelly, 1991), there is a need for novelty, and novel solutions do not occur in a void. CPS requires the systematic combination or reorganisation of existing representations (Rothenberg, 1986; Hausman, 1988; Mumford and Gustafson, 1988 cited in Mumford and Connelly, 1991) which create new categories (Barsalou, 1982, 1983, 1989 cited in Mumford and Connelly, 1991) that present a foundation for the creation of innovative problem solutions.

Both creativity and leadership thus necessitate that the innovative ideas be interpreted into solutions through action. Before implementation, *evaluation* is required to determine the validity of the idea in the context it is to be used. *Decision-making* forms part of the *evaluation* process. (Mumford and Connelly, 1991). A key factor that is often argued to inhibit effective problem solving in the leadership arena is *satisficing* or the inclination to take the first available solution

that appears (Cyert and March, 1963 cited in Mumford and Connelly, 1991). Traits affecting evaluation standards such as openness, tolerance for ambiguity and cognitive complexity would thus significantly influence the innovative extent of a leader's problem solving performance (Mumford and Connelly, 1991).

Skills and attributes

Leaders and creative people use shared sets of skills. Leaders use affective (operational) and effective (emotional) skills, as well as *divergent* and *convergent* thinking during the CPS process. This type of thinking is also characteristic of creative thinking (Puccio *et al*., 2007). In addition there is a sound connection between a leader's performance and creative capacities such as *divergent thinking* (Bass, 1981 cited in Mumford and Connelly, 1991). Interventions such as brainstorming as a creative technique, is often meant to improve creative problem solving skills, which can lead to enhanced managerial performance (Mumford and Connelly, 1991).

A common characteristic of highly creative people (Sternber and Lubard, 1992; Torrance, 1979 cited in Puccio *et al*., 2007) and leaders is that they are skilful at convincing others to buy into their ideas. There is a reciprocal relationship between the innovative problem solving ability of creative people and the persuasiveness of leaders (Mumford and Connelly, 1991), especially with their capacity to influence others for collaborative action towards realising the vision.

These common attributes shared between creative people and leaders demonstrate a key link between creativity and leadership. Behaviours showing an absence of conventionality, astuteness, aesthetic taste and imagination, assimilation and intellectuality, decision-making competence and flexibility, and ambition for accomplishment and recognition are common to leaders and creative people alike (Sternberg, 1985; Lord and Foti, 1986 cited in Mumford and Connelly, 1991).

The best performance is inclined to emerge at comparable points in the life span of leaders and creative people, which is at approximately age 45 (Simonton's (1984,

1985, 1988a, 1988b cited in Mumford and Connelly, 1991). This similarity may be due to the operation of processes that contribute to exceptional accomplishment in both domains (Simonton, 1988a cited in Mumford and Connelly, 1991). Experience gained during the course of their careers may also play a significant role in this commonality.

The primary difference to be noted in the manner of actualising creativity is that creative people favour an independent artistic bent, whereas leaders have a functional and social orientation.

Creative attitude

For leaders to be creative they need a creative attitude towards their leadership roles in order to enable them to look at novel ways to solve problems that they cannot solve in conventional ways. The components of a creative attitude towards leadership are problem redefinition, problem and idea analysis, selling the solution, realising how knowledge can help and deter creative thinking, openness to sensible risks and to encounter obstacles, belief in one's ability to complete the task at hand, willingness to tolerate ambiguity and to find extrinsic rewards for the things one is intrinsically motivated to do and continuing to grow intellectually rather than to stagnate. Good leadership therefore entails a synthesis of all the competencies noted above. (Sternberg, 2007).

Climate or context

Another factor affecting creativity in leadership is the climate or context created by the leader for creativity to occur. Leaders who want creative and novel solutions need to be open to change, support new ideas, permit autonomy, encourage risk taking and be tolerant of failures. Leaders need to be aware of the psychological diversity of the various team members and how this diversity affects creativity. This factor encompasses the various means in which people manage and arrange information. Leaders need to take the diverse nature of team member's strength in the creative process and assign the appropriate roles in order to get the most

effective results. (Puccio *et al*., 2007). Teams are essential to leaders as they permit them to compensate for each other's limitations. (Sternberg, 2007).

The greatest dissimilarity between leadership and creativity is the context in which they occur. The organisation in which the leader operates has many factors influencing it, the leader's actions and the manner in which creativity can be engaged. However, the perceived differences mask the commonalities with the creative process.

It may be argued that leaders' actions are limited by the demands of the organisation which may prevent leaders from finding very innovative solutions. However, constraints are found in many fields which enhance rather than inhibit creativity because applying previously used solutions to these contexts is not an option (Albert, 1990 and Mobley, 1990 cited in Mumford and Connelly, 1991).

Due to its fundamentally social nature, leadership inhibits the independent pursuit of creativity as opposed to the creative person's approach. However, one can view the innovative role of the leader as a form of creativity (West and Farr, 1989 cited in Mumford and Connelly, 1991). Leaders create a product by furthering organisational changes, group unity or subordinate motivation. Therefore, the social nature of leadership as part of organisational life need not inhibit creativity. (Mumford and Connelly, 1991).

The relatively limited time that leaders spend on problems as opposed to the large amount of time leaders spend on "putting out fires" (Mintzberg 1973 cited in Mumford and Connelly, 1991), may be seen as inhibiting creativity. The amount of time it takes to create solutions does not diminish their value. (Mumford and Connelly, 1991).

Organisations pursue and require stability (Schneider, 1987 cited in Mumford and Connelly, 1991) which means that there is less change during stable conditions, and this in turn reduces the opportunities for creative problem solving. However, even

under these conditions CPS can focus on maintaining and enhancing efficiency (Mumford and Connelly, 1991).

Leadership and creativity have many similarities which indicate that it may be possible to relate the creative process architects use to leadership, in order to enhance and develop a systematic process for leadership, particularly in the sustainable city transition sector.

2.4 Sustainable City Transitions.

2.4.1 Sustainability and Sustainable Development

Sustainability

In terms of the environment, sustainability encompasses several aspects, however the key element is to ensure human survival in the long-term, together with a habitable planet for all the species.

In order to achieve sustainability, the requirements under the three pillars of sustainability, equity, the environment and economics, are to be fulfilled. These demands must be kept in balance in order to ensure that none of them dominate unfairly over the others, as this would result in a vulnerable system where the dominant pillar over-exploits or undermines the functioning of the others. (Campbell, 1999, in Satterthwaite op. cit.). This is reflected in our current experiences of negative impacts, such as global warming and climate change.

For cities to become sustainable they need to fulfil the social needs of citizens, protect the natural environment and grow the economy. These needs can be fulfilled through the four types of capital which are human, natural, manufactured and financial capital. (Campbell, 1999, in Satterthwaite op. cit.).The brown and green agendas can also contribute to these transitions, with the brown agenda focussing on social issues while the green agenda focusses on decreasing the environmental impact of urban based production, consumption and waste generation on natural

resources and ecosystems and thereby on the world's life-support systems (du Plessis, 2002). See Table 2.6 below for a comparison between the green and brown agendas.

Table 2.6 - Differences between the Brown and Green Agendas in Sustainable Development. (du Plessis 2002: 10)

	Brown	**Green**
Key concern	Human well-being	Eco-systemic well-being
Timeframe	Immediate	Delayed
Scale	Local	Local to global
Concerned about	Low-income groups	Future generations
View of Nature	Manipulate and use	Protect and work with
Environmental services	Provide more	Use less

Sustainable development

Sustainable development needs to take into account the equity principles (Haughton, 1999 in Satterthwaite op. cit.) which fall into the two categories of people or the environment. The social equity principles encompass intergenerational (futurity), intra-generational (social justice) equity, and procedural equity. The environmental equities relate to transfrontier responsibility or geographical equity and interspecies equity. (*ibid*.). Unfortunately the goals of environmental sustainability are not necessarily compatible with those of economic and social sustainability (Goodland, 1995). Economic sustainability's goal is to alleviate poverty and thereby to improve social sustainability. Just as the principle behind economic sustainability is to live off interest rather than the capital, so it should be for social and environmental sustainability. (*ibid*.).

Urban sustainability is a multi-dimensional problem that requires a systemic, *holistic*, integrated and participatory approach (du Plessis, 2002). This approach should include the following seven essential dimensions. The economic dimension provides work and wealth to the citizens for sustainable livelihoods. The social equity aspects entail a sustainable urban society that contributes social unity and social harmony, and an empowered citizenry that maintains a sustainable urban democracy. In terms of the environmental components, sustainable urban shelter, proper affordable housing for all, a sustainable urban environment with steady ecosystems, and sustainable access to the city through resource-responsive movement are required. These economic, social and environmental aspects all contribute to a sustainable urban life or the liveability of city. (*ibid*.). The Liveable City or its Quality of Life is measured yearly and reported by The Economist's Intelligence Unit's Global Liveability Ranking (see Appendix E).

In terms of the sustainable development of cities, Agenda 21 or The Earth Summit's Agenda for Change (UNCED, 1992) is a programme of action which emphasises the important role of local authorities in producing sustainable development and appeals to local governments to confer with key participants and reach a agreement on local approaches for attaining the goals of Agenda 21 (Leitmann, 1999).

2.4.2 Sustainable cities

Arising from the ongoing wave of global urbanisation, especially within developing countries, over 50% of the world population live in cities. This is expected to grow to over 80% by 2050 (Global Footprint Network, 2016). On the other hand, cities occupy 3% of the earth's land surface, use 75% of natural resources, produce 50% of global waste and 80% of global GDP, and are responsible for 60-80% of global GHG emissions. (UNEP Global Initiative for Resource Efficient Cities, 2016).

In order to determine a city's sustainability there are various markers of which leaders in *sustainable city transitions* need to be aware. Some of these *metaphors* indicate the manner in which the city's *urban metabolism* operates (Girardet, 1999

in Satterthwaite op. cit.), its *carrying capacity* (Rees, 1999, in Satterthwaite op. cit.) and its *ecological footprint* (Rees and Wackernagel, 1999 cited in Leitmann, op. cit.), which in turn indicate to what extent the city is operating sustainably. The city's settlement pattern interactions (du Plessis, 2002), its human development index (HDI) (see Appendices F and G) and its liveability factors (see Appendix E) benchmark the city's inhabitants' quality of life and thereby how sustainable it is. These factors are, however, not the focus of the study but are essential knowledge for the sustainable city leader in creating the vision for the future city. An understanding of what constitutes an unsustainable and a sustainable city is also required and a short outline follows.

The undesirable present state of cities – the unsustainable city

Cities are currently deemed to be unsustainable because they are reliant on distant, rapidly decreasing sources for the basic essentials of food, water, energy and materials. As a result, they have severely harmed the wellbeing of their hinterland eco-systems on which they depend, and their social systems have been severely weakened, thus reducing their liveability (Berg 1990 cited in Haughton and Hunter, 1994).

These factors have resulted in important environmental problems in cities which are access to environmental infrastructure and services, pollution from urban wastes and emissions, resource degradation, and environmental dangers. The underlying causes are often deemed to be an absence of public awareness and involvement, insufficient governance, poor policies and deficient or inappropriate understanding of the underlying dynamics (Leitman, 1999).

The main reason that cities have become unsustainable is because they have lost their sense of a "connection to the land" on which they depend for their resourcing. As this disjointedness developed, the more remote the consequences of their citizen's choices and lifestyles on the environment became. People in cities have only limited understanding of how to grow plants or how the food they eat arrives at

their supermarkets. As long as there is food, citizens deem it unnecessary to factor the mechanism of how the food got there, into their choices and *decision-making*. This connection now needs to be restored and each inhabitant needs to take responsibility for their choices and actions. Another reason that cities continue to be unsustainable is that people are unwilling to change their behaviour even after the pre-requisite understanding manifests. Instead, they are more prone to engage with extended periods of denial followed by procrastination.

Although it is generally accepted that cities cannot be completely sustainable without reliance on the outside world, their pattern of development does have an impact on sustainable development (Satterthwaite, 1999) at a regional, national and international level (Leitmann, 1999). In spite of the growing awareness of a vital and fundamental policy direction for sustainable urban development through ongoing urban economic and environmental self-reliance, it is unlikely that total self-reliance at urban or national scale can be achieved or that it should become a desirable future goal (Haughton and Hunter, 1994). Even though self-sufficiency can contribute to a sustainable city, it does not necessarily mean that a city that is self-sufficient will be sustainable or vice versa. Currently, most cities are not self-sufficient due to the ongoing trend of globalisation. They are dependent on several resource networks spanning all over the world for their goods and services. For a city to be self-sufficient it should have local access to food, water and energy as the primary resources. It is important to note that in today's world, sustainability goes beyond the local and includes a city's relationships to networks external to itself (Haughton and Hunter, 1994).

The desirable future state of cities – the sustainable city

A sustainable city is one in which its citizens and businesses constantly try to enhance their natural, built and cultural environments at local and regional levels while contributing towards reinforcing the objective of global sustainable development (Haughton and Hunter, 1994). In addition, a city that operates so that all its' inhabitants are able to meet their own requirements without jeopardising the

well-being of the natural world or the living circumstances of others, now or in the future, can be deemed to be operating within the sustainable city paradigm (Girardet, 1999, in Satterthwaite op. cit.).

The city's sustainability pertains to its pursuit of longevity and resilience (Haughton and Hunter, 1994). Besides its aims in the present to provide an adequate livelihood or productive assets for its habitants, it also needs to provide economic security when its citizens are unemployed, ill, disabled or otherwise unable to earn a living. From a social, cultural, environmental and health perspective, the city should provide shelter with amenities, and be free from hazards. Political needs and aspirations are met through freedom to participate. (Satterthwaite, 1999).

In terms of the future needs of the city, the utilisation or waste of non-renewable resources must be minimised, sustainable consumption of finite renewable resources must occur, biodegradable wastes must not overburden the abilities of renewable sinks and non-biodegradable wastes or emissions must not overstrain the limited ability of local and global sinks to absorb or dilute them without unfavourable effects (*ibid*.). Equally the bioregions of cities need conservation measuring in the present and the future. This is primarily the element on which cities are most dependent and on which their long-term resilience is reliant. (Leitmann, 1999).

This means that the city's *urban metabolism* which refers to the flow of resources into the city, their conversion or transformation and then their flow out of the city as wastes, must no longer be linear as is the case in the unsustainable city, but rather be circular in nature. Most cities have linear metabolic systems whereby outputs are disposed of as wastes and not used as inputs for other processes. In a sustainable city the metabolism behaves much like those in nature and is characteristically circular which assures the long term feasibility of the rural environments on which they depend (Girardet, 1999 in Satterthwaite op. cit.). Outputs will need to be inputs into the production system, as shown in Figure 2.13 below.

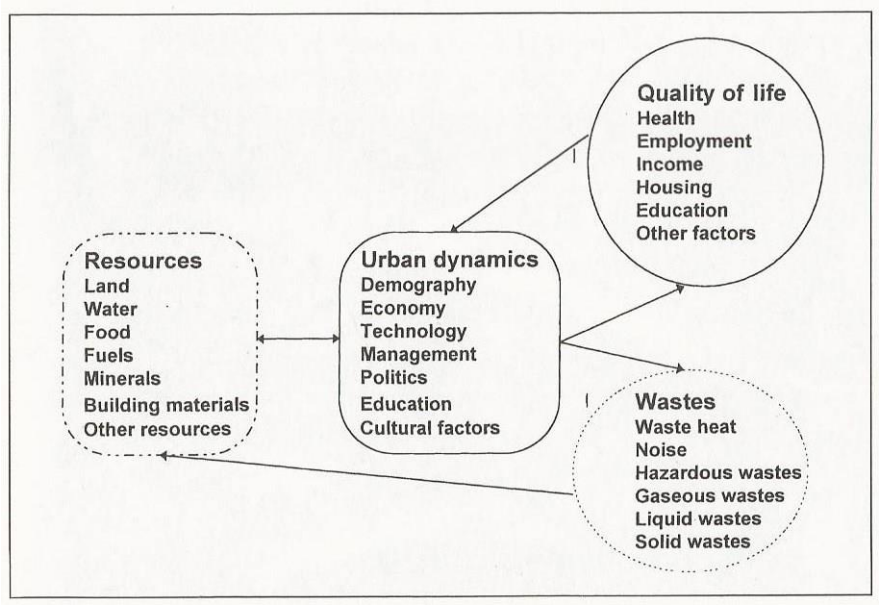


Figure 2.13: Urban metabolism diagram. (Modified from Newton 1997 in Leitmann 1999: 39).

Cities become sustainable cities when they do not exceed their c*arrying capacity*. This is defined as the population of a stipulated species that can be sustained indeterminately in a particular environment without permanently harming the ecosystem upon which it is reliant. For human beings it can be understood as the maximum amount of resource utilisation and water discharge that can be supported indefinitely in a specified region without increasingly weakening the functional integrity and productivity of the relevant ecosystems (Rees, 1999, in Satterthwaite op. cit.).

The city's carrying capacity is related to its urban *ecological footprint* (see Figure 2.14) which is the total amount of the earth's surface necessary to support a city's level of consumption and assimilate its waste products (Rees and Wackernagel, 1999 cited in Leitmann, op. cit.). It is the geographical measure of an urban population's demand on natural capital (Leitmann, 1999). Leitmann (*ibid*.) draws several conclusions from footprint analysis. These are that urban 'self-sufficiency' is impossible and a city cannot live off of its physical area. The geographical location does not equal the ecological location of a city and its ecological reach will always be

larger than its administrative boundaries. However, the objective is for cities to become sustainable and not necessarily self-sufficient.

Figure 2.14: Ecological footprint of a city. (Earth Overshoot Day, 2016)

Given that a sustainable city constitutes a dynamic rather than a static state to be conquered, the over-riding factor is how cities could better contribute to overall sustainable development for the continued well-being of humanity, within the ever-diminishing resource opportunities (Leitmann, 1999).

Cities have inherent advantages over rural areas due to their concentration of people and on-going innovations in their socio-economic and political order. This means that higher urban densities translate into lower costs per household for services such as healthcare and education as well as a reduced demand for land relative to population size. This perpetual promise of increasing efficiency in the use of resources needs to be intensified to cover emerging needs such as the reduction of fossil fuel use and resource consumption. The ever-increasing level of resource consumption in middle and upper income households living in rural areas, small

towns or cities constitute the key driver to our prevailing trend of unsustainable cities (Satterthwaite, 1999). Increased urban density reduces the footprint associated with housing type and urban transport (Leitmann, 1999).

The rapid development of the social economy of cities has yielded a distinct advantage to city living. It occurs at a local level within the city and creates a concentrated structure of relationships that allows citizens in the same area to work collectively in recognising and taking action on local problems, therefore significantly contributing to city life as well as to its resilience (Satterthwaite, 1999).

In addition, cities play an important role in stronger and more stable national economies, which in turn lead to improvements in overall standards of living. As an example, the average life expectancy grew with increasing urbanisation globally. However, in the long-term, population growth tends to be negatively correlated with urbanisation, as generally higher levels of urbanisation tend towards a drive for fewer children per household.

2.4.3 Transitioning the gap between the unsustainable and the sustainable city

Frameworks and governance

In order for cities to move from an unsustainable to a sustainable city state, various factors need to be addressed through steering the city towards a more favourable trajectory.

Institutional and regulatory frameworks are required by democratic and answerable city and municipal authorities to safeguard the social, economic and environmental needs of their constituents (Satterthwaite, 1999). These types of frameworks should address the brown agenda issues related to the health of citizens such as controlling infectious and parasitic diseases and the resultant health problems. In addition, chemical and physical hazards within the home, workplace and wider city must be reduced. (Satterthwaite, 1999).

The green agenda factors include attaining a high quality city environment for all residents and the protection of the natural and cultural heritage (*ibid*.). This requires the mitigation of the tendencies to transfer environmental costs of cities or consumer groups to other groups, ecosystems or to future generations and thus facilitate transitioning towards "sustainable consumption." (*ibid*.). Energy conservation in all sectors must be systematically pursued, the need for energy-driven heating or cooling in buildings minimized and settlement patterns should aim to restrict the need for the high levels of private motorised vehicle use. They also need to encourage the efficient use of water within all sectors, promote the reuse of waste water which together can diminish the probability of water scarcity. (*ibid*.).

Good governance is also required to ensure that cities make use of all the advantages cited above, and construct and implement the frameworks that deal with the issues as described. Without good governance cities become centres of pollution and waste, unhealthy and dangerous (Satterthwaite, 1999) and thereby unsustainable.

Leadership in sustainable city transitions

Cities have been in continuously transitioning states since their emergence in human civilisation. In order to ensure their resilience, they have had to adapt and transform to new and ever-changing circumstances. There have been leaders who have served central roles towards the changes of cities. Robert Moses and Jane Jacobs in New York are examples, but through contrasting perspectives (Flint, 2009).

Moses used his positions within New York's governing structures coupled with federal funding to steer the adaptive changes he wanted to pursue for the city (*ibid*.). He was a man of vision who promoted the advent of the motor vehicle over that of public transportation. In the process, he destroyed many neighbourhoods in order to accommodate the highway system across and out of the city. His actions had many far reaching consequences but they did improve the infrastructure and averted serious economic downfall for the city. Moses also developed the parks system, thereby increasing the city's liveability. He used a top-down authoritarian

style to influence those around him to implement his visions (*ibid*.), which is a very different approach to leadership than that practiced by Jaime Lerner in Curitiba, albeit several decades later.

The negative impacts of Moses' plans affected Jacobs' neighbourhood because of the proposed extension of Fifth Avenue through Washington Square Park, which would later encompass an urban renewal project for Greenwich Village (*ibid*.). Jacobs found this unacceptable and organised a bottom-up method to oppose Moses' plans by engaging with citizen groups. By using a *collaborative* approach, Jacobs' agenda was successful. (*ibid*.)

Cities today are no different with regard to their need for change and transformation, but now have to deal with the negative consequences of decisions taken earlier in their histories, when the impacts were unknown or regarded as inconsequential. Some of the cities that have made the transition to sustainable development include Singapore, Curitiba and Chattanooga (Leitmann, 1999). Their common success factor is that they had at least one public and/or private entrepreneur who championed the changes required for sustainable-city transitioning. The robust, creative and reliable political leadership of the respective leaders brought about many benefits to their cities. This type of long-term visionary-focussed leadership has frequently manifested in a single person such as Singapore's former Prime Minister, Lee Juan Yew and Curitiba's former mayor, Jaime Lerner (*ibid*.). Their successes may be due to their possession of qualities similar to entrepreneurial leaders who are risk-takers and who are motivated by a self-assessed high probability of success and fulfilment (*ibid*.). It is interesting to note that entrepreneurship has been recognised as one of the main factors of successful urban development in the United States (Garvin, 1995 cited in Leitmann, 1999).

Leaders who operate in the city sector need to adapt to the changing circumstances where electricity, water, food and fuel are no longer bountiful or reliably available resources. Growing and diverse populations require innovative stewardship to ensure that resources and infrastructure will keep up with the population's changing demands.

The essential elements for sustaining urban development in the 21st century entail the need to address fundamental problems, deal with underlying causes, design with nature, share, adapt and replicate successful approaches, and to humanise cities (Leitmann, 1999). Clear sets of criteria, objectives, indicators and least-cost solutions need to be developed. These objectives can be attained through seeking win-win solutions, using a combination of instruments, empowering stakeholders, internalising the elements of good governance, implementing and learning over the long-term, and using the market as well as nature (*ibid*.). These are the approaches that have been used by leaders towards transitioning their cities from the *status quo* to sustainable city states.

Leaders must recognise and build capacity and be aware of the tensions that occur (*ibid*.) in dealing with sustainability issues in cities. These include the short vs long-term considerations, trade-offs between environmental, economic and social concerns, complexity of systems versus simplicity needed for sharing and communicating the required interventions and urban versus rural concerns. The false dichotomies such as analysis versus process, centralised versus local approaches and integrated versus sector-specific solutions, need to be understood (*ibid*.) and mitigated where appropriate.

The nine most effective positions to intervene in a system such as a city and to change its goals, rules and feedback structures, are the mind set or paradigm, the goals of the system, the power of self-organisation, the rules of the system, information flows, driving positive feedback loops, regulating negative feedback loops, material stocks and flows, and market rules (Meadows, 1997 cited in Leitmann, 1999). Ultimately, the most effective way to ensure sustainable transition would be to change people's mind sets. This requires someone to introduce change in the system in order to modify behaviour that would in turn lead toward more sustainable cities in this century (*ibid*.). This should constitute the most crucial role of the leader for a sustainable city transition today.

Leaders need to guide people towards their sustainable city vision and nudge them in order to facilitate/engender a change of mind sets and decision making in favour

of more responsive lifestyles and behaviours. They will need to target the values on which choices and decisions are made and also convince people that these values need to be reassessed, if the transitions are to be pursued and attained (Du Plessis, 2002).

One of the critical insights of this challenge is that the process cannot lead the vision. Instead, the vision has to lead the process in order to ensure coherent pursuit of the goal (*ibid*.).

Curitiba as an example of a sustainable city

Geographically and demographically, Curitiba is approximately the size of Johannesburg. It is the capital of the Parana state in Brazil and is also now recognised as the ecological capital of Brazil.

In the late 1960s the city had a population of 800 000 and was headed towards being a car-dominated city with traffic congestion, air pollution, urban sprawl and insufficient infrastructure in its future. However, due to a number of factors, it developed into a city which gave preference to public transportation, worked with nature rather than against it, used relevant as opposed to high-technology solutions and innovated with citizen involvement instead of master planning. (Leitmann, 1999).

The approach in Curitiba was to integrate transport and land-use policies. Higher densities were planned for around major transportation corridors. An emphasis was put on efficient public transportation which was faster and cheaper than those in other Brazilian cities. Flooding was controlled through the protection of natural drainage systems, conversion of riverbanks to parks, and construction of artificial lakes to contain floodwaters. Solid waste management occurred through curb-side collection of recyclables and a central separation facility, participation of the informal sector in waste management and the purchase of waste from poor neighbourhoods. Institutional capacity was developed through an innovatively conceptualised urban planning institute and incentives offered for private sector

involvement in management and through public participation and transparency. (*ibid*.).

In 1972 the mayor of Curitiba, Jaime Lerner, and his team wanted to convert a major downtown street into a pedestrian corridor. Although the shopkeepers and motorists were initially against the proposal, it was converted within three days over a weekend. The shopkeepers and motorists planned to protest by using cars on the street but Lerner, in anticipation, supplied enormous sheets of paper which were unrolled on the street for children, whom he had invited, to paint on with watercolours. This is an activity that continues to this day on Saturday mornings in Curitiba. Business along the street improved after an initial decline and real estate values increased. The pedestrian street was such as success that ultimately the shopkeepers wanted it extended. (*ibid*.).

Lerner and his team developed what is now known as a rapid bus transport system because it was not as costly to develop as an underground train system. Public transport was integrated and run by separate operators paid by the municipality on a per km basis (Lubow, 2007). A flat fee was introduced and all were encouraged to use the system. Motorists benefited from reduced congestion, faster travel times and the option of leaving their cars at home in favour of a highly efficient public transportation system. (Leitmann, 1999).

Lerner used demonstration to convince people of something that they did not want and did it quickly. The strategy was to have a city that was not for cars, to admit only non-polluting industries and to include green space in the industrial district. The city has many recreational parks with lakes that catch excess run-off in the low-lying areas that flood occasionally. Waste recycling was another focus of their strategy. In areas that waste trucks could not access, people were encouraged to take it to collection points where four pounds of waste was traded for one pound of vegetables, money or bus tokens. (Lubow, 2007).

With all these initiatives, Lerner and his team managed over time, to change the course of their city and therefore the transition from being unsustainable to

becoming a sustainable city. They analysed the problems facing Curitiba and reconceptualised its course to a more desirable future. This transition, however, would not have been possible without Lerner's dedication to bringing about the needed change.

2.5 Conclusion

The link between creativity and leadership has been demonstrated through the commonalities versus differences between the actions and attributes of creative people and leaders. Creativity can help leaders to be more effective in dealing with novel problems. Leaders continually seek to improve their progress, as well as that of their organisation. The iterative nature of creativity and leadership were not reviewed in detail under this section. However, the differences in terms of the social and contextual aspects can be set aside when one considers the work of creative people such as architects who often work in organisational contexts and implement their visions through the actions of other people.

Even though creativity has been identified as an important attribute and skill for leadership, it has not been systemically pursued as a process or core capacity for leaders. Instead leadership is still predominantly viewed in terms of personal characteristics, traits, values and attributes. Creativity in organisations is still viewed as a function of product innovation rather than as an overarching process that can be implemented at all levels of the organisation to bring about innovative change and improvement.

The complexity of creativity and leadership indicates the difficulty that could arise by marrying these two capabilities. Leaders need to manage the complexity of their role as leaders, as well as the complexity of the creative process. This aspect is not addressed in the literature.

There are many aspects affecting the transition of cities to sustainable futures. The key role falls on leaders who have to initiate the changes and incubate the vision of

what needs to be attained. An understanding of all the issues that cities face is required in order to determine the goals for the city. The appropriate structures need to be created so that the pursuit of sustainable city goals can be achieved. Without coherent co-ordination across all these factors, attainment of the vision would falter. This is the insight and lessons that Curitiba's transition to a sustainable city over several years, offers for other cities and their leaders now aspiring to similar goals and transition journeys.

The core issue being investigated in the study (and also linked to the working hypothesis) is: how does the similarity between creativity and leadership guide the enhancement of leadership skills? Could the manner in which architects are inducted guide a more systematic induction of leadership competencies compared to the prevailing "trial and error" approach and aid leadership in *sustainable city transitions*?

CHAPTER 3

RESEARCH METHODS

3.1 Introduction

This chapter discusses the research method used in this study. This methodology is exploratory in nature, as it pursues an understanding of the creative process and attributes used in architectural design and leadership processes to be applied to *sustainable city transitions*.. The research approach is discussed, followed by the research methods. The case study is the primary research method used, with ethnography and phenomenology as secondary methods. The selections of primary and secondary sources are discussed followed by the data collection tools which include interviews and self-ethnography recordings as primary data collection tools. Secondary data were sourced from books, journals and interviews accessed on the internet. Data analysis and interpretation pertain to the analysis according to the creative stages as discussed in the previous chapter. Ethical considerations and research limitations of the study are examined at the end of the chapter. Figure 3.1 below gives an overview of the research method used in the study.

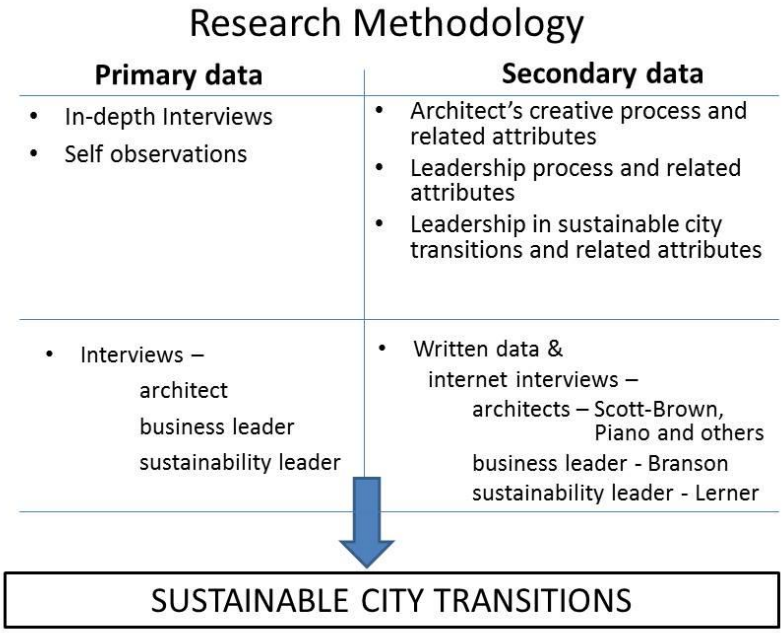


Figure 3.1: Research Method

3.2 Research Approach/ Design

The key factor guiding the research approach was to discover the underlying processes and attributes used by architects in the creative process and those used by leaders in the leadership arena. In order to determine how these processes are inducted it was deemed necessary to interview selected participants in each category. For this reason, a qualitative research approach (Creswell, 2009) was pursued.

A literature review, as presented in Chapter 2, was undertaken in order to ascertain previous works and views on the topics pertinent to this study and which would inform the questions for the interviews. The literature review covered the creative processes used by architects, leadership theories and sustainable city factors amongst others.

A case study research method was embarked upon which included identifying primary sources to be interviewed under the three categories of architect, business leader and leader in the sustainable city sector. This was complemented with ethnographic and phenomenological aspects to the research. The above information was supplemented with secondary data sources relating to the same categories.

The multiple data sources used in the research approach were emergent in nature (Creswell, 2009) because the study captured the experiences of the interviewees as revealed through the in-depth interview process (*ibid*.). The intention was to gain a deeper understanding of the processes used by the individuals in their respective careers. With regard to the secondary sources, data was gathered from archived interviews accessed on the internet and written material in the form of books or journals.

The subjective approach is intrinsic to this type of investigation, especially with regard to the creative and leadership processes and cannot be approached from a purely objective stance (*ibid*.). Although a self-ethnography method, as guided in studies such as Alsop (2002), was considered for this study, scope and time constraints made it difficult to implement as a specific approach because the

required record-keeping needed to spread over at least a specific project cycle under my practice. Instead, a phenomenologically guided self-reflection across my practice-career in general was prioritized, as the more viable option.

The ethnographic method of the study pertains to the investigation of the behaviour of specific groups of people in order to determine how they accomplish certain tasks. Although observations were not undertaken, the interview process and the examination of secondary data enabled the researcher to uncover how specific groups of people work. Through this method, it then becomes possible to understand the processes typical of that particular group of people, which in the case of the study are architects and leaders. Figure 3.2 below depicts the overall framework for the research design as followed by the researcher.

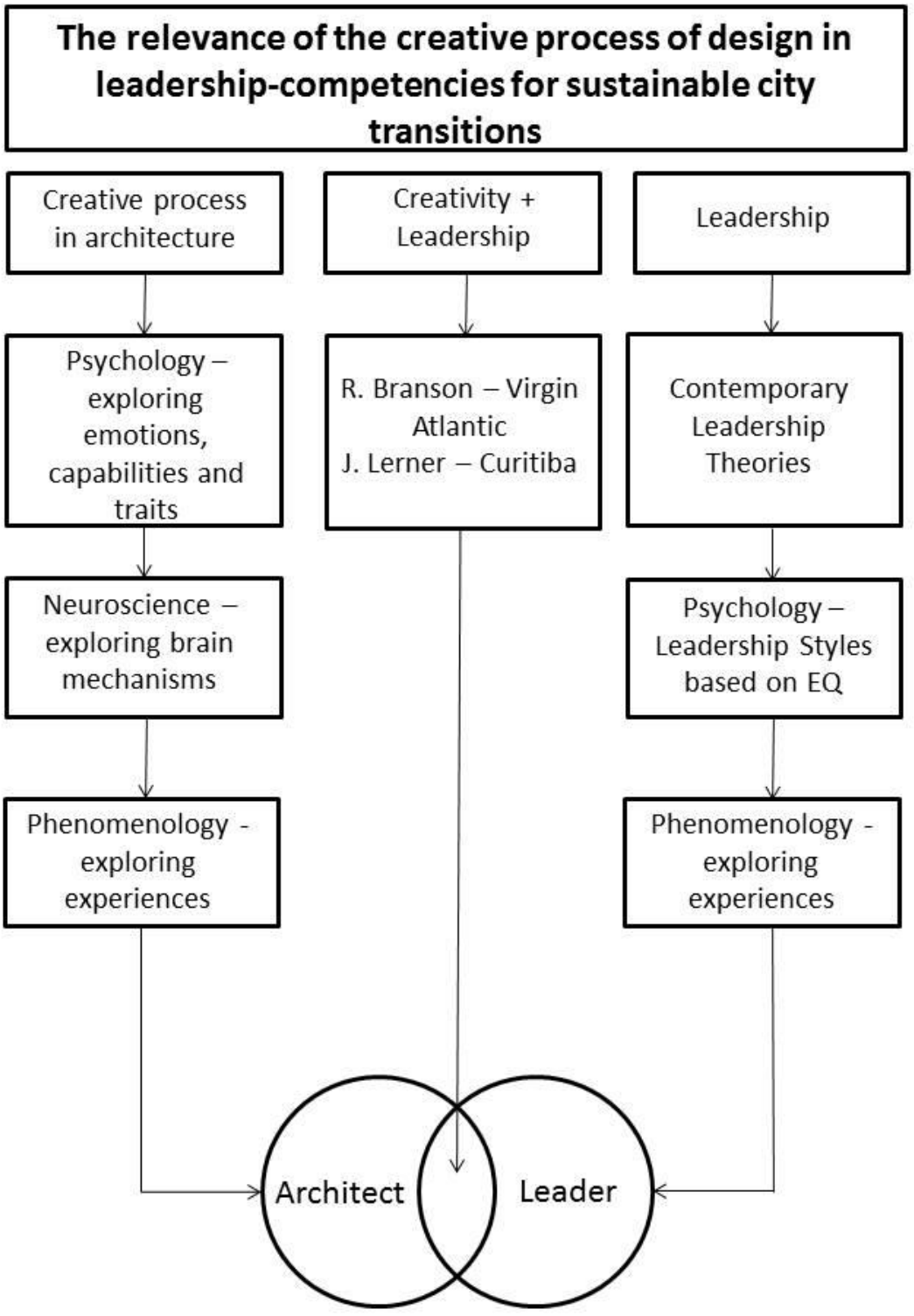


Figure 3.2: Research Design

3.3 Research Methods

3.3.1 Case study

The case study approach was used in this study and is applicable to qualitative research (Yin, 1994). Case study research "investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (*ibid*.:13).

This type of case study is of the exploratory nature as it seeks to develop a pertinent proposition for further inquiry (*ibid*.). The case study method was chosen because it is appropriate for in-depth analysis, studies whole units, as opposed to aspects of units and produces first-hand information (Sarantakos, 2005). It was also chosen because its outcomes can be generalised to theoretical propositions, although not to populations or universes (ibid.). However, with this study, the aim was to attain a theoretical proposition for leadership in *sustainable city transitions*.

This enquiry is an instrumental case study because it is used to inquire about a social issue and to refine a theory (*ibid*.). In addition, three case studies were selected in order to facilitate for comparative analysis towards the substantiation of the research question and aim of the study (*ibid*.).

During the research process, cognisance was taken of the difficulties resulting from case study methods which is often argued to lack rigour, take long and could result in big, unreadable documents (*ibid*.).

Sample selection for primary data

Purposeful sampling (Creswell, 2009) was used for the research under discussion. This is a type of sampling where individuals are selected by the researcher, on the basis of their experiences in relation to the subject being researched (*ibid*.). The sample members in this study were selected due to their expertise and experience in relation to the topic under investigation, architectural design and leadership. They were identified in terms of their positions and profiles as professionals in South

Africa. An architect, a business/entrepreneur leader and a leader in the sustainable city sector were identified as case study participants.

As part of the ethnographic method, the researcher was included as a primary source for the architectural process. Self-observations on a current architectural project were noted, together with memory recall of projects previously worked on.

Sample selection was delayed due to the unavailability of initially prioritised participants. Several female leaders were approached but one declined and the others did not respond. A leader in the sustainable city sector was also not available due to work commitments. However, alternative participants, the sustainable city sector leader and the business/entrepreneur leader, graciously accepted the invitation to participate.

The sample size was small, with three participants selected for the research study under discussion. This allowed for in-depth interviews and analysis. The architect, Archie, chosen for the interview, dealing with the creative process which is followed by architects, has many years of experience in the architectural field and in academia.

The business leader, Bussie, was selected due to her leadership position in her own company and in her later role as a leader within a larger corporation. The leader in the sustainable city sector, Green, was included in the study due to his experience in setting up an organisation affecting the standards of green building in South Africa

The three participants were very articulate and open in their responses. They explained their processes and experiences without reserve. Each had interesting views and perspectives which they shared with the researcher, and which led to an in-depth understanding of their leadership journeys.

Sample selection for secondary data

Secondary data were used to complement the data collected through primary data processes. In this way, data reliability and validity can be ascertained when secondary data is used to cross-check primary data (Lewis and Ritchie, 2003).

The secondary source architects were chosen as well-known international architects with a prolific amount of creative design work. Denise Scott Brown was identified as a key relevant source for the study due to her unique perspectives as a female architect, her writings on the design process and her background which includes town planning. Other female architects were included to obtain further insights into their views on architecture and the design process. Renzo Piano was selected as a key male architect with many completed projects which include "The Shard" in London, which was visited by the researcher in 2015. Additional writings by other architects were also reviewed.

Richard Branson as a world-renowned business leader and entrepreneur formed a key part of the study with regard to his creation of a new airline, *Virgin Atlantic*. Another secondary source is Moses from *The Bible* as a designated leader.

Jaime Lerner and his role in the transformation of Curitiba as a case study, was a secondary source for the leader in the sustainable city sector. In addition, the roles of Robert Moses and Jane Jacobs in the sustainability of New York City were included in the study.

3.4 Data Collection Tools

The main data collection tool for the primary sources of the case study method used, was the in-depth interview (Creswell, 2009). These types of interviews are semi-structured and guided by initially prepared questions whose primary aim is to highlight the scope and parameters for seeking input from those interviewed. (*ibid*.).

Interviews enable direct contact between the researcher and the interviewees and therefore offer some flexibility with regard to the direction of the discussion and also allow the researcher to explore further emerging perspectives which may not have been considered at the drafting stage of the interview questions. However it is imperative to keep the questions as a valid guide in order to safeguard against the risk of the interview deviating from its main purpose. (*ibid*.).

The initial questions were prepared for each category of the architect, the business leader and the sustainability leader, but the overall objectives were common to all the questions. These questions served as a guide during the interview, however additional or adapted questions arose during the interview (May, 2001). The number of questions was limited in order for the length of the interview to be approximately thirty minutes. Each interviewee was asked questions pertaining to their experiences in conceptualising and developing an idea from its undesirable status-quo to its maturation over time. See Appendices A - C for the interview questions.

The interviews were organised through their personal assistants. Two of the interviews were conducted telephonically due to the interviewees and interviewer being based in different cities. The third interview took place in person at the office of the interviewee. All three interviews took place within a month of each other at the beginning of 2016. The architect was interviewed first, followed by the business leader and then the sustainability leader. The interviews were audio-recorded and once transcribed, they were analysed and compared. In addition, the researcher took notes during the course of the interview. The interview was an effective type of data collection tool for this research as it allowed the time to develop a rapport with the participants and to explore the items discussed holistically.

Secondary data pertaining to the understanding and exploration of the architectural creative process entailed studying the writings of the architect, Denise Scott-Brown, and interviews of architects as accessed from the internet. These included interviews given by the world-renowned architect, Renzo Piano, and interviews given by female architects attending the Venice Biennale in 2014. The emphasis was on the design process and not on the particular style of the architect or the end product. With regard to the business/entrepreneur leader the study relied on Richard Branson's book, *The Virgin Way*, and on Moses' leadership role in *The Bible*. For the sustainability leader aspects, the data sources were books, journals and articles.

3.5 Data Analysis and Interpretation

Once the data were collected from all the sources, they were analysed and interpreted. A comparison between the interviews was made in order to find similarities and differences in the methods used by each respondent.

An inductive approach (Creswell, 2009) was pursued for the purposes of the study. In this way, the researcher can build patterns and categories from the bottom up (*ibid*.).The researcher used a coding system (*ibid*.) guided by the four stages in the creative process - preparation, incubation, illumination and verification - in order to analyse the data from the interviews, self- observations and secondary data. Initially, words were categorised into themes in relation to the creative process. This was then refined to phrases that were themed according to the stages of the creative process as discussed in Chapter 2. See Table 3.1 below for the creative stages analysed. This was then followed with an analysis of the attributes for each category under investigation - see Table 3.2 below. This process was implemented for each of the interview cases.

Table 3.1: Categories for data analysis pertaining to the creative process stages

Stages of the creative process:
Preparation – understanding the undesirable present state
Incubation – unconscious thought processes
Illumination – envisioning the desirable future state/ conscious thought processes
Verification – attaining the desirable future state
Reflections

Table 3.2: Categories for data analysis pertaining to attributes

Attributes required by interviewees :
Creative skills
Thinking/ drawing/ decision making/ thinking styles
Metaphor/ simile/ symbolism/ analogy
Technical skills
People skills
Leadership skills
Women perspectives

During the data analysis stage, it was important to concentrate on the meaning of what the participants were communicating about the issue (Creswell, 2009). This did not present as a major issue, as the participants were clear in their responses to the questions. The difficulty lay in the respondents not being explicitly aware of how they exactly conducted their roles that were under investigation.

Data from secondary sources were collected and collated in written format based on similar frameworks as the one applied for primary data interview questions (see Tables 3.1 and 3.2).

The analysis of primary and secondary data enabled the researcher to respond to the research question and sub-questions as mentioned in Chapter 1. Primary and secondary data are presented, analysed and interpreted in Chapters 4, 5 and 6. Chapter 4 is based on data relating to the creative process used by architects and their related attributes. Chapter 5 is mainly based on data on the leadership process followed by the business leaders together with related attributes and Chapter 6 is based on data on the sustainability leader's process in creating solutions to problems associated with cities, and related attributes. Chapter 7 consolidates the key sub-findings of the primary and secondary data in relation to the sub-questions in order to derive overall findings, as guided by the research question, sub-questions and working hypothesis.

3.6 Ethical Considerations

The study was directed by the ethical guidelines of the University of the Witwatersrand. The topic under research and the methods employed were not likely to cause any harm to the interviewees and they were treated with respect in the data collection (interview) stage of the study. The purpose of the research was explained by the researcher and the participants were informed that participation was voluntary and confidential. Confidentiality and anonymity were also agreed on with the participants. The purpose of the study was explained to the participants based on a written Participation Information Sheet and the consent of participants was then obtained via a signed consent form. All three participants consented to the audio-recording of the interviews.

3.7 Research Limitations and Validity

The limitations experienced during the conduct of this study were that the size of the sample was relatively small. However this was mitigated through the use of secondary data. The study and all the primary data collected pertained to the South African context, although secondary data included international sources. Due to time and financial constraints the researcher could not broaden the research to include a larger sample size.

The data in the case study method were subjected to the interpretations of the researcher. Although the researcher is an architect, which gave her in-depth understanding of the creative process used by architects, she attempted to remain objective during the interview and did not influence nor guide the responses of the participants consciously beyond the need for seeking substantiation on emerging issues from the interviews.

As stated above, although findings from qualitative studies are not generalizable, as in statistically-based studies, case study research based on multiple cases can be generalised to a broader theory (Yin, 2003). In particular, it is generally accepted that all architects follow a closely similar work process. Through this study the findings

are deemed to be generalisable towards assisting in the induction processes of leadership for *sustainable city transitions*.

3.8 Conclusion

This qualitative research was undertaken through the use of case study research methods which were supplemented with secondary data from various sources. Three case studies were central to the study and in-depth interviews were used as data collection tools and proved to be effective for this research. The phenomenological and ethnographic aspects of the study formed the underlying basis of the study, on which analysis and coding were based. These aspects are dealt with in greater detail in Chapters 4, 5 and 6. The key findings of the primary and secondary data analyses were consolidated with the intention of responding to the research question.

CHAPTER 4

THE CREATIVE PROCESS IN ARCHITECTURAL DESIGN

4.1 Introduction

This chapter investigates the process followed by case study architects from the start to the end of a design project which entails the *realisation* or manifestation of a building from the initial or early inputs to the complete and occupied building under operation.

Each stage is examined in detail and includes an analysis of the creative process incorporating the four stages of creativity as discussed in the literature review combined with the *conceptual* and *realisation* stages (Nalkaya, 2012) and *backcasting*. The actions within each stage are discussed and thereby the mapping of the process is evident at the close of the chapter in order to understand the architects' journey through the process. For the purposes of the study the process is appraised from the creative process point of view as opposed to the conventional stages that architects follow during the course of their work, as prescribed in contract agreements such as the Architect-Client Agreement (SAIA Client-Architect Agreement, 2008). In addition a brief investigation was carried out to determine whether female architects experience the process differently to their male counterparts.

Initially, a brief overview of the information gathered from the architect interviewed as well as self-ethnography and secondary sources have been presented. The interviewed architect described his views and approach to design which included his team's involvement in the process. In my synopsis, I explain my process as a sole practitioner who is involved directly in every step taken. Several pertinent sources were appraised for secondary data, which are presented and analysed in later sections of the chapter.

The overview is followed by the data analysis whereby information was extracted from the interview, self-reflections, video recordings and the secondary source

literature. Key concepts were identified in order to determine how they relate to the creative process. Comments by interviewed individuals were also analysed in terms of the experience of the process as well as their reflections and skills utilized throughout the process. These data were captured in tables as presented in this chapter.

The sub-findings and initial conclusions were generated from the analysis in order to understand how the creative process of design develops from the individual's vision to the collective *realisation* of the project. This is a complex, multi-step, iterative, cyclical, and emotional process which requires many skills and intense collaboration with many individuals, each contributing unique and diverse skills to the process.

4.2 Data Overview

4.2.1 Primary sources – interviewed architect

The architect interviewed (Archie, 2016) indicated that the architectural design process brings to the fore a product that serves a purpose which differentiates architecture from the other arts. He describes the creative process as an *iterative* process between the purpose of the building and the spaces and forms that are being imagined. He states that the relationship between form and purpose is fundamental to the creative process in architectural design.

Archie (*ibid.*) and his team do a careful *analysis* of their client's needs, after which the process of drawing begins. Many drawings are produced from which the ideas for the building and its components emerge. He describes this stage of the process as "thinking through drawing" and compares the process to an excavation an archaeologist undertakes, but the architect excavates with a pencil through the process of drawing – one layer over another. Architects realise their imagined thoughts through drawing and through this process, the ideas emerge and then evolve until something materialises in a manner that satisfies the needs of the site, programme, and other parameters.

Ideas are realised through the act of drawing. There are many ideas in the mind especially from one's experiences, which serve as the repository of information that one draws from when designing. He explains that the ideas in one's head have to do with one's history, one's background, upbringing, the books that one has read, and the buildings one has visited, amongst others, all of which are floating in one's subconscious.

Archie (*ibid*.) often feels stuck during the process but advises that one needs to remember that the decisions one makes are not 100% correct or incorrect. He believes that the drawing process plays out any contradictions as they cannot be resolved in the mind but through the act of drawing. He and his team then translate the ideas from hand drawings into a three dimensional model which is realised through a computer software called Revit. The model is continually adjusted as they work through the *iterative* process of design, which entails layering more and more drawings until at the end of the process, when they have a three dimensional model that comes closest to what had been envisioned initially.

The design process continues through the refinement and construction stages of the project until the building is handed over to the client. Archie (*ibid*.) considers the construction phase to be important in the *realisation* stage of the design process as there are many things that are initially conceptualised in "provisional terms" and, therefore, can be improved upon, during the process of construction. Accordingly, the process of construction is as important to the creative process as the drawing and technical documentation processes. His team do all of the "supervision" of the work on site themselves, because he believes that the architect needs to be continuously involved in the process if one wants to make a good building.

When the building is completed the architect hands it over to the client to use as the client wishes. It occurs often that the client uses spaces in very different ways to those envisioned by the architect, but this is part of the development of the design and the architect releases the building to exist as its own entity under someone else's hands and care. Archie (*ibid*.) notes that the design is completed when the keys are handed over to the owner.

He depicts the process as unpredictable and difficult which is due to the many, sometimes conflicting, requirements, the many key players involved in the process and the inherent demands of the creative process. It can be smooth at times, but at other times, also long, arduous and time consuming. It is a process of discovery through drawing. He further states that throughout the design process, he and his team build on a process of critical judgment calls. He views architecture as not about solving problems but believes that architects make critical judgments, with reference to all the demands required and that there are no right or wrong answers. There are always competing demands that have to be reconciled, such as what the client wants and what is feasible or structurally possible.

4.2.2 Primary sources – self-ethnography

From my own perspective as an architect, when I design, I look at the constraints presented by the brief and the site. I look at examples of the same building typology and think about what the building needs to achieve. Orientation is always a factor, as well as access, form of the building and their relationships to one another. I produce sketches of the various ideas that come to mind after which they are examined. Invariably, I find that none of the ideas fulfils all the requirements. This lack of definitiveness/ certainty is always disappointing even though expected. I choose the idea that meets most of the requirements and "intuitively feels right." There is a measure of regret in letting some ideas go. Some of the abandoned ideas may re-emerge later in the process. It is difficult to commit to one idea, as there is apprehension that perhaps later in the process it may emerge as being not the most appropriate, and thus call for a re-set to an earlier idea, which had more options from which to select.

As the chosen idea is developed, the process repeats itself with each aspect of the design. There are always many possibilities but one must be chosen and the others weeded out. The design process is about continually making choices and decisions that are fraught with many possibilities and not knowing with 100% certainty which choice is likely to emerge as the best. These choices and decisions are often made intuitively based on a synthetic, rather than an analytic, mode of thinking.

Once the client accepts the conceptual design, the decision process enters the working drawings stages. If necessary other consultants give their input in the design which is then adjusted. The process repeats itself with each aspect faced. For example, when I designed a bathroom for a house renovation recently, I analysed the existing layout of the bathroom and determined what I wanted to achieve with the bathroom design. The concept entailed removing an existing structure in order to create a shower with a view into the adjacent courtyard so that one has the effect of showering in the courtyard but remaining inside. The rest of the design revolved around this concept and many iterations were developed in order that the other elements in the bathroom were not compromised. When I was satisfied that all the requirements were met, the drawings were finalised. This process occurs across all stages of the design.

When the drawings are completed they are distributed to the contractor for pricing and then for construction. I prefer to remain involved in the process of construction in order to guide the contractor when uncertainties occur and to gain an understanding of the issues that appear on a physical and tangible level and, thus, unlikely to manifest in thought and through drawing. Certain aspects of the design may change due to factors encountered on site or because of valid suggestions given by the contractor. The client may also change their mind and drawings may have to be revised. Once the building is completed it is handed over to the client.

4.2.3 Secondary sources

Belief, vision, *collaboration* and influence from and of many people are necessities for the architect's craft (Quddus, 2014). The various architects reviewed indicated how they start their design process and that the relationship between form and experience (*ibid*) is a key relationship to be considered when designing buildings (*ibid*). Architects' design processes start with determining the clients' needs (*ibid*.) which is generally captured in the design brief, from which architects translate the brief's requirements into a conceptual design and finally implement into a physical form (Scott Brown, 2009).

Architects use many tools to understand what is required from them in order to realise their vision for the project into a real artefact. They use good research which allows detailed handling of a project (Quddus, 2014) and examine the context in which the building will exist because it is an important aspect for architectural design (*ibid*.). Architects also view architecture as telling a story (Chin, 2014; Basulto, 2012). They employ various artistic media such as drawing (Scott Brown, 2009), collage (Quddus, 2014), painting, and computers (Serrazanetti and Schubert, 2011) towards developing their ideas.

Architects use associations when designing (Scott Brown, 2009). This helps to generate many ideas from which they can choose the most relevant. Ideas do not only develop while drawing or making models, but may also appear when architects are in a state of rest or doing a menial task like brushing their teeth or travelling (Chin, 2011).

4.3 Data Analysis and Interpretation

The primary and secondary data are analysed in terms of the four stages of the creative process as discussed in the literature review – *preparation, incubation, illumination and verification*. The *conceptualisation* and *realisation* phases as described by Nalkaya (2012) encompass these stages and the *backcasting* method is incorporated into them. In the analysis, these concepts have been combined and placed into the appropriate stage of the creative process.

4.3.1 Preparation – understanding the undesirable present state – primarily analytical and conscious thought processes

The initial step for architects on a project is to internalise the client's needs. This is done through conversations with the client, *analysis*, observation, investigation, identification, research, understanding, interpreting, visualising and drawing of all the parameters including the environment or context pertaining to the desired future state. Clients set out what is undesirable about the present state in which they are operating and give an indication of what they would like the architect to achieve for the new building. The intentions and criteria are captured in a document

called the brief. Architects identify this document as the beginning of the design process. The architect's challenge is to make a transition from words and an empty site to a functional building which is responsive to the client's diverse needs.

4.3.2 Incubation – unconscious thought processes

When all the needs and parameters have been identified and understood, the architect needs to conceptualise the building that will fulfil most, if not all of the needs identified. This *incubation* period is typically a passive time during which the architect processes all the information received. This time may be characterised by an inability to work or make progress. The architect disengages with or procrastinates from the process and takes up another activity unrelated to the design process. Ideas are left to settle during periods of silence. These activities may be reading, resting, sleeping, exercising, brushing teeth, travelling or other similar activities.

Architects are aware that the sub-conscious or *conscious* brain plays a role in the creative process since there are many experiences stored in the brain. The creative process entails making many associations which may be personal and/or poetic in nature. These associations may occur consciously and subconsciously. Architects use associations to connect the past and the future which is done through memory and the desire to invent or create something new. The arrangement and combination of the elements of a building occur largely unconsciously to the architect in the creation of the building form. (Scott Brown, 2009).

4.3.3 Illumination – envisioning the desirable future state - conscious thought processes

Illumination occurs when the solution idea emerges. This may occur while the architect is drawing or doing leisurely activities as occurs during the *incubation* phase. The design process requires the idea which is the basic spark from which the design process evolves. It is the vision that the architect realises for the future building. Architects intensions are to invent or create and make things in the future, which will improve on the circumstances of the owner and the users. The act of

design can be seen as an act of optimism and can therefore be argued that it aims to engender positive change or transformation.

The architects' intentions feed the vision. The building must fulfil its purpose and the relationship between form and purpose is critical to the vision. Architects intend to achieve something with their buildings. These intentions may be to build adaptable buildings or buildings that have cultural importance or are aesthetically appealing architecture (Archie).

The drawing process facilitates with the generation and refinement of ideas. The early sketches often show insights that do not typically appear in later drawings (Scott Brown, 2009), whereas other artistic media may also be used in the *conceptualisation* of ideas, drawing remains the key tool for architects. They use anything and everything they can to conceptualise and realise the vision for their buildings but ultimately, it is primarily through drawings that decisions are captured and shared with others in the design process.

4.3.4 Verification – attaining the desirable future state

Once the concept is defined and agreed upon it is translated into technical drawings, which play a crucial role at this stage as many ideas and options are drawn. It is through the process of drawing that ideas are selected, combined and refined until a satisfactory solution results. This process is then continued by translating the two dimensional drawings into three dimensional drawings or models. Again, many revisions or *iterations* result in order to resolve conflicting demands and issues. This part of the process may be *collaborative* in nature as several people including specialist consultants, may be working on different aspects of the same project. The design is influenced by many factors and people. Throughout this stage many decisions, choices or critical judgements are made to enhance the design of the building, which is guided by what is often termed as the architect's "blueprints".

The construction process forms an integral part of the design process. It is the stage where the building is realised on site. The involvement of the architects in this part of the process gives them control over what/how the building is to be built. At this

point architects oversee the full-scale *realisation* of the vision and can identify positive and negative factors in the design in reality. Through meetings, there is team dialogue with the engineer, contractor, sub-contractors and suppliers, as the design is implemented and if necessary modified. The building progress is supervised by the architect and/or team members and issues are resolved as they occur. Revisions and adaptations of design may occur due to unforeseen circumstances, such as services not fitting into the space allocated because what was envisioned on the drawing proves to be unfeasible in reality. The relationship with the contractor is a key factor at this stage because the architect can resolve and discuss issues with the contractor in order to attain exactly what was envisioned.

See Table 4.1 below for insights on key aspects of the creative process during the design and construction stages as determined from the primary and secondary sources.

Table 4.1: Insights on key aspects of the creative process during the design and construction stages.

OVERVIEW OF KEY INSIGHTS ON THE ARCHITECTS' CREATIVE PROCESS IN THE DESIGN OF BUILDINGS	
Preparation - understanding the undesirable present state	
Interview data - Architect - Design Process	
You cannot satisfy an appetite until you know what is needed to be satisfied	knowledge/needs
challenges in a world like we live in today of great change is how you make a building that is designed around a particular programme	challenges
of people's needs that is designed in such a way	needs
make spaces for your buildings in a certain way, that they are vigorous enough, and robust enough to be able to be adapted by people	robust, adaptable
we do a careful analysis of all the needs of our client – the kind of program, the kind of site they have	analysis of needs
Self-ethnographic data - Architect - Design Process	
Observed Georgian style house not renovated or maintained for substantial amount of time	observation
spend a lot of time doing research	research
Analysed the environment and realised not only to renovate the house but to change its style to its context	analysis of context
identifying what is not working	identification
listen to the client	listening
understands what is required, what others have done and what is not required	understanding
Drawing aids the process of understanding.	drawing to understand
Secondary data - Architects - Design Process	
Research based practice with good knowledge base and library to access information quickly (Quddus, 2014)	
Start with the brief – a word document that needs to be translated into built form (Scott Brown, 2009)	brief/ words
Engage in conversations with clients to determine needs, interests and what is in their hearts (Quddus, 2014)	conversations/ needs
the brief is the starting point of the architectural project (Scott Brown, 2009)	brief/ start
Words can be primary sources for creativity in architecture because they have infinite non-linear dimensions through the layers of association they invoke (Scott Brown, 2009).	words/ associations
The brief and context give the directions for navigating the transition from words to forms (Scott Brown, 2009)	brief/ context/ direction
Architects use everything at their disposal to understand and interpret and then to visualise (Scott Brown, 2009)	understand/ interpret/ visualise
Intentions and criteria are set which the final design must fulfil (Scott Brown, 2009)	intentions/ criteria
After bringing the design hypothesis into focus he starts investigating what already exists (di Battista, 2015)	focus/ investigates
Creativity works idiosyncratically and something initiates the process Scott Brown (2009).	

Table 4.1: Insights on key aspects of the creative process during the design and construction stages (continued).

Incubation - unconscious thought processes	
Interview data - Architect - Design Process	
Feels stuck - All the time,	stuck
There's a huge repository of ideas in one's head which has to do with one's history, one's background, upbringing as a child, the books that one has read, the buildings one has visited, etc etc.the books that one has read, the buildings one has visited, etc etc.	knowledge - history memory
And all of that is floating in one's subconscious.	subconscious thinking - history
Self-ethnographic data - Architect - Design Process	
Reflected on the client's needs and how to find the best solution for updating the house within budget	reflection
period of rest or doing something else such as exercise or watching television occurs	rest
Secondary data - Architects - Design Process	
He postulates that an architect is always connected to the past and the future through memory and invention (Basulto, 2012)	past/ future
An excess of tradition may paralyse one but a balance between gratitude for the past and desire of invention, curiosity for the unknown, is required (Basulto, 2012)	invention
It is because things get forgotten, that there is a space in which to create (Basulto, 2012)	forget
During the design process architects use whatever helps them which include their own personal and poetic associations (Scott Brown, 2009)	associations
creative cycles call for activities such as reading, thinking, impassioning, followed by sleeping or opening a new book (Scott Brown, 2009)	activities
Architects use vocabularies and grammars of form to arrange and combine the elements of buildings. This occurs largely unconsciously to the architect (Scott Brown, 2009)	form/ combinations
The procrastination period is the time they take to incubate ideas, that is, to consider divergent ideas (Grant, 2016)	procrastination/ divergent
marked by long silences while he tries to pinpoint an idea in his mind (di Battista, 2015)	silence
leaves the initial ideas to settle for a while (di Battista, 2015)	wait
Ideas may come when she is brushing their teeth or travelling (Chin, 2011).	activities

Table 4.1: Insights on key aspects of the creative process during the design and construction stages (continued).

Illumination - envisioning the desirable future state/ conscious thought processes	
Interview data - Architect - Design Process	
is through the process of drawing that ideas start to emerge.	drawing/ ideas
the creative process involves an iterative process between the purpose of the building and the spaces and forms that one's imagining	iterative relationship/vision
architecture is different from the other arts in as much as it has brought into being an order to satisfy a purpose	purpose - motivation
fundamental and implicit in any architectural design process is this relationship between form and purpose.	relationships
interested in making something that has cultural importance attached to it	cultural importance
– when we make plans we want our plans to be the way that we want them to be forever	future
that the act of design is always to build something in the future	future
it has to therefore, by its nature, be an act of optimism.	optimism
we are architects who make drawings of our intentions and then we see those intentions being built.	vision/ intentions
Our buildings can contribute towards change but we don't change things.	change
they look forward to building something for the future that is going to do something better in the future than what exists now	future/ vision
make spaces for your buildings in a certain way, that they are vigorous enough, and robust enough to be able to be adapted by people	adaptable
that what you have at the end of the process is a beautiful piece of architecture.	vision/ intentions
Self-ethnographic data - Architect - Design Process	
vision is to improve the design and experience of the users of the house	vision
Secondary data - Architects - Design Process	
architects need vision and to feel that one can do things better and have in-built optimism (Basulto, 2012)	vision/ optimism
architects use verbal images as heuristics when designing (Scott Brown, 2009)	verbal images
early sketches record the search for substance and can be the most revealing drawings in the process because they illustrate moments of insight and areas of resolution (Scott Brown, 2009)	early sketches - insights
They are done serially, represent great creativity, reveal precision and freedom and assist to develop the idea further. They achieve their artistry by indirection. (Scott Brown, 2009)	serially
Tasmin Shariff describes design as a process to come up with an idea (Quddus, 2014)	idea
Damiani (di Battista, 2015) indicates that design for him means research, experimentation, simplification, invention and responsibility towards	research, experiment, invent
After bringing the design hypothesis into focus he starts investigating what already exists (di Battista, 2015)	investigate
imagining a new life for an object represents the basic spark that sets off the whole design process (di Battista, 2015)	new life
Drawing is essential to visualising and conceiving in architecture – expresses a philosophy and a polemic (Scott Brown, 2009)	

Table 4.1: Insights on key aspects of the creative process during the design and construction stages (continued).

Verification - attaining the desirable future state	
Interview data - Architect - Design Process (continued)	
then it is a process of drawing and drawing many, many times	drawing
is through the process of drawing that ideas start to emerge.	drawing/ ideas
new possibilities emerge and you redraw and redraw it many hundreds of times, until something finally emerges that starts to satisfy all the	redraw/ needs
we are architects who make drawings of our intentions and then we see those intentions being built.	drawings/ vision/ intentions/ built
what we then do, is we start to translate those ideas into a 3D model which we make on Revit.	translate ideas/ model
continually adjusted as we work through the design process by drawing more and more	continually adjust/ iterations
make more and more adjustments to the 3D model	adjustments/ iterations
until at the end of that process, we have a 3D model that is exactly what we need	needs
We build on a careful process of critical judgment calls through the process of design.	judgment process/ making decisions
Architecture is not about solving problems. We make critical judgments.	decision making
process of construction is an important part of the design process	construction
building - important part of the design process	building
we do all of the supervision of the work ourselves	supervision
architect needs to be continuously involved in that process if you want to make a good building	continuous involvement
if we want to make good buildings we have to be as much involved in the process of construction as we are in the process of design,	involvement in whole process
the creative process involves an iterative process between the purpose of the building and the spaces and forms that one's imagining	iterative relationship/vision
and then people come in and they pick our buildings around and change them in other ways.	change
to satisfy all the needs, the conflicting needs and demands of program, site and form etc.	satisfy needs - conflicting co ordinate
The good designer is someone who can reconcile those conflicting demands	skill - reconciliation
Self-ethnographic data - Architect - Design Process	
Design the changes and develop sketch designs for client approval and working drawings from which contractor can build	drawings
Appoint contractor and sub-contractors to implement the changes	contractors
Choose materials such as tiles, paint colours, sanitaryware, ironmongery etc	materials
Meetings with contractor, sub-contractors and engineer to ensure that the design and its essence were being followed and to monitor progress	meetings
Deal with conflicts and issues on an ongoing basis	conflicts
Secondary data - Architects - Design Process	
During this process architects think and draw their understanding of the parameters (Scott Brown, 2009)	think and draw
Words and sketches in the initial stages of design are appraised only if they determine the efficiency of the building process or quality of its outcome (Scott Brown, 2009)	appraisal
The end-design must pass the test of usability (Scott Brown, 2009)	usability
Construction is a fundamental part of architecture and is an incredible mix of different disciplines. Architecture is the art of making things piece by piece (Basulto, 2012)	consturcition/ making
work out his solution in more depth and establishes its character. Drawings and models do the rest. (di Battista, 2015)	solution
Architects use various media to develop their ideas such as drawing (Denise Scott Brown (2009), collage (Quddus, 2014) or painting (Serrazanetti and Schubert, 2011).	
you have to give up that building to the person who has paid you that huge amount of money to build it	letting go

4.3.5 Phenomenology – description of the direct experience of the process

The architects interviewed and researched indicate that there are positive and negative experiences throughout the process of designing a building. Despite being a long, arduous and difficult process, it is also a process of discovery, fulfilling, exciting and challenging. At times it can be frustrating and difficult and at other times it flows.

Transition periods from the idea to the *realisation* are frustrating and difficult. The architect may experience doubt, anguish and even be frightened during the process when resolutions are not revealing themselves within the critical timelines of a project. A type of paralysis may set in and result in procrastination. The architect needs to find a way to break through this barrier. Grit is required during the entire process of design in order to deal with all the challenges the architect faces at a personal and team level.

On a superficial level, developing ideas may appear to be a smooth process but it does have difficulties in reality. There are many challenges and it is those challenges that make it both stimulating and frustrating at the same time. The act of design is optimistic in nature as it is a process of making things better, but the struggle between needs and desire is ever-present.

At the end of the process, when the construction is completed, there is a “letting go” of the building and giving it up to the client. The architect then has to detach from what has been created. This type of “letting go” or “detaching” occurs throughout the process when the *incubation* phase is entered and before *illumination* appears.

4.3.6 Reflections

Architects do reflect on their process and appraise it regularly in order to understand, learn and improve from it. All aspects are looked at including the design, interactions with the client, professionals and contractors and the building process itself. These reflections tend to occur at the end of the project but also occur during the process itself.

Whereas the design process does evolve throughout the process and over the lifetime of an architect, it does not get easier, probably due to its unpredictable nature but equally because each project brings along unique circumstances, never becoming formulaic or routine, even after several projects have been successfully completed. Understanding the process, however, does make it easier and one learns to trust the process rather than to simply focus on the end result.

When reflecting on the process itself, it is seen as planning, data *analysis* and *synthesis*, identifying goals, investigating alternatives and making choices which lead to the development of the design. There is no particular order and it does not occur in a single cycle but oscillates between the activities that generally fall within the polarities of two aspects – *analysis* and *synthesis*. These two interdependent processes are required due to the nature of architectural design, which necessitates *holistic* thinking towards the examination of the diverse components required to create and make a building. The process moves from the unmeasurable through the measurable to the unmeasurable again (Louis Kahn, no date cited in Scott Brown, 2009). The creative part of the process synthesises while the analytical part evaluates the creative outcome. (Scott Brown, 2009).

The design process can therefore be viewed as a process of discovery though which architects search for creative and novel solutions to a client's complex needs and aspirations, but within the constraints of time, and often other resources, such as land and budgets.

See Table 4.2 below for insights on the phenomenological and reflective aspects of the creative process during the design and construction stages as determined from the primary and secondary sources.

Table 4.2: Insights on the phenomenological and reflective aspects of the creative process during the design and construction stages.

Desciption/ experience of the process - phenomenology	
Interview data - Architect - Design Process	
It can be smooth but you can never predict how it works	smooth
it can be as it can also be a long and arduous one and takes a huge amount of time	long/ arduous
It is a process of discovery and it takes a long time	discovery/ long
act of design is an act of drawing and it is thinking through drawing	drawing/thinking
and the process of discovery is through the act of drawing	dicovery/ drawing
it has to therefore, by its nature, be an act of optimism.	optimism
Feels stuck - All the time,	stuck
The whole process is difficult	difficult
the design process continues - until the end of the process when you hand over the building to the client.	duration
fulfilling process	fulfulling
very exciting	exciting
challenging	challenging
it is full of challenges and we get stimulated by those challenges	stimulating
as you get older you get better	improvement
Self-ethnographic data - Architect - Design Process	
There are periods of frustration	frustration
an inspiring time when ideas flow	inspiring
devastating period when ideas do not manifest	devastating
Procrastination may result due to the uncertainty	procrastination
transition from idea to reality is often very difficult.	difficult
Secondary data - Architects - Design Process	
Shariff describes design as a process to come up with an idea and one needs grit to get through it (Quddus, 2014)	grit
An excess of tradition may paralyse one but a balance between gratitude for the past and desire of invention, curiosity for the unknown, is required (Basulto, 2012)	paralysis
architects need vision and to feel that one can do things better and have in-built optimism (Basulto, 2012)	vision/ optimism
two types of doubt during the creative process – self-doubt and idea doubt (Grant, 2016)	doubt
the link between original thinkers and procrastination (Grant, 2016)	procrastination
Unearthing the motive is always the most difficult and anguished phase for him (di Battista, 2015)	anguish
the intuitive aspects of architectural creativity may be frightening (Scott Brown, 2009)	frightening

Table 4.2: Insights on the phenomenological and reflective aspects of the creative process during the design and construction stages (continued).

Reflection	
Interview data - Architect - Design Process (continued)	
design process has evolved over time	evolved
has it gotten easier - No, I don't think so	not easier
when we have finished a building we look at it and we try and appraise it	appraisal
we don't look at just the design we look at the whole process	appraise the whole process
So we try and learn through understanding it as a total process from beginning until end	learn
We look at how we designed it,	analysis
how we interacted with the client	analysis
how we interacted with the other professionals	analysis
how the building process itself played itself out.	analysis
Self-ethnographic data - Architect - Design Process	
design process still difficult but easier to deal with as one does it more	difficult process
construction process more difficult over time due to lack of skills	lack of skills
contractors difficult to work with as a lack of knowledge of the construction details as they are more project managers than builders	lack of skills
professional consultants work well within the process	consultants
analyse the whole process to understand how to improve on the next project	improvement
Secondary data - Architects - Design Process	
architects follow the Davidoffian planning sequence which involves going through various stages. (Scott Brown, 2009)	planning
These are to gather data, analyse, synthesise, identify goals, investigate alternatives, make a choice between alternatives and finally develop the chosen one. (Scott Brown, 2009)	process
It does not always follow in that order and not in a single cycle. (Scott Brown, 2009)	cyclical
She sees the architectural process as analytic and synthetic. (Scott Brown, 2009)	analysis and synthesis
Its various components, such as structures, construction, mechanical and electrical systems are dealt with analytically and then reunited in different ways in the design process (Scott Brown, 2009)	components
Subroutines of analysis and design occur continually either simultaneously or quickly oscillating, and at many levels throughout the architectural design process and even in reverse (Scott Brown, 2009)	subroutines/ oscillations
although the intuitive aspects of architectural creativity may be frightening, it should still be subjected to rationally based critical analysis. (Scott B	critical analysis
It is this analysis that takes up most of the designer's time (Scott Brown, 2009)	time
Architects think holistically otherwise buildings would fall down. It is this holistic thinking that requires both analysis and synthesis (Scott Brown,	holistic thinking
Louis Kahn said that the process passes from the unmeasurable through the measurable to the unmeasurable again. (Scott Brown, 2009)	unmeasurable/ measurable
points out that architects design and manipulate and that the process is about not being happy with one result but continuing to search	search
the oscillations between the intuitiveness of the creative process versus the rationality of the testing process. The two processes are interdependent (Scott Brown, 2009)	interdependence

6.4.3 Skills

Whereas architects often understand themselves primarily as building designers, the primary skill through which they create is drawing. They use drawing as a tool for thinking and understanding. Ideas are generated through the process of drawing and decisions are made throughout the process with drawing as the primary medium of *synthesis* and *analysis*. Architects make associations while designing and use *metaphors*, similes and symbolism during the creative periods. At times they view architecture as the telling of a story. The creative process can also be viewed through the *metaphor* of a storm (Leski, 2016).

In addition, multiple technical skills such as computer skills and modelling (analogue and digital) are utilised. Architects are required to be not only designers, but also technicians and project managers, based on their understanding of building processes and time and financial aspects of projects. Many skills are required to ensure that the projects are realised as envisioned, but also within time and budget constraints.

From the above it is therefore clear that in addition to the technical skills, people skills are essential for architecture. These include the ability to sell the vision to the client and other interested parties. They need to be able to deal with objections and negotiate through any contentious issues while keeping true to the vision. *Collaboration* with all parties involved is part of the process and this entails active listening, interpreting and liaison. Communication is, therefore, an important skill for the management of the sharing and *collaborative* needs of the project process.

Given that architects need to lead the teams collaborating on their projects in order to ensure oversight on the project, a leadership role is required in order to deal with difficult circumstances and equally to facilitate change. In the leadership role, architects need to persuade others to change to find an innovative way of living, thus entailing transitioning.

4.3.8 Female architects

Archie observes that female architects read the world differently to their male counterparts and provide balance in a team. They may use their intuition more than their male counterparts and are also likely to be better designers as they are probably more people-centred and stronger team-players. Unfortunately, in my experience, female architects still have to deal with more prejudice than their male counterparts and need to work harder to persuade others of their abilities within the project process and the overall profession in general.

See Table 4.3 below for the analysis of architects' skills required for the process of design as determined from the primary and secondary sources.

Table 4.3: Analysis of architects' skills required for the process of design.

ANALYSIS OF ARCHITECTS' SKILLS REQUIRED FOR THE PROCESS OF DESIGN	
Creative skills	
Interview data - Architect - Skills	
move away from the idea of describing the architect only as a designer	design
the architect is more than just a designer	design
Self-ethnographic data - Architect - Skills	
When I design	design
I produce sketches of the various ideas	ideas
Secondary data - Architects - Skills	
Thinking/ Drawing/ Decision making/ Thinking styles/ Satisficing	
Interview data - Architect - Skills	
"thinking through drawing"	think/ draw
Architecture is not about solving problems. We make critical judgments.	decision making
There's a huge repository of ideas in one's head which has to do with one's history, one's background, upbringing as a child,	remember/ think
the books that one has read, the buildings one has visited, etc etc.	remember/ think
And all of that is floating in one's subconscious.	subconscious thinking
Self-ethnographic data - Architect - Skills	
Drawing aids the process of understanding	drawing
listen to the client's requirements and try to interpret them	listen/ interpret
architect is thinking and processing	thinking
produce sketches of the various ideas	drawing
working drawings are produced	drawing
Secondary data - Architects - Skills	

Table 4.3: Analysis of architects' skills required for the process of design (continued).

Metaphor/ Simile/ Symbolism/ Analogy	
Interview data - Architect - Skills	
the relationship the program and the form is essentially the same as that relationship between an appetite and its satisfaction	simile
it's a bit like being an archaeologist – you have to excavate into the ideas to find out what it is that lies beneath	simile
The architect excavates with a pencil through the process of drawing – one layer after the other.	metaphor
to make sure, like a military campaign, that it plays itself out absolutely fantastically	simile
how you bring and co-ordinate the work of the whole army of people who come	metaphor
Self-ethnographic data - Architect - Skills	
african feel	metaphor
Secondary data - Architects - Skills	
Architecture is also viewed as one of the ways of telling a story, be it good or bad (Basulto, 2012).	metaphor
His aim is to find an idea around which to construct a new story. (di Battista, 2015)	metaphor
imagining a new life for an object represents the basic spark that sets off the whole design process (di Battista, 2015)	metaphor
Leski (2015) describes the process of creativity though the metaphor of the storm of creativity.	metaphor
Technical skills	
Interview data - Architect - Skills	
what we then do, is we start to translate those ideas into a 3D model which we make on Revit.	technical
you are competent as a designer	design
competent as a technician	technical
competent as a project manager	manage
the things that we are really meant to know about which is how do you build	build
how do you manage projects	manage
the architect is a manager of projects	manage
project management being run by architects who are trained and have a sensitivity to good architectural values.	manage
Self-ethnographic data - Architect - Skills	
drawing on the computer	computer skills
financial aspects of the project	financial skills
project manage the project	project management skills
understand the construction process and details	construction process skills
Secondary data - Architects - Skills	

Table 4.3: Analysis of architects' skills required for the process of design (continued).

People skills	
Interview data - Architect - Skills	
you have to find subversive ways of getting around the objections	resolve
you have to learn to become a good sales person.	sell
we have to maybe learn, as architects, to be a little bit tougher and to be able to take over those roles	responsible
speak to the builder as an equal and find out what the builder thought it was that we were trying to build	communicate
find ways and means of being able to negotiate different issues, team and find ways and means of getting our ideas built….	negotiate
difficult issues with builders and with other members of the professional	resolve
we work in a fairly, very collaborative way	negotiate/ collaborate
project managers have absolutely no understanding of the value of what good architecture means	understand
and to be able to take over those roles and understand that it is just a lot more hard work.	responsible/ lead
we have to find ways and means of being able to negotiate different issues,	negotiate
understood exactly what the architect was talking about	understand/ communicate
understood what the client needed and he tried to find a synthesis between the two	understand/ communicate/ synthesise
looking for a way of bringing the two, sometimes mutually opposing value systems, together into one single point of agreement	negotiate/ synthesise
a manager of people	manage
how you bring and co-ordinate the work of the whole army of people who come	co-ordinate/ manage
how you manage that on a day-by-day, hour-by-hour basis	manage
to make sure, like a military campaign, that it plays itself out absolutely fantastically	implement
that what you have at the end of the process is a beautiful piece of architecture.	complete
Self-ethnographic data - Architect - Skills	
listening to the client's needs and interpreting them	listening/ collaborating
discussing aspects with the contractor and sub-contractors	communicating/ collaborating
liasing with the engineers regarding the roof structures	communicating/ collaborating
Secondary data - Architects - Skills	

Table 4.3: Analysis of architects' skills required for the process of design (continued).

Leadership skills	
Interview data - Architect - Skills	
if architects do architecture properly they will have a leadership role.	lead
lead the team	lead
you can get onto a building site and instruct the builder properly	lead - instruct
If you can do that, you will be recognized as the leader	lead
that wonderful position of being an architect in control of what you are doing	lead - control
where you can command your work in a powerful way	lead - control
where people will listen to you	lead - communicate/ persuade
how do you actually deal with difficult builders and clients	lead - communicate/ collaborate
architects look forward	lead - vision
someone who is able to facilitate change	lead - change
convince people about change	lead - persuade/ change
we have to find other ways of living	lead - vision
We do not create change in society, we are not politicians	lead - change
Self-ethnographic data - Architect - Skills	
instruct the contractor and the sub-contractors on what is required	instructing/ comminicating
ensure the consultants follow what is required	instructing/ comminicating
Secondary data - Architects - Skills	
Female architects	
Interview data - Architect - Skills	
women architects sometimes read the world in different way	awareness
at *** University in the 15 years that I have been there, the best students have all been women.	better designers
Self-ethnographic data - Architect - Skills	
experience prejudice from contractor	prejudice
deal with issues intuitively as well as intellectually	intuition
Secondary data - Architects - Skills	

In conclusion, the data indicate that there are many activities undertaken by architects during the creative process of architectural design, but most of them take place within a *holistic* thinking as bounded by the *analysis-synthesis* polarities. The activities encompass the *preparation* phase where information is gathered, and the *incubation* phase where the individual rests and ideas are left to simmer until a conceptual solution appears in the *illumination* phase. The *verification* phase is where the idea is translated into reality through the acts of drawing and construction. This phase requires the most attention in support of the *collaboration* with a diverse range of individuals under the oversight of the architect. Once the building is complete, the architect detaches and reflects on the experiences of the process.

4.4 Discussion of Key Findings

The analyses have led to several findings in terms of the process. Architects are aware of the process they follow but the in-depth workings in terms of thought processes and experiences of each stage are not explicitly narrated in the literature or in professional fora. Instead, the emphasis is mostly focussed on an externalised explanation of the *realisation* of the project without the subjective experience of the process.

One of the key findings is that a process that is followed by architects definitely exists. Architects are aware of the starting point and what they need to achieve. They regard the brief and the site or context as the initiators of the process. Their vision needs to take into account all of the client's requirements and result into the physical *realisation* of a functional building at the end of the process.

In addition, the data demonstrate that architects do experience the four stages of creativity. The *preparation* phase with all its research which includes understanding the brief, visiting the site, researching similar projects and typologies, leads to the *incubation* phase where ideas are incubated until a conceptual solution that fulfils the requirements presents itself. These solutions are then verified and developed into a built artefact.

Many *unconscious* processes occur with the unconscious being the field from which ideas are sourced without the *conscious* effort often involved in the *analytical* stage. Intuition, therefore, plays an important role in the design process as it aids the creative process towards the direction of the solution, despite there being no consciously known certainty that it is the correct direction.

Architects are aware that ideas can emerge at inconspicuous moments, especially during the *incubation* stage. The architect is normally in a state of rest when the idea appears, they could be in the shower or brushing their teeth. This moment of *illumination* can be preceded by a period of inaction or paralysis with regards to the project process. This is when the *incubation* period starts and it ends when the idea breaks through to *conscious* level.

The process of *conceptualisation* is the least discussed process among architects. They focus on the idea that has been chosen to be developed. They do not discuss the many alternatives and possibilities that they encountered and rejected. There is seldom an explanation of how they go through the *decision-making* for each aspect of the building. They allude to *divergent* and *convergent* thinking but do not express it as a known entity. They do, however, acknowledge the use of *metaphors*, similes and symbolism in order to share their conceptual solutions with other involved parties, and particularly with the client to explain their conceptual ideas.

Whereas various tools are used to develop ideas, drawing serves as the primary tool that drives the whole process. The data strongly suggest that for architects ideas emerge out of the bodily engagement of mind through their layered drawing process, which is *iterative* in nature.

The *preparation, incubation and illumination* phases repeat at various stages during the *verification* phase as more aspects of the building are designed and detailed. It is a process of continuous adjustments, with oscillating cycles of *analyses* and *syntheses* occurring throughout, with revised drawings as the primary tool. These *iterations* are fundamental to the creative design process. See Figure 4.1 below for a graphical representation of the architectural design process.

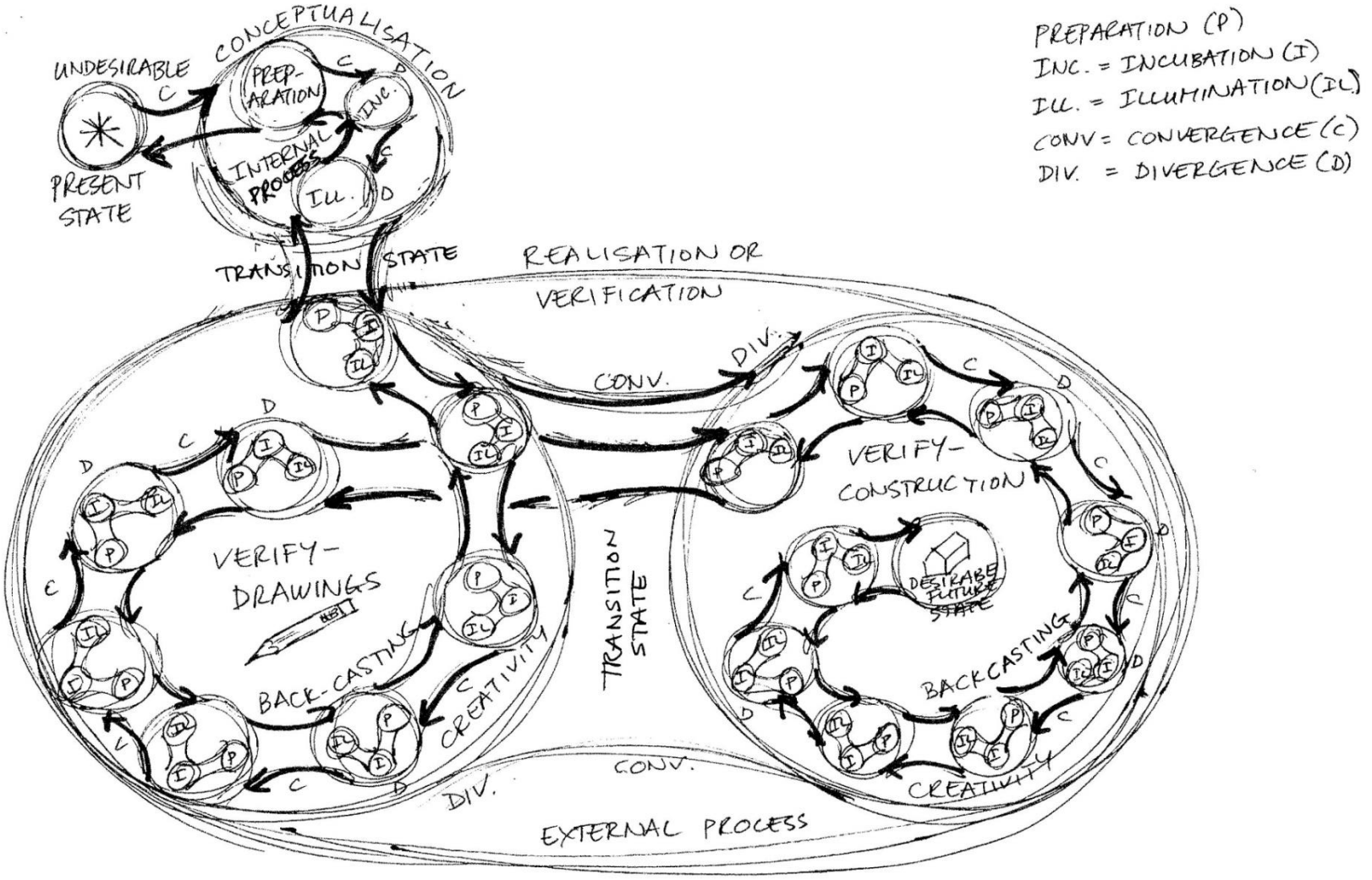


Figure 4.1: The reconceptualised creative process in architectural design

Given that many individuals are involved in the process of realising the vision, principally during the *verification* phase, *collaboration* is an integral part of the process, without which the building cannot be built. Architects oversee and direct this process, especially through integrating and co-ordinating input from the various individuals. They balance all the needs of the building through managing the process and the people involved. Architects, therefore, need leadership skills in order to fulfil the role of supporting *collaboration* towards the *realisation* of the visions effectively.

The construction stage forms a vital part of the *verification* process and the architect's involvement at this stage is to ensure that their designs are built as they were envisioned. Adjustments and *iterations* continue to occur during this stage of the process until the building is completed and handed over to the client.

Architects do not generally discuss their experiences of the process when explaining their projects but instead emphasise what they have achieved. They may acknowledge that it is difficult but they rarely indicate to what extent. It is a process fraught with challenges and conflicts which need to be resolved. It is equally a complex process and thus requires much attention due to the many factors and people involved. The transition periods are the ones fraught with the most difficulties. These can occur when moving from the *preparation* phase to the *incubation/illumination* phase and from the *illumination* phase to the *verification* phase. This is reflected by an observation from one of the secondary data sources, who notes that: "Moving from words to buildings is one of the great challenges of architecture" (Scott Brown, 2009: 146).

Positive experiences also result from the process. When ideas appear and the resolution is easy, the process is exciting and challenging. Architects may experience "*flow*" when ideas and resolution occur spontaneously and without much effort. But this tends to only emerge after the exhausting grit of the analytical phase. The related experiences are likely to manifest into cycles, which may occur many times throughout the process thus resulting in a rollercoaster effect of emotions and alternating experiences of fulfilment and frustration.

Architecture involves many physical and non-physical aspects which must be taken into account by the architect. All aspects need to work in harmony and be kept in balance by the architect for a work of architecture to be created and function as envisioned. This *holistic* nature of architecture is what makes the process of creating architecture difficult and time consuming. Its all-encompassing nature requires attention at every stage, from the big picture scale to detail level. Through careful mastery of this attention cycle, the architect can ultimately ensure a successful building.

Creativity is an essential part of architecture and occurs at every stage. Whereas some stages demand and warrant more creativity than others, it remains as the key driving force behind good architecture and the profession as a whole. In as much as it is difficult to understand and describe explicitly what happens in the mind of an architect while creating at a *phenomenological* level, it is understood or experienced as an intuitive experience that defies *analytical* approaches or explanations even in the area of brain and mind sciences, as pursued in neuroscience. In the face of the numerous challenges and conflicts throughout the process, the architect still relies not only on knowledge and skills but predominantly on creativity in order to resolve these challenges and uncertainties.

Every creative decision made depends more on intuition than logic. The architect vacillates between certainty and uncertainty relying on creativity to deal with the uncertainty and on analytical knowledge and skills to verify the certainties. These are the *analytic* and *synthetic* processes as described by Scott Brown (2009), and are also the oscillations between the intuitiveness of the creative process versus the rationality of the testing process (*ibid*.).

The findings indicate that architects use the creative process to envision and realise their buildings and that the process involved is a difficult and complex one. Given that the future is unknown, architects use creativity together with drawing as the primary tool or medium, to negotiate their way into the future. This is pursued for the enhanced experiences of the transformed environment for others, and particularly for their clients and the users of the buildings.

4.5 Conclusion

The creative process of architectural design has several phases which align with the creative phases as described by Wallas (1926). From identifying the undesirable present state during the *preparation* phase to *incubation* of ideas, and *illumination* to *verification*, the process entails *analytical* and *synthetic* cognitive tasks and is an emotional journey embarked upon by the architect. Through the process, the desired future is pursued with drawing as the primary tool or medium. *Back-casting*, therefore, forms part of the process that architects use.

It is a complex process because many factors need to be taken into account and the *collaborative* input of several people is required in order to realise a project from the initial vision to the constructed building. It is a process that requires many *iterations* and adjustments throughout. It also requires the architect to spearhead and guide the process in order to achieve what is desired. This translates to a leadership role for the architect.

Design, and thereby creativity, occurs at every stage to a larger or lesser extent. Revision or *iterations* occur continuously in order to attain the best possible solution for each and every aspect of the building. The process is cyclical and can be represented by a spiral that contracts and expands as it progresses through the various stages. The contractions occur during the transition phases which may be difficult but then expand into more possibilities and *realisation* of the idea until the building is completed.

Phenomenologically, several emotions are experienced by architects throughout the process, particularly at the transition points. The difficulties and uncertainty of how to resolve them may lead to doubt, procrastination, panic, anxiety and a resulting inability to continue. However, with relaxation, this phase passes and leads to a proliferation of ideas and actions. The breakthrough brings about the excitement to work on the issues and continue with the project. Architects experience something similar to the hero's journey (Campbell, 1949) as they work through this process as

they encounter and engage with challenges, which they have to overcome in order to achieve their vision.

Within a collaborative framework, the architect co-ordinates and guides the process. When architects give up some of these roles, it is unlikely that the vision will be pursued by others as envisioned by the architect. A breakdown rather than a breakthrough occurs. The architect's core involvement is imperative for a successful *realisation* of the vision in terms of the initial objectives.

The creative process is used by architects to deal with uncertainty and to engender future change through their buildings. Creativity is, therefore, a tool for dealing with the inevitable uncertainty, especially where there is a gap in knowledge or method. Uncertainty develops from not knowing how to solve a problem that one has never encountered before (Leski, 2015). Leski (*ibid*.) notes that uncertainty leads to attentiveness and an open mind. An open mind leads to the creation of something new in order to solve the problem. This is done by letting go of skills that are no longer of use and accessing new skills and associations (*ibid*.). She describes the creative process as wanting to know something that you do not know. Creativity therefore does hold the key to solving novel problems.

Although neuroscience has led to a better understanding of the creative process, it is still not exactly clear how the brain functions during creativity. However, neuroscientists have been able to identify which parts of the brain are active during the process and it appears to involve several areas of the brain simultaneously. They have also identified the characteristics highly creative individuals possess and which areas of the brain are activated when these characteristics are in action. Through increasing the understanding of creativity, it becomes possible to teach creativity more systematically in order to find solutions to previously unknown problems in a more effective manner.

The *preparation, incubation* and *illumination* stages encompass the *conceptualisation* stage as opposed to Nalkaya's (2012) interpretation, whereby the *conceptualisation* stage continues until the working drawings are produced from

which the building is then constructed. The *verification* or realisation stage starts as soon as architects pick up their pencils to draw and develop their ideas from the concept envisioned in the sub-conscious brain. From that point the *verification* stage continues with many cycles of the *conceptualisation* stage occurring during which the architect will need to resolve many issues, conflicts and details for the building.

Architects experience the different stages of the creative process many times during the process of envisioning and constructing the building. They use multiple *back-casting* cycles during the process, even though they are not explicitly aware of this conceptual technique. The process is an unpredictable and predictable process and one fraught with many challenges. The architect's journey is similar to the hero's journey as described by Campbell (1949) whereby the hero has a goal to attain, overcomes obstacles and triumphs in the end.

CHAPTER 5

THE LEADERSHIP PROCESS AND CREATIVITY

5.1 Introduction

This chapter investigates the processes used by business leaders in bringing about change or improvement to their business organisations. Data from various sources are presented and analysed, followed by findings derived from this information in determining whether a definitive process is evident in their leadership process.

The investigation of the leadership process is similar to the previous chapter, whereby the process is examined in terms of its similarity to the creative process, including *backcasting*. The leaders' experiences and reflections were noted as were the various skills or tools, techniques or media they use in implementing their goals.

As in the previous chapter, the study takes the view that leadership is about the future. It is about having a vision of being in a better state in the future compared to the current state or *status quo*. Leaders have a good understanding about the problems in the present that need to be resolved in order to attain the desirable future goal. Their core challenge is how to create a feasible route to that future.

A leader's primary tool is the vision. They determine that there is a gap between where they are and where they would like to be. Negotiating this gap becomes the primary concern of the leader. They possess the skills to understand what they are facing and to motivate others to follow them. The negotiation of the journey through the gap is determined by their decisions. Leaders are faced with choices and make decisions every day in uncertain environments.

The data sources provided insights on their journeys from the start of their organisations and leading their teams towards attaining their vision.

5.2 Data Overview

The primary source is a female business leader and the secondary sources are the world renowned entrepreneur and business leader, Richard Branson, from his book,

The Virgin Way (2014) and the biblical Moses from *The Bible*'s *Old Testament*. Richard Branson's (*ibid*.) journey in creating a new airline in competition to the larger established airlines is investigated in order to determine the method he followed.

5.2.1 Primary source – interviewed business leader

The business leader was interviewed in order to determine how she (Bussie, 2016) generated changes in her company which operates in the executive search sector. A female leader was chosen in order to gain a sense of whether there are different approaches between female and male leaders in the leadership process, even though this is not the primary focus of this study.

Bussie (*ibid*.) and her partner created their local company which later joined a global organisation. She was wary of the transition from a small business to a global company. Her male partner, on the other hand, was very keen to join. Her approach is quality driven and she is always looking for ways to improve performance and systems in the business.

The company and its development are always on her mind. She keeps a notepad on her desk in order to record any ideas as they come to her while she is working. Bussie also finds that she gets ideas while she is in the shower or when she is dreaming. She tries to analyse her dreams in order to understand what she can develop from them. Many ideas come to her but not all are implementable and she does find that not all novel ideas can be meaningfully translated to reality.

She is constantly looking for ways in which to improve her business and thinks that innovation is an important aspect. She likes to draw on a flipchart to explain her ideas. There are people in her business who help her to translate the ideas into reality. The process they use in order to fulfil their clients' needs is *iterative* in nature, because it is often difficult to determine what the client is looking for. She also needs to interpret what the client needs rather than just what they are asking for since often what they are seeking does not exist.

Her experience of developing the company and its processes has been difficult and time consuming. She needs to understand what the client requires and translate that vision to her teams of researchers so that they can fulfil the client's needs. The value of what she does is through the process which needs to gain confidence and trust from the client. More knowledge of the processes and industry has led to more confidence and respect. Intuition plays an important role in her dealings with clients and understanding what they require. She has also learnt to communicate in a more structured way. Bussie (2016) is cautious about making decisions and analyses carefully before taking critical decisions. She has also come to terms with her *decision-making* role as she gets older, and thus more experienced.

Her quality driven focus ensures that she can improve processes and the working environment of her researchers and employees. She uses all her skills and training to improve the situation and always strives to lead by example. Any ideas that will lead to improvement are investigated and the viable ones are implemented. Although she does not have a set method that she follows, she investigates ideas, assesses their viability and engages with others to help with her vision.

She feels that she is fully accountable to her organisation and she does not accept anything that may prevent the improvement or implementation of ideas that will lead to her achieving her vision for the business.

5.2.2 Secondary sources - Richard Branson and (Biblical) Moses

Branson (2014) reports that when he started his career as an entrepreneur his motivation was to make people's lives better. As a frequent traveller on commercial flights he was disenchanted with the flying experience. He thought it may be viable to start and operate his own airline. He went to speak to someone who had started his own small airline in the United Kingdom, which had been successful until it was undercut by the bigger airlines. Although the airline had ultimately failed there were many lessons learnt and thus, much valuable advice was received by Branson.

He created Virgin Atlantic to fill a niche market at the time. He decided to give the traveller a new experience in flying. The airline offered an upper class seat which was

not first or business class but fell under the business class category. Business people could still buy these tickets as business expenses and feel that they were getting a first class experience. Stand-up bars and massage therapists were introduced on board and a limousine service offered to and from the airport, which the other lines were not offering to first class passengers. Lounges at airports were created with facilities such as bathrooms, food and internet services. Good quality headphones that could be taken away by passengers were provided on board and individual TV screens were installed for each seat.

In its initial stages, the airline faced opposition from a major airline flying the same route. Branson (2014) reports that he took the advice he had been given and challenged the airline concerned in court and won. His airline competed successfully on its first route from London to New York and grew into an international airline.

As recounted in the *Old Testament* book of Exodus, the story of Moses leading the Israelites out of Egypt is one of the most commonly narrated *metaphors* on leadership. It explains the leadership journey undertaken by Moses in order to fulfil the goal set for him by the God of the Hebrews. Moses (*ibid*.) was to lead the Israelites from Egypt to Canaan, but unfortunately the transition was not accomplished within his lifetime and was continued by his successor. He knew the starting point and the destination but the manner in which he would get there was unknown to him. He set a path in the direction of Canaan although he was not aware of how he would negotiate all the obstacles they would encounter. Moses and the Israelites encountered many challenges along the way but the biggest was when they arrived on the shores of the Red Sea which they needed to cross. With the Egyptians chasing them, the options available to Moses and the Israelites were limited. One option that they most probably would not have considered would have been the parting of the Red Sea. God provided this possibility, and the Israelites were saved while the Egyptians drowned once the parted sea resumed its normal state.

5.3 Data Analysis and Interpretation

The analyses of the data in this chapter follow the same procedure as for the previous chapter. It is based on the creative process stages, *backcasting* and the hero's journey.

5.3.1 Preparation – understanding the undesirable present state – primarily analytical and conscious thought processes

When we examine the actions of the leaders, we notice that all were aware of a current situation in their environment, *status quo* or undesirable present state, which caused them deep concern. They internalised the problem and decided that it was upon them to do something towards bringing about the necessary change to improving the situation towards the desirable future. Through the process of being or becoming aware of the undesirable state, they set up the criteria for what they would like to achieve as the desirable alternative in the future.

The next step was to think about what their contribution could be to alleviate or improve their respective situations, rather than to live with the *status quo* or even possibly leave it up to someone else to bring about change. The *status quo* situations were too untenable for them to not do something within their own contexts and capabilities. These situations provoked them to look for meaningful and lasting solutions to the undesirable state. Each leader was inspired to embark on a journey to transform the perceived undesirable situation to a better future state not only for them but primarily for others.

During this stage the leaders not only identified the problem state but also analysed it in order to understand and internalise what was required to improve the situation. They needed to *evaluate* the critical parameters so as to be able to improve on the situation. In order to get a full understanding of the circumstances and to grasp its complexity, leaders need to gather as much information as possible. When this is done, a set of solution-criteria must be developed to ensure that the needs will be met. Once the *illumination* occurs, the vision can be evaluated on the basis of the criteria in order to assess whether it will fulfil the vision.

Branson (2014) analysed the airline industry and their *status quo* mediocre service. He then recognised that he could not compete by doing the same thing as the established airlines as this would lead to failure. This he knew because others had tried the same strategy only to be undercut by the bigger airlines which led to the failure of the smaller airline. Branson sought out a mentor to discover as much information as possible about starting a new airline. Bussie (2016) undertook a lot of research in order to understand what her clients would require. Moses knew the conditions under which the Israelites were living in Egypt and the terrain they would need to cross to reach the Promised Land.

When the leader has processed all the information, the next phase begins. The most important role a leader has is to create a vision which entails identifying the situation that requires change.

5.3.2 Incubation – unconscious thought processes

When the undesirable present state is understood, time is taken to process the information. It is reflected on consciously and unconsciously.

The period before *illumination* appears to be a passive time such as when a person is resting, sleeping, taking a shower or doing an activity that does not require much cognitive effort. This is the time that the brain is unconsciously processing the information. Bussie noted that ideas may come when she is writing a report or when she is dreaming.

Branson (2014) reports that he reflected on his experiences as a passenger. He indicated that his decision to start the airline was an intuitive decision as opposed to a rational process. This indicates that the motivation and the information gathered from his mentor were processed unconsciously to some extent. Moses did not believe he was the right person to lead the Israelites and it was only after repeated assurances from God that he accepted the role.

5.3.3 Illumination – envisioning the desirable future state - conscious thought processes

The moment the idea has emerged into the *conscious* mind is the moment of *illumination*. This is when the vision or solution to the undesirable present state presents itself in the brain. It usually occurs during periods of rest or during the *incubation* phase. This is when the future desirable state is envisioned. Bussie's (2016) vision was to have a recruitment company that focussed on the executive level market-niche, as well as being research based. Branson's (2014) was to create a new niche market by starting his own airline. Moses' *illumination* came as a calling from God.

5.3.4 Verification – attaining the desirable future state

The idea or vision was then embraced wholeheartedly by each leader and each believed it was the solution to the problems they had identified. When they were clear on what they wanted to achieve they considered how they could attain the vision.

They all realised that they would not be able to implement the actions required on their own and would need the expertise of others. Firstly, they needed to persuade other people to accept that what they wanted to do was worthwhile and that they should join the leaders on the journey. By engaging and communicating with others, and explaining what they wanted to achieve, they accomplished buy-in from various people who were convinced of the validity of the vision.

The leaders equally realised that on their own they may not have all the relevant knowledge or skills with which to implement the vision. Collaborating with others was, therefore, a key feature in the *verification* and *realisation* of their ideas, which could not be carried out by one person's efforts or capacity. Finding the right people with the right skills was a significant strategy of the process for the leaders. Branson employed those he thought were the right people with the relevant skills to help him attain his vision. He listened to their suggestions and advice although he steered the direction of the vision.

The *verification* stage was fraught with many difficulties. Resistance was met by various parties. In Bussie's case, one example of resistance came from an employee who did not share the same vision for the methodology that the company was implementing. Another problem arose when the partner with whom she started the company was no longer authentically engaged in the business. Branson faced opposition from the existing major airlines, especially those operating on the route he had prioritised for initial entry. These and other challenges were addressed through diverse strategies in order to keep steering towards the vision.

The *verification* or implementation stage involves many aspects and activities to ensure the continued success of the endeavour. Once the vision was achieved the sustainability of this achievement needed to be considered. New ideas were generated in order to improve the sustained functioning of the realised vision. Bussie focused on quality and implemented various ideas for the improvement of all the systems in the business. Branson and his team continued implementing new and innovative services for passengers and expanded the airline to other routes. Moses kept engaging with God as he met resistance from the Israelites and challenges from the environment.

Refer to Table 5.1 below for insights on key aspects of the creative process during the leadership process as determined from the primary and secondary sources.

Table 5.1: Insights on key aspects of the creative process during the leadership process

ANALYSIS OF BUSINESS LEADER'S PROCESS	
Preparation - understanding the undesirable present state	
Interview data - Business Leader - Leadership Process	
it was really working with the client to find out exactly what they wanted and what they needed	needs
what the internal processes were in terms of how the work was done – and how we interfaced with our clients	internal processes
have a client to try and understand them more in terms of what is going to fit with them	understand
need to understand enough about them to try and get a good sense of what they are like	understand
have to know, really well, why this person can do the job	knowledge
but I have to really know that	knowledge
you really understand them and they understand you	understand
they get the confidence that you understand their business and where they want to take it and that you understand the market	understand
I analyse quite carefully around making a decision about what we are going to do	analyse/ decisions
very important in business right now is constant innovation	innovation
Secondary data - Business Leaders - Leadership process	
the difference between true entrepreneurs and great leaders is that the entrepreneur has an intrinsic abhorrence of the status quo and the belief that with a little or often with a lot of thought everything in life can always be improved upon (Branson, 2014)	status quo/ improvement
the entrepreneur with a spirit of inquistiveness recognises gaps that can be filled with new products and services (Branson, 2014)	gaps to be filled
never accepting the status quo and always looking for ways to improve upon it (Branson, 2014)	status quo/ improvement
airline passengers - myself included - were sick of paying through the nose for lacklustre service that had been getting worse for years (Branson, 2014)	undesirable present state
I wanted to make people's lives better (Branson, 2014	motivation
once again, as with the airline, it was my own experience as a dissatisfied consumer that screamed out to me that we just had to get involved (Branson, 2014)	undesirable present state
I found an ally who was uniquely qualified - and highly motivated - to mentor me with a treasure trove of invaluable advice (Branson, 2014)	mentor

Table 5.1: Insights on key aspects of the creative process during the leadership process (continued)

Incubation - unconscious thought processes	
Interview data - Business Leader - Leadership Process	
something will come into my head while I am in the shower	ideas/ time
while I am asleep I wake up with thoughts	ideas/ time
have a dream and wake up and think what the hell did that dream mean and then I will come up with something from it	ideas/ time
be writing a report and 'bang' something will come into my mind and I write it down	ideas/ time
You just have ideas going round like this all the time and actually you overwhelm your partners in this business	ideas/ overwhelm
Secondary data - Business Leaders - Leadership process	
we got into commercial aviation with Virgin Atlantic …very much on the basis of my gut feeling rather than on any huge files of carefully researched market data and financial projections (Branson, 2014)	intuition
Illumination - envisioning the desirable future state/ conscious through processes	
Interview data - Business Leader - Leadership Process	
something will come into my head while I am in the shower	ideas/ time
while I am asleep I wake up with thoughts	ideas/ time
have a dream and wake up and think what the hell did that dream mean and then I will come up with something from it	ideas/ time
be writing a report and 'bang' something will come into my mind and I write it down	ideas/ time
differentiate ourselves from recruitment agencies in terms of our methodology	differentiation/ goal
the part of the things that motivated me was that I am very quality driven	quality/ goal
my main focus is to land new business	new business/ goal
working at the very top level in a really quality and process-driven environment	top level/quality
to me working to global best practice is very important	global best practice/ goal
it was a need to see improvements in the way things worked	needs
We will have the best research team in South Africa, we will have the most efficient and effective and delivery-focused research process in South Africa	goal
I am not going to compromise the business	not compromise
engaged in all of that stuff of wanting to make it better	improvement
I knew what I wanted it to look like	vision
Secondary data - Business Leaders - Leadership process	
Strong leaders … while maintaing stability, must have vision, creativity and, perhaps most importantly, the ability to influence others and support them in the challenges of moving the organisation into unchartered and often highly risky territory (Branson, 2014)	vision
goes out to create a whole new niche market - Virgin Atlantic (Branson, 2014)	create
recognise that any business needs a clear direction and a steady hand at the helm (Branson, 2014)	vision

Table 5.1: Insights on key aspects of the creative process during the leadership process (continued)

Verification - attaining the desirable future state	
Interview data - Business Leader - Leadership Process	
you are only allowed to present one idea at a time	one idea
think about how to operationalize that idea	operationalise/ transfer
then I have to be able to transfer that vision to my researcher	transfer
do find it quite difficult to translate them into reality	translate/ difficult
some of my ideas are not translatable into reality	not translatable
don't show me an excel spreadsheet, I just can't do it but give me a flipchart and I will draw things that link together	flipchart/ draw
I have made myself become more concrete	concretise
when I have an idea I think 'OK, how do we concretise this in the business?	concretise
look at all of those things – the systems in the business, the processes, the workflow and the people	processes
sometimes it works and sometimes it doesn't	works
worked very hard on the research processes	work hard/ processes
difficult for me to find the right touch points in the business where I could influence and where I could make things better	influence/improve
finding the right touch points in an organization where identifying where are the influences or who are the responsible people	influence/people
can maybe see your vision and go with you in terms of your vision	vision
who are in the right place in the business to walk with you and influence their area of influence.	people
I started to try and work out the touch points in the business from where we could change it and how we could improve	change/improve
and I just kept pushing towards those things	pushing
I knew what I wanted it to look like	vision
you have to be constantly, constantly looking at your business and seeing what you can change and what you can improve.	improvement
Secondary data - Business Leaders - Leadership process	
Many entrepreneurs require someone else to manage the transition from idea to implementation (Branson, 2014)	collaboration
bringing an idea to life requires the help of many people and that the key to this is collaboration (Branson, 2014)	collaboration
Virgin Atlantic - massage therapists or stand-up bars on board its planes (Branson, 2014)	implemented ideas
branding it as 'Upper Class' - designating it as business class and pricing it accordingly (Branson, 2014)	implemented ideas
complementay limos in Upper Class (Branson, 2014)	implemented ideas
greater choice of meals, electronic headsets, seatback TV screens in every seat on the airplan (Branson, 2014)	implemented ideas
I found an ally who was uniquely qualified - and highly motivated - to mentor me with a treasure trove of invaluable advice (Branson, 2014)	mentor
collaboration, whether internal or external, is a vital component in buildign a healthy company (Branson, 2014)	collaboration
didn't own any airplanes or have our own maintenance capabilities or airport counters, so we simply leased everything (Branson, 2014)	challenges
as a result one the biggest libel action in British legal history against British Airways (Branson, 2014)	challenges

5.3.5 Phenomenology – description of the experience of the process

Whereas the experiences of the business leaders are generally reported as positive, they also reflect that the process is time consuming and can be difficult and arduous. It requires pushing boundaries and constant surveillance to find improvement areas. Intuition plays an important role in the *decision-making* process. For example, Bussie was afraid when her partner left the business but she subsequently noticed that it was easier being the sole decision-maker. Engaging with others forms an integral part of the process. She also gets excited about her ideas especially when she shares them with those working with her and they in turn enjoy her energy and facilitation.

Branson also noted the use of intuition as mentioned in an earlier section. Although he reports that he does not like confrontations, he observes that it is better to deal with the difficult challenges sooner rather than later. He enjoyed some of the marketing stunts such as when they covered the tail fin of a competitor's aeroplane with their logo. He had successes and failures and tries to learn from both. He reports that the airline was one of the instances where he succeeded based on a decision to start the company purely on an intuitive basis, while also admitting that there were other times when he failed.

5.3.6 Reflections

The leaders acknowledge that they have grown and changed over time. Bussie has gained more knowledge about the industry she is working in and has become more confident. She has changed her way of thinking and communicating to be more structured and logical. She has also accepted her role as a leader together with the associated power and responsibility, as well as her enhanced *decision-making* skills. Branson notes that leadership has developed to be a more collective process in which authority and power are shared by the group involved in the process. He has stepped back in his role as a leader in some of his companies and relies on others to sustain and grow the businesses he has launched to date.

Refer to Table 5.2 for insights on the phenomenological and reflective aspects of the creative process during the leadership process as determined from the primary and secondary sources.

Table 5.2: Insights on the phenomenological and reflective aspects of the creative process during the leadership process

Desciption/ experience of the process - phenomenology	
Interview data - Business Leader - Leadership Process	
you don't do that easily and casually	difficult
had to start to push and really push the boundaries around how the work was done	push
we spend a lot more time with our clients and with our candidates than you would in a normal type of recruitment	time
it's a very difficult business to be in.	difficult
a consulting process	process
we needed to re-jig it a little bit	re-jig
we needed to fix it,	fix
it is generally something a little bit difficult to find	difficult
have to go and actively find	actively
find out where those people are	search
be able to call someone	communicate
have a discussion	communicate
have to have those conversations all the time	communicate
it's a very difficult process	difficult
it takes long	time
and I am nowhere near where I want to be yet	motivation
different people do it differently	differences
it kind of seems to happen	happen
do you think that you use your intuition when it comes to who might be a better candidate?Definitely	intuition
I know that what you are doing when you are using your intuition is that you are putting together a whole lot of clues	intuition
almost subliminal clues that you picked up while you are talking to the person and 'bang' comes together in a thought, an opinion or a something	intuition
Do you ever doubt your decisions? Of course.	doubt
the business became tough, it became much harder than it was and he battled to transition into that	tough/partnership
by the time that he left, it was actually quite a relief because I felt like I was dragging this person along behind me	tough/partnership
it was scary going on my own – it was quite difficult	scary/ difficult
but I very soon found that, in fact, being the sole decision maker is so much easier than having a partner who is disengaged	decisions/ easier
researchers were feeling the frustration of him not making decisions	frustration
you have to have one final decision-maker	decisions
you consult and you engage	communicate
go to networking dinners	networking
Secondary data - Business Leaders - Leadership process	

Table 5.2: Insights on the phenomenological and reflective aspects of the creative process during the leadership process (continued)

Reflections	
Interview data - Business Leader - Leadership Process	
as you get older you command more respect as you get older – and you get more confident.	respect/confidence
all of the stuff that I have got in my head about different industries, different organisations I have built all of that over years	experience
you can only have the conversation by building the knowledge over years.	experience
I have become now more confident	confident
I have grown – obviously that is change - I have grown hugely	grown/change
I did have to look at myself more carefully and become more structured and be able to present my thoughts in more of a structured way	structured/ self-aware
certainly I have changed around the way that I communicate	changed communication
I will quite consciously - and maybe it has become more automatic for me now	consciously
– speak in a more structured, more logical, more factual way	communicate
even if behind it I am thinking more ideas, innovation whatever	ideas
So I will structure an argument more than what I used to	structured
I have definitely become – and this is a gender thing – more able to accept my own leadership and my own power,	leadership/power
I have become much more able to say 'Well, that is my decision and I am making the decision…	decisions
but actually I am the boss and I make the decisions	decisions
I am not going to compromise the business	compromise
Secondary data - Business Leaders - Leadership process	
leadership … is becoming much less about power vested in a single person or role, and more about a collective process in which the authority and power is shared by a group with a shared interest (Branson, 2014)	collective process

5.3.7 Skills

The leaders interviewed through primary and secondary sources re-affirm that creativity plays a role in their leadership journeys. Bussie relies on her creativity to come up with ideas although she does not explicitly acknowledge herself as being creative. Branson directly acknowledges the role of creativity and notes that uncertainty compels people to be creative when they are forced to achieve non-conventional goals. Bussie likes to draw on a flipchart to explain her ideas and Branson notes that listening is more important than talking and suggests taking notes. With regards to *decision-making*, Bussie does refer to finding the best possible person for a client's position although this may not be the person that the client might be looking for, but is the best fit, which is *satisficing* as used by architects. She notes that often the client wants a candidate who does not exist.

Branson (2014) acknowledges the role of creativity in his success as an entrepreneur and with the success of his airline. Creativity helped him market the airline in its infancy on a very small budget. They created many innovative services on board to enhance the travel experience.

These leaders make limited use of *metaphors*, *analogies* and similes, although Branson does compare his venture with the airline as the biblical David's slingshot. They do not narrate on their technical skills to any great degree. On the other hand, they do acknowledge that their influence on others is an important part of the process.

Both leaders view leadership as an important strategic role in the success of their respective organisations. As leaders, they push the vision and influence and support others to move towards that vision. They are assertive and find the right touch points to influence and improve the organisation.

Branson (2014) discusses that people who procrastinate in making decisions interfere with the running of the business and can suffocate progress. At the other end of the spectrum there are the people who make snap decisions based on gut feeling. He, however, conceded that he has made these kinds of decisions many

times, such as when he decided to start Virgin Atlantic. He did not base his decision on carefully researched market data and financial projections. He took a risk and it succeeded. However, he has also had failures where his instincts guided decisions that did not result in successes.

Over time Branson (2014) has gained wisdom and has learnt from his mistakes. He has realised that sometimes it is better to wait, depending on the situation. He calls it the "art of orchestrated procrastination". Branson (ibid.) argues that if the situation requires a quick decision, one should respond accordingly or otherwise the opportunity is lost. But, if there is time to deliberate, then it is better to use the time to understand the full potential of the deal before making the decision (*ibid*.).

5.3.8 Female leaders

Bussie mentions several factors that she thinks were different between her and her male business partner. These include the fact that she was more cautious with *decision-making* while he was more outward looking in terms of the business, and that she was more sceptical about joining the global company than he was. These could however be personality traits rather than differences between male and female approaches to leadership.

Upon deeper reflection she assesses her approach to be more masculine than feminine. She has noticed that there are differences in the subject matter of conversations she has with clients as opposed to discussions clients have with male counterparts. As a female leader, she has learnt to accept her role and its associated power, but this only took effect after some time due to the upbringing that generally casts women as unlikely to become business leaders.

Branson does not mention the role of women in his airline company. He does look at the statistics of women leaders in business and concedes that there is still significant improvement needed. Bussie mentioned that she knows only one female CEO in the sector within which she operates, and who is based in Australia.

Refer to Table 5.3 below for an analysis of business leaders' skills required for leadership as determined from the primary and secondary sources.

Table 5.3: Analysis of business leaders' skills required for leadership

ANALYSIS OF BUSINESS LEADER'S SKILLS REQUIRED FOR LEADERSHIP	
Creative skills	
Interview data - Business Leader - Skills	
Secondary data - Business Leader - Skills	
Strong leaders … while maintaing stability, must have vision, creativity and, perhaps most importantly, the ability to influence others and support them in the challengs of moving the organisation into unchartered and often highly risky territory (Branson, 2014)	creativity
a healthy degree of uncertainty forces participants to think more creatively about how to accomplish the group's objectives (Branson, 2014)	creativity
Thinking/ drawing/ decision making/ Thinking styles/ Satisficing	
Interview data - Business Leader - Skills	
don't show me an excel spreadsheet, I just can't do it but give me a flipchart and I will draw things that link together	draw
The person that you want, does not exist" , however here is our best fit	best fit/ satisficing
This business succeeds or fails on the basis of the decisions that I make most of the time	decisions
Secondary data - Business Leader - Skills	
Leaders need to be adept at making decisions at every step of implementing the vision (Branson, 2014)	decision making
note-raking is therefore a wonderfully complementary skill to that of listening (Branson, 2014)	note-taking
decision making - three types: the serial procrastinator, make snap decisions or the art of orchestrated procrastination (Branson, 2014)	decision making
Metaphor/ Simile/ Symbolism/ Analogy	
Interview data - Business Leader - Skills	
Secondary data - Business Leader - Skills	
But when someone arives on the scene with a hybrid product that they cannot pigeonhole - as was the case with the biblliccal David's slingshot - it can cause massive confusion in the enemy's ranks (Branson, 2014)	metaphor

Table 5.3: Analysis of business leaders' skills required for leadership (continued)

Technical skills	
Interview data - Business Leader - Skills	
doing an honors degree in clinical psychology through UNISA	psychology
when I have an idea I think 'OK, how do we concretise this in the business?	concretise
get really good industry knowledge there	knowledge
Secondary data - Business Leader - Skills	
People skills	
Interview data - Business Leader - Skills	
the quality of your people in your business is extremely important	quality of people
the quality of your systems and your processes	quality of systems
quite obsessive about delivery to clients	obsessive
quite bossy	bossy
maybe you need to do these things a little bit more gently	gently
form a good relationship with the head of research	good relationship
have you thought about it like that	communicate
maybe we should be thinking about that she began to enjoy that and to buy in	thinking
How I get people engaged, I think that they really enjoy my energy	engaged/ influence
because I get excited about ideas, other people get excited about ideas	excited/ influence
Do you think that we could extend that a little bit,	engaged/ communicate
I like to get buy-in from everyone and people to go along with me	buy in
then I have to be able to transfer that vision to my researcher	transfer
you are only allowed to present one idea at a time	present/ communicate
a consulting process	communicate
to have really in-depth, strategic discussions with people	communicate
do you think that you use your intuition when it comes to who might be a better candidate?Definitely	intuition
finding the right touch points in an organization where identifying where are the influences or who are the responsible people	influence/people
can maybe see your vision and go with you in terms of your vision	vision/ persuade
Secondary data - Business Leader - Skills	
Strong leaders … while maintaing stability, must have vision, creativity and, perhaps most importantly, the ability to influence others and support them in the challengs of moving the organisation into unchartered and often highly risky territory (Branson, 2014)	inflence
bringing an idea to life requires the help of many people and that the key to this is collaboration (Branson, 2014)	collaboration
a good leader needs to deal with confrontation and not shy away (Branson, 2014)	confrontation
A good leader needs to be able to communicate effectively, but listening is also an important leadership skill and is a more important skill than speaking (Branson, 2014)	communication
a leader needs to be accessible to people, especially those that work for him so that effective communication can occur (Branson, 2014)	accessibility
collaboration, whether internal or external, is a vital component in building a healthy company (Branson, 2014)	collaboration

Table 5.3: Analysis of business leaders' skills required for leadership (continued)

Leadership skills	
Interview data - Business Leader - Skills	
talking from a leadership position at the beginning I probably did not do it very well	leadership
found it quite difficult that I was challenging and pushing the boundaries	difficult
am not a hugely aggressive person but I am an assertive person	assertive
I actively try and put people into the business that can help me to translate those ideas	right people
learn to be more aware that sometimes people just don't want to do more than what they are doing	awareness
need to just let them do what they do well and not everybody wants to extend their capabilities	not push
This business succeeds or fails on the basis of the decisions that I make most of the time	decisions
there was even more pressure on – in terms of the transition	transition
I think they are trying to make changes	changes
still call things like leadership the soft skills	soft skills
If you call something a soft-skill it is not that important, they should be calling those things the core-skills because they are	importance
strategically leadership is so important'	strategically
so I think they talk about it but I don't know that they actually do it	talk not do
HR should be driving that	HR
so some CEOs are putting in HR directors that are strategic and commercial and understand the business and know how to drive leadership but some just aren't	drive leadership
had to start to push and really push the boundaries around how the work was done	push/ drive
but I very soon found that, in fact, being the sole decision maker is so much easier than having a partner who is disengaged	decision/partnership
can maybe see your vision and go with you in terms of your vision	vision/ buy-in
I knew what I wanted it to look like	vision
I started to try and work out the touch points in the business from where we could change it and how we could improve	change/improve
and I just kept pushing towards those things	pushing/ drive
difficult for me to find the right touch points in the business where I could influence and where I could make things better	influence/improve
something I have really had to work on	self-aware
Secondary data - Business Leader - Skills	
A good leader needs to be able to communicate effectively, but listening is also an important leadership skill and is a more important skill than speaking (Branson, 2014)	communication
generally people associate great leaders as great orators which equates to powerful people, however, a great leader does not necessarily need to be a great orator (Branson, 2014)	orators
Strong leaders … while maintaing stability, must have vision, creativity and, perhaps most importantly, the ability to influence others and support them in the challenges of moving the organisation into unchartered and often highly risky territory (Branson, 2014)	influence
Good leaders delegate rather than relegate (Branson, 2014)	delegate

Table 5.3: Analysis of business leaders' skills required for leadership (continued)

Female leaders	
Interview data - Business Leader - Skills	
harder for them to accept because you are a woman	harder
men do it very differently to woman	different
Some men are much more aggressive	aggressive
I can't think of one female CEO that I know – well in Australia I know a couple but not here	female ceos
they might listen to different aspects more from a woman than from a man	different aspects
how men talk to one another and how they talk to me they might talk to the men about the very technical	technical talk
they will talk to me more about culture, leadership, maybe what they see as the softer aspects	culture talk
they might use their intuition without knowing that they are doing it	intuition
I think that I am quite masculine in the way that I do my business	masculinity
that there are a lot of women in my type of business who would access feminine traits	femininty
– or traits that we would see as feminine – far more than I do	
I probably access masculine traits more in myself than maybe some women would.	masculinity
I have had to learn that as a woman it is fine for me to do that	decisions/ woman
that is because of my age and how I grew up – girls didn't do stuff like that when I was a girl,	women
you were not supposed to be the most powerful one in the family - your brother was	power
I have a really good coach who has helped me to see that it is fine to just say well that is just the way it is going to be	coach
they are all women with children	staff - women
we have flexible working hours and they can work from home if they want to, they can log in from their computer at home	flexibility
*** was probably more of a leader in the business than what I was in terms of outward facing	masculine
– I was much more looking at fixing processes inside the business	feminine
he was quite a lot more out there than what I was	masculine
I was the one that was more sceptical about joining ***	feminine
he was maybe also a little bit less measured around decision making than what I am	masculine
I think I give the impression – with all this stuff going on – that I don't make decisions carefully but I do	feminine
I was much more cautious about that process	feminine
Secondary data - Business Leader - Skills	
mentions statistics with regard to female board member (Branson, 2014)	women

5.4 Discussion of Key Findings

When we look at the actions taken by the reviewed leaders, we find that each of them identified an untenable situation within their environments. They then gathered as much information as possible and analysed the situation in order to understand what the underlying drivers were. They internalised their observations which led them to understand the situation and resolve to be the ones to bring about the needed change. This did occur within a context where they were not under any obligation to act or change anything.

The internal journey is the first step in leadership. It is the point at which the person decides not to be passive or leave the matter to someone else to resolve but instead to "take up the sword and fight the good fight". Their motivation is not for themselves alone but rather the need to improve the situation for others. This demonstrates an altruistic and social dimension of the leader.

Roberto (2009) noticed that often the most difficult challenge for leaders is to identify the true problem facing an organisation. He believes that leaders need to progress from problem solving to problem finding. Roberto (*ibid*.) is correct in this observation as the leader's fundamental role is to create a vision and in order to do that, the problem or the undesirable state needs to be coherently understood and internalised.

Each leader reflected about the problem and what the possible solution could be. None of the leaders indicated having thought of many solutions. One idea intuitively emerges and it is the idea with which they engaged. The process towards the *realisation* of the dream or vision appears to have been a solitary journey without input from others at the inception or *illumination* stage. Only after *illumination* did the leader put forward to others the idea or vision and then collaboratively, it was pursued.

Sergio Ermotti (2012 cited in Abib-Pech, 2013) believes the ultimate signs of leadership are the concrete *realisation* of ideas, vision and the ability to lead change.

Branson (2014) concurs that strong leaders must have vision, as does Abib-Pech (*ibid*.) who views the skill to craft a compelling vision as a critical pillar of leadership.

The leaders' descriptions indicate that the creative process and *backcasting* are tools that leaders use although seemingly unaware that they are doing so. They appear to be aware of a process in their description of their step-by-step actions but they do not follow a set methodology. They understand the importance of creativity but are aware of it from the perspective of improving processes, services or products, in the *verification* phase and not in the process of conceptualising a vision for their businesses.

Once they conceptualised the vision, the leaders pursued it relentlessly with *collaboration* as a key factor in the *verification* phases. The leaders realised that they could not achieve the vision on their own. As a result, they employed the right people to help, remained committed to the achievement of the goal and confronted any challenges that could derail their plans, in order to ensure that the *implementation* was kept in line with the vision. They remained true to the vision and followed its *implementation* from inception to *realisation*. The *realisation* of ideas is not always a smooth process and the challenges that occur may lead to new developments or *iterations* of the product or services that the organisation would like to offer. The leaders described their actions in a matter-of-fact way and emphasise the responsibility of *decision-making*, which is an integral part of leadership.

A pattern does appear when data from all the sources are analysed together. The creative process emerges in their actions albeit without their *conscious* knowledge. There is evidence of the *preparation, incubation, illumination* and *verification* phases throughout the leadership journey. This leads to a crucial finding that creativity plays a significant role in the leadership process.

Creativity manifests in the leaders' role at various stages of the process and is consciously present in the *verification* phase. The continuous striving for improvement indicates not only the leader's commitment to the vision but also the

willingness to build upon successes. This commitment to innovation with much *iteration* is a significant factor in creativity which helps to ensure the success of the vision. Collins and Hansen (2011*)* found that the ability to adjust innovation and to combine creativity with discipline is a more defining factor of success.

The most important link between leadership and creativity is that leaders wish to bring about change in a similar manner to the creative person. The difference between the leader and the creative is the scale at which this change occurs and whom it affects. Creative people often work at the individual and personal capacity level while leaders work at larger scales and particularly within complex organisational systems.

Change is an important aspect of leadership and if the leader does not bring about change then the *status quo* prevails. Most leaders have constant improvement as part of their modus operandi, without which their organisations will not keep up with the fast pace of change in modern day society. As Abib-Pech (2013) notes, leaders need to welcome and embrace, lead and manage through the change process.

Branson (2014) notes how by not keeping up with changes in the market place, his Megastores vision floundered and failed. Collins and Hansen (2011) found that there is a threshold for innovation which is at different levels for different industries and those that do not meet the innovation threshold in their respective industries do not succeed. Companies need to be aware of what competitors are doing and keep up with the changes. When they fail to reach the innovation threshold, there is no future for them. However, once they are above the threshold, especially in unstable environments, being more innovative than competitors does not mean they will be more successful. Those who innovated less than their counterparts but innovated enough were more successful in these types of environments, which means that threshold innovation is necessary for survival and success. This indicates that creativity is important for companies to survive but that it is not the only factor and, therefore, companies do not need to be the most innovative in order to succeed. (*ibid*.). The data sources do confirm that innovation is on the leader's agenda at all

times and effective leaders recognise its importance. However the data do not indicate that the leaders studied wish to innovate more than their competitors.

Branson (2014) states that the difference between true entrepreneurs and other great leaders is that the entrepreneur has an intrinsic abhorrence of the *status quo* and the belief that with a little, or often with a lot of thought, everything in life can always be improved upon. Whereas, there is a difference between entrepreneurs and leaders, the data do not corroborate Branson's view of where the difference lies. In contrast, the data seem to indicate that leaders and entrepreneurs share these approaches and any difference could be one of degree. Change and improvement is intrinsic to the role of leadership. However, an entrepreneur may excel at formulating new ideas but that does not necessarily mean that the entrepreneur is a good leader. Many entrepreneurs require someone else to manage the transition from idea to implementation, and Branson admits to this with regard to his own companies. This observation is further corroborated by the case of Steve Jobs and his highly innovative Apple products, coupled with his failure to be a good leader and, therefore, was ousted from the company he created. However, there is no doubt that without him Apple floundered in the innovation or creative development of its products and this constraint improved after Jobs returned to head the company. Any organisation that aspires to be highly innovative in a competitive market environment would need a leader that understands creativity and innovation in the sector.

The leaders studied, equally demonstrated a *holistic* approach, whereby they always kept the big picture in mind even while dealing with the details of implementation. Davis (2016) defines good leadership as a type of practical wisdom which encompasses seeing and understanding the big picture. It is acquired through study and experience and is utilised with judgment or the making of decisions when the leader is faced with challenges. This type of approach allows the leader to understand all the options available, the obstacles that may be encountered, all the people involved with their related needs, talents, hopes and fears, and an understanding of the leader's own motivations, strengths and weaknesses. (*ibid.*).

Abib-Pech (2013) observes that leadership is not an individual exercise, it is a journey towards excellence and is directed by context, events and people. This is similar to the architect's journey. Architects work holistically in a complex environment and need to understand all the factors influencing their ideas, actions and motivations.

Authentic and effective leaders create better organisations which are mainly intangible products as opposed to creative people who produce more tangible artefacts. The creatives primarily deploy physical means to produce something new, whereas, leaders mainly work by influencing people. This explains the common experience where there is a heightened awareness of the importance of *social skills* for leaders, whereas, with creatives such as architects, the heightened awareness revolves around their creative skills.

Overall, leaders reflect on their experience in a positive manner while also acknowledging that it can be a difficult and a prolonged process. Inevitably there are times when they experience doubt and frustration. Even though there may be vulnerability in leading an organisation, there is a realisation that this burden must be shouldered by someone. Intuition is an important guiding mechanism and having the right people to help is reassuring.

Leaders need multiple skills in order to craft and pursue their transformative visions. These include technical, intellectual as well as cognitive, creative and *social skills*. However, the emphasis for leaders is on their *social skills* which are dependent on their emotional intelligence, which is needed to guide the process and the people tasked with different roles in relation to the vision.

Without emotional intelligence, Goleman (2004) argues that IQ and technical skills remain latent as "threshold capabilities" which means that they are elementary requirements for executive positions. Whereas intellect is a driver for outstanding performance, big-picture thinking and long-term vision constitute critical components of cognitive skills for leaders, he argues that EQ could be twice as important as the other skills for jobs at all levels. This is because the higher the level

of the person in the organisation, the more EQ capability is indicated as the reason for their effectiveness (*ibid*.). The five components of EQ that he investigated are *self-awareness, self-regulation, motivation, empathy*, and *social skills* as discussed in Chapter 2. Abib-Pech (2013) concurs with this view that a high level of *self-awareness* and empathy form critical pillars of leadership competencies. These views are corroborated by the information received from the leaders in the study who also emphasised the role of *social skills*. All five components of EQ were evident in the data sourced, even though they were not central to the research for this report.

Overall, there was no clear evidence on the role of *divergent thinking* and the consideration of multiple options before prioritising the most appropriate vision. Ideas are articulated mainly through verbal communication with no clear evidence on the use of tools or media such as *metaphors*, similes and *analogies*. Drawing or writing does not feature much as a communication or development tool whereas it plays a significant role in the creative process of architects.

The available data seem to suggest that women do experience leadership differently to men when dealing with other people (*social skills* and EQ) even though their processes seem to be similar. However this is not a core element to this study, but rather calls for subsequent investigation.

Finally, there is systemic evidence to support the processes hypothesised under Theory U methodology, even though it is clear that this is unlikely to be consciously evident to leaders as they immerse themselves into their roles. It possibly only becomes evident after deep reflection based on extensive exposure to several leadership journeys not followed in a *conscious* or systematic manner.

5.5 Conclusion

“If your actions inspire others to dream more, learn more, do more, and become more, you are a leader.” John Quincy Adams (1767-1848 cited in Davis, 2016).

Peter Drucker (1986 cited in Collins and Hansen, 2011) believed that the best and maybe only way to predict the future is to create it. This is the essence of leadership

and it is present in the actions of the data sources appraised in this chapter. When the leader has a vision, the process of realising the envisioned future begins. Collins and Hansen (*ibid*.) found that some companies succeed during times of uncertainty or chaotic change because their leaders do not just react, but create instead.

Creativity has a role in the leadership process from the beginning and continues throughout the process even if leaders are not always consciously aware of its role or of their own creative abilities. There are elements of the creative process evident in leaders' actions and they experience similar phases as creative people do. *Collaboration* is another shared characteristic with the creative process that architects use and similarly leaders deal with challenges along the journey to their goal. *Decision-making* and commitment form integral roles throughout the process as they do in the creative process, particularly as experienced by architects.

However, there are aspects of the creative process, as evident in architects' experiences that do not appear in the leaders' accounts of their own experiences. These aspects include *divergent thinking*, drawing and the use of *metaphor*. There is, therefore, possibly room for leaders to consider adopting these tools to develop their ideas before implementation. Formalising the creative process in leadership could, therefore, help leaders to develop more creative solutions for the issues they are facing. This approach would be particularly useful for leaders facing *sustainable city transitions* where new and innovative solutions are required.

CHAPTER 6

LEADERSHIP IN SUSTAINABLE CITY TRANSITIONS

6.1 Introduction

This chapter investigates leadership on the sustainable city scale and related transitioning. The case-study leaders prioritised for primary and secondary data are positioned in the building and property-sector of the city and used their positions to bring about change at the building and city scales. Even though they did not have prior experience in bringing about sustainable initiatives at the city level, they did identify with something that they wished to change and decided to do what they could to bring about transformations in order to advance the sustainability agenda.

The data overview initially presents a short synopsis of the leaders' journeys while also explaining their motivations and actions. This is followed by the data analysis which follows the same methodology as the two previous chapters, in order to determine the presence of the creative process and *backcasting* in the implementation of the initiatives as envisioned. The actions during the four creative stages are examined together with a short diagnosis of the experiences and reflections of the processes. In addition, any comments regarding skills, use of *metaphor*, drawing, *thinking styles*, *satisficing*, technical, people and leadership skills are examined to understand their role in the induction process.

This is followed by an in-depth investigation of a leader who transitioned his city from one that would develop like the many other cities in the world to one that is more sustainable and ecologically adaptive to its surroundings. The processes and actions of this leader and his team are explained.

The analyses and interpretation are followed by the findings derived from the data gathered. The conclusion gives an overview of the chapter regarding the leadership processes that were used for sustainability initiatives towards *sustainable city transitions*.

6.2 Data Overview

The person interviewed for the study developed an organisation to improve green building at a local and national level. The emphasis is on the building sector but its impact on the city in terms of energy and environmental or resource efficacy is evident in the mechanisms that were developed for the rating of green buildings, as being efficient in terms of energy and water usage among other impacts. The secondary data source case study leader examined is Jaime Lerner as the protagonist of the many initiatives in the city of Curitiba, Brazil that brought about more efficient and sustainable systems to the city, making it a global leading example of how to transition cities into more liveable and sustainable cities.

6.2.1 Primary source – interviewed sustainable city business leader

The interviewed leader, Green (2016), was well positioned in the property industry to understand its deficiencies. Green (*ibid*.) wanted to improve the local business environment as a whole and thereby make a meaningful contribution to the global challenges. He was motivated to do something out of his comfort zone and something for which he did not have prior experience of how to implement. He decided to do some research which entailed investigating what had been done overseas. After approaching those who had implemented it in other countries and who committed their support, he appointed a CEO to collaborate with him on the implementation and adaptation of global practice into a local model. Green's vision was to have a green building rating organisation of substance. Instead of building it up slowly, he decided to put a fairly big structure in place so that the organisation could be perceived as substantial from the very beginning. He solicited key directors on the board of the organisation and attracted sponsors and members by presenting a big conference with key international speakers.

Due to financial constraints, he devised an innovative way to attract membership through a conference that offered a substantial discount for attendance to members. This made it more attractive for those who wanted to attend the conference to join the organisation. In this way the organisation gained on

membership, as well as financial input early in its establishment. Although he did partially fund the conference with his own financial resources, this was reimbursed to him when the organisation reached a stable financial threshold.

Green (*ibid*.) has kept to the original vision and has grown the organisation to the extent where he later led the global network of similar organisations. In this role, he realised that the global network itself had veered somewhat off course and he found it necessary to redirect it to its original goal and vision.

6.2.2 Secondary source – The transitioning of Curitiba to a global model of a sustainable city

Jaime Lerner is an architect in Curitiba, Brazil and served as the driving force behind Curitiba becoming a global model of environmentally friendly cities. Following the success of his initial initiatives he became the mayor of Curitiba for three terms, twice under the authoritarian military regime from 1971-1975 and 1979-1983 and the third term from 1989-1992, as an elected mayor after democracy was restored in Brazil. (Leitmann, 1999).

Lerner's journey began when he objected to the proposed widening of streets and a highway bypass that would run through the historic centre of the city, thus destroying much of the city's history. His activism led to his becoming involved in the future of the city whereby he and his team developed a vision for Curitiba that became destined to create a better city for its inhabitants. (McKibbon, 1995 cited in Mang, 2009).

Lerner felt provoked by Curitiba's trajectory when he realised that part of the city's history would be lost and he felt it to be his direct responsibility to stop the threat from materialising. In as much as he wanted the historical centre to be saved, he realised that the city needed to change in order to become more liveable. There was a realisation that it was not just about stopping something from happening but also about putting forward a more acceptable solution. (Mang, 2009). He must have realised that someone needed to do something and felt strongly enough about the

issues that he decided he would be the person to bring about the change that he wanted to see for Curitiba.

Lerner assembled a team with whom he could work and who shared the same vision and commitment to their city, in order to realise the changes required to achieve their goal for it to become a liveable city. Through a long-term transformation programme the downtown area was rejuvenated, the public transport system was uniquely restructured and the city's economic base was revitalised. (*ibid*.). These core initiatives were complemented by additional sector specific interventions such as parks, environmental waste management and food security, among others.

6.3 Data Analysis and Interpretation

The data were analysed along the same lines as in the previous two chapters on the creative process of architectural design and leadership. Themes were identified in the data and categorised according to the creative process stages and *backcasting*.

6.3.1 Preparation – understanding the undesirable present state – primarily analytical and conscious thought processes

The leaders became aware of a challenge within their environments that was no longer tolerable. For Green it was the contribution of buildings to the effects of climate change and its consequences, and for Lerner it was the threat that part of the city's historic centre was going to be destroyed. These situations were not tolerable to either of them and each decided they needed to do something to mitigate what they viewed to be unbearable consequences if the *status quo* trajectory prevailed into the future. Green examined his position in the industry and researched what had been done in other countries and whether this was something he had the capacity to do. He wanted to bring change to his area of influence as he was well positioned in the industry and had influence due to his access to role-players. Lerner's knowledge of the city allowed him to understand the predicament of Curitiba and the need to improve on it.

The individuals were concerned about issues that pertained to them at the city scale due to their involvement in their own careers but they also realised that they needed to do something to change and improve on the undesirable state of affairs. In both cases there is an element of social need because both leaders wanted to improve the situation for others and improve the environment for the benefit of all people concerned.

6.3.2 Incubation – unconscious thought processes

There is no indication how long their respective *incubation* periods took but it appears to be relatively short. It almost appears as though the idea manifests without the *incubation* period and as if it logically results from the analytical *preparation* stage. The leaders do not explicitly explain how the idea came to them, beyond observing that they knew what they wanted to do. However, there is evidence of *incubation* periods emerging later in the process. Green mentions that he stepped back to think about doing the initiatives because he would have to do it part-time. Lerner would assemble his team at a location in a city park to develop new ideas for the city (Capdevila, 2012).

6.3.3 Illumination – envisioning the desirable future state - conscious thought processes

The leaders do not indicate when the vision materialised for them. They wanted to change things and make an impact with their changes. For Green, he wanted to create an organisation of substance that could improve the situation at a building level but also across cities nationally. At first Lerner developed a solution to the city centre issue but then took up the challenge to improve more fundamental issues that he had discerned as not working well at city level. Both leaders took advantage of their work situations to drive their initiatives. The individuals spearheaded their visions from the positions where they were based which then developed into broader and more encompassing initiatives and roles.

Lerner views the city as an agent of change (Lerner, 1996). His view of an environmentally friendly city is one that minimizes waste and economizes to the

maximum (*ibid*.). The vision for Curitiba was to improve the environment for the child and, thereby, the future (Mikesh, 2009). In this way it became a collective dream for the citizens of Curitiba and gained their commitment for the initiatives and participation. Lerner and his team would generate ideas on the collective issues pertaining to the city and work on large scale, visionary planning (Capdevila, 2013). They examined the operating systems of the city and created new links to improve these systems (Mang, 2009).

Lerner (Meadows 1995:2 cited in Mang, 2009) stated,

> "There is no endeavour more noble than the attempt to achieve a collective dream. When a city accepts as a mandate its quality of life; when it respects the people who live in it; when it respects the environment; when it prepares for future generations, the people share the responsibility for that mandate, and this shared cause is the only way to achieve that collective dream."

Both leaders looked to the future at a city scale and identified how they could improve the environments and systems in which they operated and experienced. The vision was clear to them and they did not change it despite the challenges that they had to confront.

6.3.4 Verification – attaining the desirable future state

Green and Lerner realised that the implementation of their vision would require the input from others. Green appointed a CEO, put together a board of directors and found sponsors for the organisation. Lerner assembled a team (Mang, 2009) for his city initiatives, which became known as the "Lerner Group" (Schwartz, 2004). Both had to convince others of the validity of their visions. For Green, it was at industry level where he needed to gain members for the organisation and for the industry at large to accept the standards that would be set by the organisation. Lerner needed team-players who were in line with his vision, and to gain the support of those at municipal and city level. The Lerner Group engaged with the citizens of Curitiba and developed partnerships with key stakeholders for the implementation of their proposals. (Mang, 2009)

Green had an existing model of similar organisations in other countries, from which to work for the structure of the organisation and its services, which had to be adapted to the local situation. Rating instruments were developed for the improvement of the functioning of buildings. These focussed on better efficiencies in multiple performance areas, with a particular focus on energy and water use. As explained earlier in this chapter, Green used innovative thinking to finance and encourage as much "buy-in" from as many role players in the industry, as possible. Once the organisation was established, new products were created to ensure the relevance and growth of the organisation in service to the industry.

Despite having a model to work from, Green realised that it needed to be adapted to his environment and that ongoing innovations were required for the organisation to develop and remain relevant to the industry. He also realised that he needed members to promote the use of the instruments in order for the industry to accept the standards that the organisation wanted to attain.

Lerner, however, developed ideas from first principles which were in keeping with an architect's approach to creating something afresh. He and his team established sets of objective and subjective criteria for their initiatives in order to evaluate their relevance and improve the ideas they were examining (*ibid*.). Their focus was on improvement rather than on once-off optimisation (Swartz, 2004). He and his team would meet in the mornings in order to understand the systemic workings underlying the problems that were manifesting in the city and then creating integrated solutions (Mang, 2009). In the afternoons, they would return to their office in the city and work on daily issues and meet with constituents (*ibid*.).

They implemented many initiatives on a very limited budget of which Lerner is quoted to have rhetorically stated that if one wants creativity, one should cut one zero from one's budget and if one wants sustainability, one needs to cut two zeros from one's budget (The Guardian, 2014). Green's initiatives also originated from a very limited budget whereby he took a risk and used some of his own money in setting up the organisation.

Some of the many initiatives that materialised in Curitiba's vision were the rejuvenation of the city centre, the public transport system that was restructured in a unique and innovative way and the city's economic base that was revitalised (Mang, 2009). More people used the Bus Rapid Transit (BRT) which mitigated against the use of cars in the city, therefore improving on energy usage and, and thus reducing the related air-pollution. The linear growth of the city with structural arteries (*ibid*.) that resulted from the envisioned city-model improved energy consumption in the city. Similarly, the waste recycling programmes encouraged this activity and reduced the need for landfills and for transport of the waste to the dump sites outside the city.

Given that Lerner already knew that planning for a city's development takes time he used an approach that he termed "*urban acupuncture"* to implement critical catalyst ideas quickly (Mang, 2009). *Urban acupuncture* starts with the development of a good idea. They are small, but catalytic, interventions that can contribute new energy to the city, and thus give support during the process of long-term planning which takes much longer (Leitman, 1999). *Urban acupuncture* helped them to identify key focal points where they could apply leveraged interventions that would save the city energy and resources. He applied this strategy in order to demonstrate what they wanted to achieve on a larger scale, but on the long-term horizon. (Mang, 2009).

They also made use of the *charrette* methodology of brainstorming ideas in a group setting. This technique has its history in architecture and is a creative design process in which key experts from different fields are brought together in order to expedite solutions to challenging problems. (*ibid*.). Lerner worked with his team in this manner and they would invite guest specialists to contribute when required. It is an effective method of generating many ideas from various perspectives, after which the most viable ones are chosen. This approach and strategy reflects some of the processes described by Scharmer (2009) in Theory U.

Lerner and his team worked together to improve the city's functioning with a limited budget plus a lot of creativity. He led the team but each team member contributed

significantly. The parks and recycling programs in Curitiba were developed from the ideas of a civil engineer, Nicolau Kluppel, who had envisioned them in 1966-67. The architect, Rafael Dely, created the Trinary Road System design, otherwise known as the Bus Rapid Transit (BRT). Carlos Ceneviva, an architect, was the designer of many of the buses that operate on Curitiba's streets. The civil engineer, Cassio Tanigushi, has been working for Curitiba since 1971, firstly as president of Urbanisation Company of Curitiba (URBS), and then twice as mayor of Curitiba. The Rodoferroviaria or bus-train stations of Curitiba and the Industrial City were established under Tanigushi's presidency of URBS. (Vaz, 1999).

See Table 6.1 below for insights on key aspects of the creative process during the leadership process in *sustainable city transitions* and Table 6.2 below for insights on the phenomenological and reflective aspects of the creative process during the leadership process in *sustainable city transitions* as collected from the primary and secondary sources.

Table 6.1: Insights on key aspects of the creative process during the leadership process in *sustainable city transitions*

ANALYSIS OF SUSTAINABLE LEADER'S PROCESS	
Preparation - understanding the undesirable present state	
Interview data - Sustainability Leader - Leadership Process	
The thing that motivated me was the whole climate change	present state
it's really an important issue, we really do need to do something about it	important/ need
they were very negative	negativity
we are just tumbling down the path of our own extinction	social need
there are so many challenges that we are facing in terms of climate change	challenges
We have loads of time to try and put things right and we need to accelerate stuff wherever we can so there is a time-pusher behind these things	time/ fix/change
give it a lot of thought as to whether I could take it on board, whether I had the capacity.	reflect
I wanted to talk to other developers to say "OK, so how do you do this?"	communicate with others
you need to transform the whole industry	transform industry
we will help you along the way	help
you are well-positioned in the industry	well-positioned
you are in touch with everybody in the market virtually	connected
you are in a sort of influential position, you have access to people	influential
if you get them involved and you have the backing of the whole industry it just makes the job that much easier	organisations
you see a thing going on and you kind of just do what you can	leadership
we are not really there to make people's lives and buildings more comfortable we are there to try and save the planet	social need
Secondary data - Sustainability Leader - Leadership Process	
objected to the then mayor's proposed widening of streets and a highway bypass that would run through the historic centre of the city	objection
he decided to stop it from happening (Mang, 2009)	stop
putting forward a more acceptable solution (Mang, 2009)	solution
He believes that if one has a clear overall picture of the problems and prospects of a city, it is entirely possible to govern and guide its	picture/ prospects
It is essential to view the city as an agent of change. (Lerner, 1996).	change
Lerner has stated that if you want creativity you need to cut one zero from your budget and if you want sustainability, you need to cut	sustainability

Table 6.1: Insights on key aspects of the creative process during the leadership process in *sustainable city transitions* (continued)

Incubation - unconscious thought processes	
Interview data - Sustainability Leader - Leadership Process	
had to take a step back and think about it because I did this as a part-time thing	break
But whether I want to get involved in anymore platforms to do stuff about it I don't think I will – I feel like a need a rest and to see what happens next	rest/ break
Secondary data - Sustainability Leader - Leadership Process	
Every morning they would meet at a location in a city park (Capdevila, 2012)	location
They concentrated on the fundamental issues of the city. (Capdevila, 2012)	fundamental issues
Illumination - envisioning the desirable future state/ conscious through processes	
Interview data - Sustainability Leader - Leadership Process	
organization of substance	vision
It was an idea whose time has come in a way	idea/ time
we had to set up an organization and it needed to have credibility	vision
it just makes economic sense	sense
Secondary data - Sustainability Leader - Leadership Process	
they would conceptualise their ideas on the collective issues of the city and work on large scale, visionary planning (Capdevila, 2012)	conceptualise
generate new, systemic solutions enabling them to see links and potential links between the operating systems of their city. (Mang,	system links
His view of an environmentally friendly city is one that minimizes waste and economizes to the maximum. (Lerner, 1996).	minimise and economise
The strategic vision centred on the child and the environment. (Mikesh, 2009).	child and environment
This emphasis on the child and thereby the future, and on the environment in which the citizens of tomorrow will live, united the	the future
There is no endeavour more noble than the attempt to achieve a collective dream.(Meadows, 1995)	collective dream
Lerner and his associates continuously deepened their vision and understanding of their place and it's potential. (Mang, 2009).	vision and potential

Table 6.1: Insights on key aspects of the creative process during the leadership process in *sustainable city transitions* (continued)

Verification - attaining the desirable future state	
Interview data - Sustainability Leader - Leadership Process	
I did feel that I could not run this thing myself	limitations/ choice
I will appoint someone to run with it	coolaboration
I appointed her as CEO right up front to kind of help.	CEO
get a board of directors in place	directors
The next thing was to get funding in place	funding
major institutions and got them to come on board as sponsors	sponsors
put in some bridging-finance to make it work	finance
whole organisation had been set up with company structure	company
marketing package	marketing
board of directors were also solidly behind it	directors
we kind of had a model to go on	model
needed something that was customizable to South African conditions	cusomizable
we are sort of up and running and we are not asking you to fund something that is not going to happen in the future.	vision
we thought we needed a convention	convention
get some activities going right up front	activities
set up technical working groups with South African experts	technical/ team
we developed a category….. that would address socio-economic issues in developing countries	technical/ social
there was very good buy in, nobody that we approached in the private sector was against it	buy in/ collaboration
Secondary data - Sustainability Leader - Leadership Process	
Lerner assembled a team (Mang, 2009)	team
Lerner and his team looked beyond the externally manifesting problems to the systemic workings underlying them. (Mang, 2009).	systemic workings
The downtown area was rejuvenated, the public transport system uniquely restructured and the city's economic base altered amongst	initiatives
return to their office and meet with their constituents and deal with daily issues (Mang, 2009)	daily issues
He notes that joint responsibility is also required. (Lerner, 1996).	joint responsibility
guided Curitiba's structural growth as a linear city with structural arteries. (Mang, 2009).	liner city
able to interpret the collective dream and translate this into projects which reflected the spirit and collective will of the city. (Mang,	interpret and translate
they were able to develop integrated solutions (Mang, 2009).	integrated solutions
used something he called urban acupuncture to implement ideas quickly. (Mang, 2009).	urban acupuncture
their implementations were aimed at improvement and very rarely aimed at optimization. (Schwartz, 2004).	improvement
They engaged with the people of Curitiba and developed partnerships of co-responsibility with key stakeholders. (Mang, 2009).	stakeholders
They developed sets of objective and subjective criteria by which to evaluate and refine potential ideas (Mang, 2009.).	develop/ evaluate/ refine
Planning a city means correcting your course all the time … by allowing people to correct you. (Jamie Lerner w/ Daniel Wermus).	correcting
They did receive political and economic support along the way (Mang, 2009).	support

6.3.5 Phenomenology – description of the experience of the process

The experience of bringing about change in the industry was not all that daunting for Green but he did find that running the organisation was difficult, particularly when the CEO was on a break. He did this while running his own company on a full-time basis. Lerner emphasises that they enjoyed what they did which helped them to accomplish their goals (McKibben 1995 cited in Mang, 2009). Both leaders enjoyed the process, in their respective leadership journeys, even though there were numerous challenges.

6.3.6 Reflections

This experience has led Green to realise the importance of having the right people in place and that this is a key contributor to the success of the venture. It has also changed his world-view in that he has a wider perspective, which he did not have when he was operating within his initial working environment. He is also aware of the beneficial contribution the organisation has made and that it is in the process of transforming the industry. The involvement of a large property organisation contributed to the network of the organisation and thereby its success. Green noted that those who joined the process early were those who wanted to be leaders in the field, whereas those who joined later did it for the financial benefits. He reflects that it was critical for people who needed to know how to do things more energy efficiently while remaining cognisant of their budget constraints.

Lerner and his team instituted a planning structure and culture that would continue their work through ongoing innovation (Mang, 2009). They enjoyed their work and Lerner reflected that there is nobleness in trying to achieve a collective dream (Meadows, 1995).

Both leaders are aware of the impact that their visions brought to others and that it was a valuable contribution to the environments in which they operate.

Table 6.2: Insights on the phenomenological and reflective aspects of the creative process during the leadership process in sustainable city transitions

Desciption/ experience of the process - phenomenology	
Interview data - Sustainability Leader - Leadership Process	
It was an amazing process because it wasn't hugely challenging	not challenging
the biggest issue was finance	challenge
we took a risk	risk
I had to take over a full responsibility of running it for about 6 months until we found a replacement CEO.	reponsibility
I must admit that was quite a tough time – it was just too much for me to deal with really	tough
Secondary data - Sustainability Leader - Leadership Process	
secret to creativity is to have fun. They loved what they were doing, which helped them to accomplish their goals (McKibben, 1995 in	creativity/ fun
Reflection	
Interview data - Sustainability Leader - Leadership Process	
it has made a big contribution	contibution
it has transformed the industry	transformation
that makes a significant impact in terms of the whole	significance
it is a hugely beneficial process in society	beneficial
It has resulted in a lot of innovation	innovation
people having to work out how to do things more energy efficiently but still maintain some sort of budget sensibility	innovation/ budget
find a really good CEO.	CEO
worked through their network	network
their member data base	data base
having the backing of a mainstream industry association like that was really useful	association
it has certainly changed my view	change
you get a fairly broad view on top of the normal work stuff that you do as management	broad view
I have become very aware of how, if you have the right people in place, things work well for you	awareness
it is just really important to get the right people in place	team
But whether I want to get involved in anymore platforms to do stuff about it I don't think I will – I feel like a need a rest and to see what happens next	rest/ break
Secondary data - Sustainability Leader - Leadership Process	
They instituted a planning structure and culture that fostered ongoing innovation and evolution. (Mang, 2009).	innovation/ evolution
secret to creativity is to have fun. They loved what they were doing, which helped them to accomplish their goals (McKibben, 1995 in	creativity/ fun
There is no endeavour more noble than the attempt to achieve a collective dream.(Meadows, 1995)	collective dream

6.3.7 Skills

There is systemic evidence to support creative thinking with regard Green's transitional leadership journey with the organisation he initiated. He found some innovative ways to deal with the challenges he was facing, with a key example of the conference as a strategy to entice new members into the organisation. This indicates a degree of *divergent thinking*. He made some critical decisions along the way in order to ensure the success of his endeavour. Although creativity tools such as *metaphors*, *analogies* and similes are absent in his interview responses, Green expressed a reservation that he sensed that he did not have the necessary skills to implement his vision but rather relied on his experience and ability to learn in the process of doing.

Green's *social skills* are evident in the way he engaged with others to help with the implementation of his vision. Even though he does not think of himself as a leader, especially due to his lack of public speaking abilities, his actions and *collaborative* approach indicate strong leadership skills. Having decided on what needed to be done, he did not allow his perceived inadequacies to prevent him from pursuing the vision. There is also an acknowledgment of the social need, which served as the driver for what they accomplished.

Based on a systemic-level approach, Lerner and his team used creativity to find new ways of dealing with issues facing the city. Their *decision-making* was based on judgmental heuristics or rules of thumb, anchoring and adjustments, mental shortcuts and optimisation techniques Schwartz, 2004). This reflects a creative manner of making decisions. They also used the *charrette* methodology to generate ideas which was conducive for team engagement.

Lerner and his team constantly engaged with the public and stakeholders in order to gain buy-in and support in pursuit of their cost-effective programmes. On a daily basis they would deal with the public and the issues they brought to the team's attention. Lerner's leadership abilities are renowned primarily when referenced to the successes he achieved with his team. Although some have counter-argued that

his style was dictatorial, those who worked closely with him did not think that it was a precondition for his success (Leitmann, 1999). Lerner's approach and the involvement of all the team members and stakeholders, contradicts the perceived dictatorial approach in his journey. However, the reference to a dictatorial trait in most leadership personalities possibly revolves around their unwavering commitment to the vision.

6.3.8 Female Leaders

The role of women in Green's endeavour was not discussed in any depth. Whereas he notes that the initial CEO of the organisation was a woman who effectively founded or anchored the initial implementation or *verification* process. They worked together to create the organisation and he articulated the significant leadership value contributed by the woman co-leader, although not in detail. The role of women did not feature in the Curitiba story as most of the team members were men.

See Table 6.3 below for the analysis of business leaders' skills required for leadership in *sustainable city transitions* as determined through the primary and secondary sources.

Table 6.3: Analysis of business leaders' skills required for leadership in *sustainable city transitions*

ANALYSIS OF SUSTAINABLE LEADER'S SKILLS REQUIRED FOR LEADERSHIP	
Creative skills	
Interview data - Sustainability Leader - Skills	
I started exploring	exploration/ discovery
Secondary data - Sustainability Leader - Skills	
the secret to creativity is to have fun (McKibben, 1995 cited in Mang, 2009).	creativity
Thinking/ drawing/ decision making/ Thinking styles/ Satisficing	
Interview data - Sustainability Leader - Skills	
decision to do start and organisation	decisions
Secondary data - Sustainability Leader - Skills	
Their decision making relied on judgmental heuristics, that is, rules of thumb, anchoring and adjustment, mental shortcuts and optimizing techniques. (Schwartz, 2004).	decision making
using the charrette versus conventional linear problem solving (Mang, 2009).	charrette
Metaphor/ Simile/ Symbolism/ Analogy	
Interview data - Sustainability Leader - Skills	
Secondary data - Sustainability Leader - Skills	
Technical skills	
Interview data - Sustainability Leader - Skills	
Get a marketing package, do things really professionally	marketing
we put really good material together so we had a really good presentation	presentation
I learnt along the way	learning
Secondary data - Sustainability Leader - Skills	
architect	creative

Table 6.3: Analysis of business leaders' skills required for leadership in *sustainable city transitions* (continued)

People skills	
Interview data - Sustainability Leader - Skills	
I got in touch with guys that were doing it	collaboration
I got people on board	collaboration
that was about the need for this, and how it worked	persuation
that people are getting concerned about and here is a way to do something about it.	persuation
where normal business tries to keep its cards close to its chest and it's very competitive,	competition
this is an area where you are all in it to achieve a better cause and it is just about sharing and it is a wonderful environment to be involved with.	social cause
Secondary data - Sustainability Leader - Skills	
develop the political will and trust of the people, which in turn allowed them to work on more extensive changes in the system. (Mang, 2009).	will/ trust

Table 6.3: Analysis of business leaders' skills required for leadership in *sustainable city transitions* (continued)

Leadership skills	
Interview data - Sustainability Leader - Skills	
go for it – not be tentative – we decided to really go big and as I said we had to spend some money upfront	risk
I thought well maybe through all this process, you become much more confident in terms of speaking and talking to people and taking leadership roles	leadership/ process
I don't know if that's really true.	doubt
guys who take the lead and some people do it on a moral issue, they understand the thing and put their money where their mouth is	leadership
sense of leadership and distinguishing yourself by being the first person to do	leadership
you see a thing going on and you kind of just do what you can	leadership
I am not a great public speaker, I get very nervous about speaking	public speaking
you had something that you set yourself, that you have to do and you just got to do it because it's the way it has to be	leadership
But I didn't feel that I was any great natural leader or any orator which I am not.	leadership
I have had to try and put that on a different path because I thought it was going in a wrong direction and that took me a lot of energy and time to sort out	leadership
so we have refocused	leadership
don't get complacent and mired in the technical thing	leadership
they continue to push boundaries	leadership/ change
some people clearly were cynical.	challenges
resistance that we had found and we still find is people always go on about the cost	challenges
perceptions don't match across the reality	perceptions
most of the implementation fell to the CEO	delegation
the followers take it up because there is a lot of financial case	followers
Secondary data - Sustainability Leader - Skills	
dictatorial type of leadership ?	
participation of team	
Women leaders	
Interview data - Sustainability Leader - Skills	
Secondary data - Sustainability Leader - Skills	

6.4 Discussion of key findings

The approaches of the two leaders had significant similarities as well as striking differences. Green followed a predefined model in the implementation or *realisation* phase, although he adapted it to the situation in which he found himself. Lerner, on the other hand, approached the issues encountered from a purely creative perspective.

They both identified a situation that required improvement and envisioned a way in which to change the situation for a better experience in an envisaged future. They imagined the future they wanted to attain and then determined how to achieve it. This state strongly reflects a *backcasting* method and also the initial stages of the creative process. Although Lerner's approach is more creative which is possibly anchored by his architectural competencies, both leaders used creativity to implement and improve their ideas. There is evidence to support the view that their leadership journeys manifested the four stages of creativity, not only at the beginning of the process but also throughout the implementation or *verification* stages.

Both leaders engaged with other people in order to pursue their visions. Lerner seems to have engaged more with his team at the level of generating ideas towards achieving the vision. The scale of their visions and the context within which they worked may account for this difference. Green's influence was industry-based whereas Lerner's was city-based. Green enticed professionals to join the organisation in order to gain an opportunity to participate in the process of improving performance in the industry, whereas Lerner engaged with the public not only for participation in the implementation but also for generation of ideas.

Lerner relied on a systematic and disciplined approach to the initiation of ideas and implementation. The team had a specific venue where they met for this activity, which was in a peaceful setting and conducive to creative thinking. It also minimised interruptions. The *charrette* served as the main tool for developing and iterating on

their new ideas. Implementation of ideas was initially fast, based on the acupuncture approach, so that the public could experience the outcomes quickly.

Both leaders did not regard the process as prohibitively difficult even though there were challenges along the way. They understood the impact and significance of what they were pursuing and finally achieved. In both cases, the leaders used their multi-faceted skills to deal with key issues as they arose. In particular, the *social skills* formed a critical part of their leadership skills. They both had the stamina to see through the pursuit of their vision and ensure that the pursuit was kept on course.

In their visions the city was viewed in a *holistic* manner and the vision, as well as its accompanying solutions, resonated with the long-term needs of the city as a whole.

6.5 Conclusion

The case-study leaders appraised in this chapter brought about changes to their city contexts at a larger scale than those investigated in the previous chapters.

The two leaders operated at the city scale and executed ideas at many points within the city. They collaborated with others at a public level as well as at a private level and solicited engagement from multiple parties. They guided the process and ensured that their visions served as the primary beacon throughout the journey. They used creativity to find innovative solutions to existing problems, although to a greater degree in the case of Lerner than that of Green. Both leaders made use of their technical, cognitively *conscious* leadership skills and finally reflected on their experience in a positive light. Lerner followed a creative process which is used in architecture, whereas Green implemented an adaption approach to an existing model in order make it suitable to the local context.

Whereas there are several commonalities between the two leaders and the processes they followed, the key differences mainly pertain to the extent to which they relied on creativity in their leadership journeys. Lerner openly acknowledges the use of creativity in his process, whereas Green does not mention it at all. Lerner

also had the additional challenge of procuring political and public support, while this was not as crucial in Green's journey.

Both leaders achieved their vision on a similar scale, although their approaches and processes varied significantly, primarily due to context as well as prior stages in their preparatory phase, where Lerner came from an architect-training route while Green's contextual background was a property development and investment route.

CHAPTER 7

OVERALL FINDINGS AND CONCLUSIONS

7.1 Introduction

This chapter consolidates the findings of the study based on the processes used by architects and leaders, together with their associated abilities. A consolidation of the background is given which is followed by a review of the research questions and framework undertaken in order to formulate a response to the research question and sub-questions. This is followed by the identification of the primary themes used for the comparison, enabling conclusions to be drawn and the research question to be answered. Recommendations for future research based on the insights from the study conclude the chapter.

7.2 Consolidation of Background

The functioning of cities will become more important in the future as more people migrate from rural areas and towns to the major urban centres, particularly in developing countries. This anticipated increase will result in increased pressure on services and infrastructure in cities which will require increased energy supply. In order to mitigate the increased use of energy based on fossil fuels, cities will need to move away from these types of unsustainable energy sources. Cities will also need to meet the demands of its citizens in terms of food and water supplies. In order for cities to adapt to these ever changing conditions, they will have to make the transition from the unsustainable practices of the present to the sustainable practices of the future and thus ensure that they meet the needs of their citizens for present and future generations.

It is recognised that cities across the world must transition as soon as possible, however, there are only a few known examples of cities that have managed to make the sustainable city transition successfully (such as Curitiba and Singapore). In order to promote these transitions more effectively, it is proposed that leadership in the sustainable city sector, which will require new solutions to existing problems, is

targeted as a major influencing factor which will aid the transitions more timeously. In order to enhance leadership in this sector, it is proposed to adapt the working practices of architects in order to develop leadership processes which will enhance the transitions more effectively.

7.3 Research Questions

The study endeavoured to answer the research question "Can the working methods of architects be applied to leadership-development for *sustainable city transitions*?" In order to respond to this question, it was necessary to ask several sub-questions which would determine whether there is a process that architects and leaders use and how it is implemented. Chapter 4 examined the creative process of architectural design so as to answer the sub-question, "What are the creative processes and competencies of architects and how are they inducted?" Chapter 5 studied whether a process is followed by leaders so that a response for the sub-question, "What are the leadership processes of visionary leaders and how are they inducted?" could be determined. Leadership in the sustainable city arena was explored in Chapter 6 with the purpose of replying to the sub-question, "What are the leadership processes of leaders in the sustainable city sector and how are they inducted?" The findings of the research sub-questions enabled the determination of processes in each category with related capabilities, which allowed a comparison to be made across the processes and capabilities. In this way, it could then be determined whether there were sufficient overlaps to indicate whether the processes used by architects and leaders are relevant to one another and in particular, if the processes used by architects can inform those used by leaders. Following from this, it can then be concluded whether the working methods used by architect can be applied to leadership-development for *sustainable city transitions*.

7.4 Primary Themes of the Comparison

The themes for comparison were the processes used by architects and leaders, *phenomenology*, the future, traits, skills or tools, techniques, leadership theories and styles and finally, context.

The processes used by architects and leaders include the four stages of the creative process and the associated characteristics such as the *iterative* and *holistic* nature of these processes. The experiences of the processes are compared in the *phenomenology* section and under the future theme, change is the key factor. *Backcasting* forms an integral part of the process and is discussed under the "Process" theme, however, it is also applicable in the "Future" theme of the study.

The traits that are compared are intelligence (IQ), domain-specific knowledge, novelty seeking, reduced inhibitions, and emotional intelligence (EQ) of which *social skills* are discussed in more detail and features under the techniques section as well. *Convergent* and *divergent* thinking styles, *metaphors*, similes, *analogies*, associations, drawing, and *collaborations* are contrasted as they are used by leaders and architects. Techniques evaluated include SWOT analysis, brainstorming, clustering, the *charrette* method and *urban acupuncture*.

In terms of leadership theories, transformation and transition aspects are compared and under leadership styles, the *authoritative* style as the more relevant of the styles is considered in the comparison. The context factors are the leader's organisation, the built environment for the architect and the city as a common context for both.

7.5 Overall Findings and Conclusions

Overall, the study finds that there are many similarities and differences between the processes followed by architects and leaders in their working methodologies. These are discussed below under the themes identified above.

7.5.1 Process

The architects investigated in Chapter 4, follow a defined and systematic process when creating designs for architectural projects. In contrast, the leaders investigated in Chapter 5, follow a step-by-step intuitive process. The architects are aware of the process they use in terms of conceptualising and realising the built form and that creativity is central to this process. Leaders are unaware of the process they follow as they tackle each situation independently, however it is likely that previous situations encountered do inform the manner in which the leaders deal with new situations. There is some awareness in terms of the use of creativity for the leaders, whereas architects do not articulate in-depth awareness of the inner workings of the creative process as experienced on a cognitive and phenomenological level. Leaders do focus on innovation in terms of the output of their organisations but do not focus on innovation or creativity in terms of how they work.

The commonalities for architects and leaders in terms of process are that both processes are complex, as many factors need to be taken into account, and as a result require *holistic* approaches. In order to have a *holistic* approach, both require the *conceptualisation* of a vision. Architects and leaders envision a desirable future from undesirable present circumstances. They then develop ways in which to attain the desired future by using *backcasting* as a method to determine what is required. Both groups use *backcasting* intuitively. Architects focus on refining their designs as they take more and more aspects into account and leaders concentrate on continuously improving the output of their organisations. This indicates another commonality which is the *iterative* nature of both approaches.

Architects follow the four stages of creativity – *preparation, incubation, illumination* and *verification* – in a systematic manner, although perhaps they not aware of the inner workings of these stages. Leaders, on the other hand, follow these stages intuitively with very little, if any awareness at all, that they are following this process. Initially it may appear that the architect's creative process is as portrayed in Figure 7.1 below and the one followed by leaders as shown in Figure 7.2 below, however,

neither is an accurate depiction of either processes as they both have creative characteristics and can be represented systematically as shown in Figure 7.3 below.

Figure 7.1: Journey as an irregular spiral (Sullivan 2015)

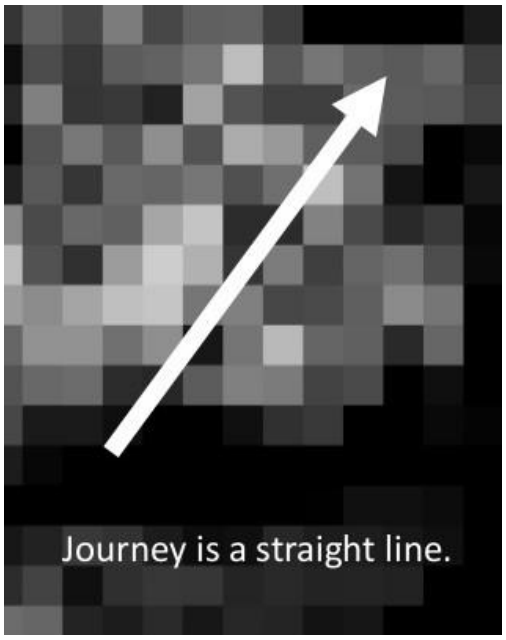


Figure 7.2: Journey as a straight line (Sullivan 2015)

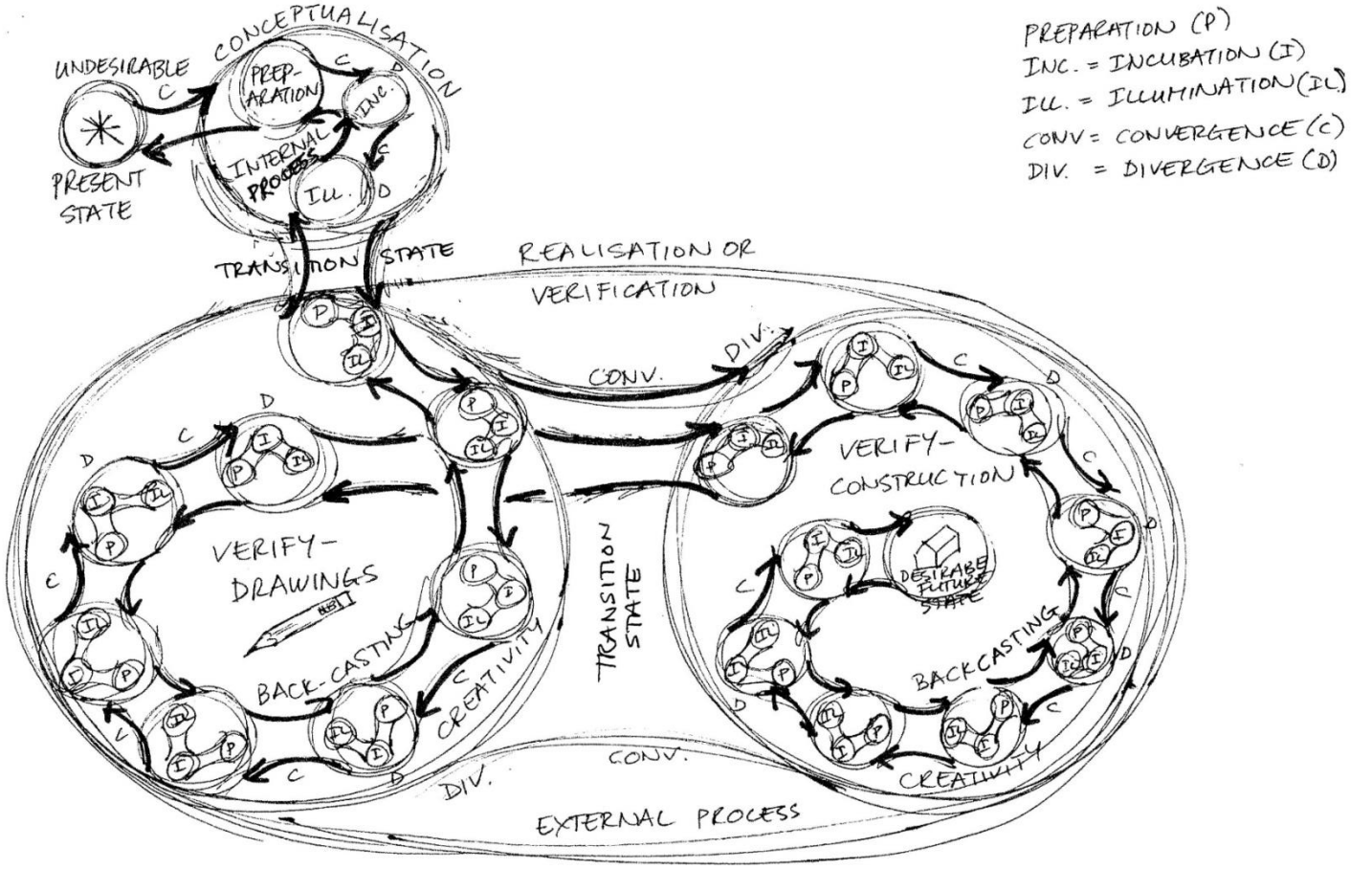


Figure 7.3: The reconceptualised creative process in architectural design

Due to the commonalities between the two processes it is possible to see that the process leaders' use can become more systematic or defined and can be based on the architect's process. The processes used by leaders in the sustainable city sector as discussed in Chapter 6 further substantiate that following a systematic creative process can lead to innovative solutions not only in organisation building but also in the transition to sustainable cities.

7.5.2 Phenomenology

The experiences of leaders and architects in terms of their respective roles and processes, can be viewed as the "hero's journey" as described by Campbell (1949) with its many trials and challenges. It is an emotional journey with both groups experiencing positive and negative emotions during the course of action they take. As was determined in Chapters 4 and 5, the architect's experiences in terms of the creative process are more emotionally charged than the experiences of leaders who operate from a more structured or logical base. Introducing more creativity into the leaders process may create more emotional upheaval but will also ensure a greater connection for leaders to their core capacities and more innovative and novel solutions will result. In addition, a better understanding of the psychological, cognitive, neuroscientific and phenomenological experiences of the creative process can lead to more positive experiences during the creative process which will result in better solutions.

The experiences of the leaders in the sustainable city sector, as determined in Chapter 6 of the study, indicate that the processes that they followed were not as fraught with difficult experiences as those experienced by architects and leaders in the business world. They recalled more positive experiences and equated the use of creativity with fun. This could indicate that combining the methods used by architects and leaders can lead to more fruitful, creative and enjoyable experiences and solutions.

7.5.3 The desirable future

Leaders and architects have a desire to create the future by changing the present. They work in uncertain environments as the future is unknown. Creativity is used to bring about some certainty to the future as the goals are set in the present by leaders and architects. In the context of architecture, a key difference between architects and leaders is that leaders typically originate a vision which the architect interprets into a vision for the building. As a result of the future thinking and visions created by leaders and architects, both bring about change in the environments within which they operate. The leader brings about change in the organisation while the architect brings about change in the built environment. There is a reciprocal influential relationship between the architects and leaders and the environments within which they operate. Architects and leaders not only create change but they also react to and adapt to change. Creativity is an ability that allows this type of flexibility and aids with the process of enhancing and improving the environments within which people operate.

The leaders involved in the *sustainable city transitions* featured in Chapter 6 of the study, were very focussed on making changes that would result in liveable buildings and sustainable cities for the future. Their focus was on the citizens of the future. This is imperative for *sustainable city transitions* especially with the increasing numbers of people moving to cities throughout the world. Cities will need to be more sustainable in order to support growing numbers of populations and their resultant needs. Services and infrastructure will need to function in energy-efficient ways as greater demands are imposed on them. Envisioning the requirements of the cities of the future is the core function of leaders wanting to transition cities from the undesirable unsustainable present to the desirable sustainable future.

7.5.4 Architects' and leaders' traits

There are many traits that architects, as creative people, and leaders have in common. These include intelligence, domain-specific knowledge in their respective arenas, novelty seeking and reduced inhibitions. The link between intelligence and

creativity is weak which indicates that intelligence is not a major contributing factor to creativity. It is, however, important for leaders and architects to have at least a threshold IQ in order to function within their roles. However, architects cannot function without creativity. Domain-specific knowledge is essential and without which neither category could function effectively. Novelty seeking and reduced inhibitions are strong traits for creativity and leadership, indicating that creativity does play a role in leadership.

Wisdom and emotional intelligence have been identified as key traits for leadership but not necessarily for architects or creative individuals. *Social skill* has been recognised as an important factor for leadership but not necessarily for architects. In as much as creative traits can enhance leadership, *social skills* can improve the *verification* process of architectural designs.

Sustainable city transition leaders show a combination of leadership and creative traits. Creativity, IQ, domain-specific knowledge, wisdom and *social skills* are evident in the *conceptualisation* and *realisation* of their visions. Their engagement with all these traits, led to the successful outcomes of their visions. This indicates that all these factors are important for leadership, especially for those in the *sustainable city transition* sector.

7.5.5 Skills/ Tools

Architects use *divergent thinking*, *metaphors*, similes, *analogies* and symbolism during the creative process in order to make associations that are novel and different. Leaders, on the other hand, seem to use these skills or tools to a much lesser extent, if at all. They are more reliant on their business or strategic and *social skills* to implement their visions. The emphasis for leaders, therefore, appears to be more on the *verification* or implementation phase than on the *conceptualisation* phase. Architects tend to emphasis the *conceptualisation* phase more. For leaders to develop their *conceptualisation* skills or visions, they need to use *divergent thinking* to a much greater extent. This will lead to more creativity which will allow leaders to

consider more options and view problems and solutions in a different way, resulting in new solutions.

Both groups use *convergent thinking* to reduce the number of options available to them, although architects tend to generate many more options than leaders. *Decision-making* forms an integral part to both process and takes similar forms as both rely on a *satisficing* type of *decision-making* as not all options are known to the decision makers when they are required to make decisions. In essence, decisions are made on a temporary basis until more information is available and decisions are adapted or changed to suit the new circumstances. This suggests that leaders and architects have a great degree of flexibility in their thinking.

A crucial skill for architects and leaders is *collaboration* which requires *social skills* for its success. Leaders tend to be better equipped with this skill than architects as generally creativity is perceived as the domain of an individual act, however, in architecture, designs cannot be realised without the *collaborative* effort of others. For this reason, architects needs to cultivate their *social skills* just as leaders do. The *verification* phase is primarily a *collaborative* experience for leaders and architects, whereas the *conceptualisation* phase for both is primarily an individual and personal exercise and experience, as they are the generator of the vision. This denotes another key creative link between the architect's and the leader's roles.

Architects' primary tool for manifesting ideas into reality is drawing. They use drawing to "think" through their ideas, revising their drawings many times until a resolution of the initial idea manifests. Drawings form the back-bone of architectural design and become the blue-print or master copy for the construction phase of the design. Leaders primarily use words to convey their visions to others and to persuade others of their viability. Architects also need to persuade clients, consultants and contractors of their ideas in order to ensure that the reality matches the vision. Drawing or other forms of "artistic" media could enhance the refinement of the leader's ideas and help to clarify them to the leader and to others.

The architect in the *sustainable city transition* role as discussed in Chapter 6, used the skills he assimilated during his training as an architect. He used similar methodologies and worked from a creative standpoint and first principles rather than using previously used solutions that were not appropriate. Many innovative solutions were achieved, some of which spearheaded new energy saving transport systems across the world. This is a clear indication that using creative thinking tools such as *divergent thinking* can solve unprecedented problems that are more effective than previously used solutions. *Collaboration* with all stakeholders is imperative in this sector which ensures buy-in and the success of the implemented solutions. These skills need to be developed in order to achieve energy-efficient and sustainable solutions for cities.

7.5.6 Techniques

As mentioned earlier, architects use associations in its various forms when conceptualising a building. The leaders in Chapter 5 of this study did not indicate using techniques such as the SWOT analysis, brainstorming and clustering, amongst others. These association-type techniques are used by architects and at times by leaders. It, therefore, can be said that leaders and architects do make use of associations when thinking of new ideas or visions and thereby, that the two processes are more closely linked than would initially appear, however leaders use them in a more limited manner. Cultivating associative thinking through the use of *metaphors*, *analogies* and other methods can enhance leader's creative thinking skills, whereas, the use of techniques such as brainstorming, can formalise architect's creative thinking to a greater extent.

The *charrette* is used successfully in the *sustainable city transition* as discussed in Chapter 6. Architects use this type of technique less frequently but it is successful when the input of many collaborators is required. It allows everyone to contribute and can result in more appropriate and resolved ideas and proposals because the many viewpoints and concerns are taken into account at a very early stage. *Urban acupuncture* is also a technique which allows the implementation of a project quickly and effectively, with the benefit that buy-in from citizens can be achieved quickly.

All these techniques result in better and more creative solutions which enhance liveability in cities and thereby contribute to increasing their sustainability.

7.5.7 Leadership Theories

Leadership theories have documented the evolution of leadership from a hierarchical authoritarian role to a more inclusive and follower-based process. Leaders need to influence various stakeholders and in particular those whom they lead. Therefore, they bring about transformation on a social level whereas architects transform the built environment, however, both groups bring about transformation. They bring about change that will result in a future envisioned by them. Creativity is the key to these transformation processes albeit in different domains.

Transformation is required for cities to move from current unsustainable practices within cities to sustainable practices, thus resulting in sustainable cities. Transformation requires change and creativity can aid the process effectively. The solutions as implemented by the leader in the sustainable city transition discussed in Chapter 6 brought about changes and thereby transformation of the city through a creative process that was accepted by the citizens. The transformation is not only of the city but primarily a transformation of how people utilise the city, its services and infrastructure. It is the leader's role to guide this process of transformation and ensure that it occurs as smoothly as possible.

7.5.8 Leadership Styles

Architects do not concern themselves with leadership styles, however, these are important to the way in which leaders function and achieve results. EQ informs the leadership styles which in turn affect the organisational climate. The *authoritative* style is most associated with fostering creativity within the organisation, with developing a vision and setting a path towards attaining that vision. As a result, this style is the one most closely linked to creativity.

The *democratic*, *affiliative* and *coaching* styles together with the *authoritative* are the most effective. The leaders interviewed in Chapters 5 and 6, displayed several of

these styles in their interactions with others which led to successful outcomes. Leaders having strengths in several styles are more likely to succeed with the *conceptualisation* and *realisation* of their visions.

Architects could benefit from leadership styles information and developing the associated EQ skills to enhance their *conceptualisation* and *verification* roles in the creative architectural process. These skills would lead to better *collaboration* and, therefore, better implementation of the projects. Although, the *authoritative* style is shown to be the most effective for vision creation and implementation, a combination of styles would prove more useful so that the architect and leader have more adaptability to different situations. This approach would fit in better with different personality types.

Leaders in the sustainable city arena need to have various styles due to the complex nature of the context within which they work. Although strong leadership type personalities may appear dictatorial, it does indicate a strong commitment to the vision and ensures successful implementation thereof. Leaders in these roles need to be cognisant of their approach so as not to alienate collaborators or team members.

7.5.9 Context

The contexts within which architects and leaders primarily operate are different. The architect's context is the site or environment where the building is to be constructed, whereas the leader's context is the organisation. However, both occur within the context of the city. Architecture has a more direct relationship with the city than the leader's organisation, but the organisation networks across the cityscape to attain the services it requires. The context provides the constraints within which the architect and the leader operate. These constraints limit the possibilities and provide the structure for new possibilities to emerge. Without the context the architect and the leader would operate with theoretical or conceptual models and not attain a vision in reality. A thorough understanding of the context is essential for architects, business and *sustainable city transition* leaders, without which appropriate and relevant solutions cannot manifest.

As seen in chapter 6*, sustainable transitions city* leaders operate in complex environments which include the organisations within which they function and the external environment which includes not only the city but also other organisations and the people of the city. They, therefore, combine the architect's and the business leader's contexts and an understanding of the operations of both environments are required to develop sustainable solutions. The understanding of the context within which these leaders operate is of paramount importance to ensure solutions that are appropriate, relevant and effective in achieving *sustainable city transitions*.

Figure 7.4 shows the key primary themes as discussed above with a related key concept (except for leadership styles which encompasses all the styles) as compared between architects and leaders, indicating their relative strengths. In order to achieve enhanced processes and capabilities, each group can contribute its knowledge and skills to the other, resulting in a balanced state.

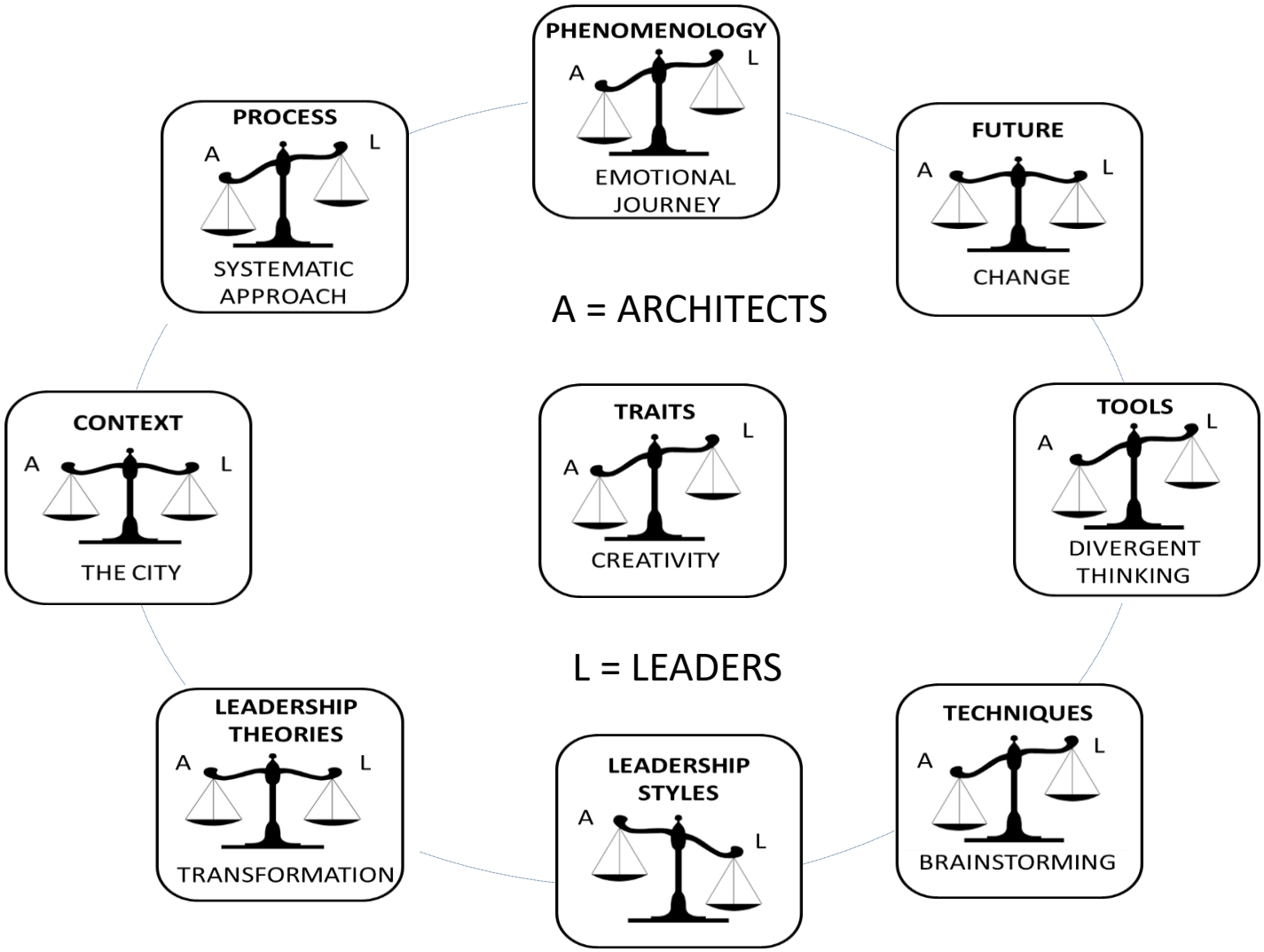


Figure 7.4: Key primary themes and concepts applicable to architects and leaders

Initially it appeared as though the processes followed by architects and leaders have very little in common, as captured in Figure 7.5 below, but as the study concludes it is evident that the two processes have more in common, and is captured in Figure 7.6.

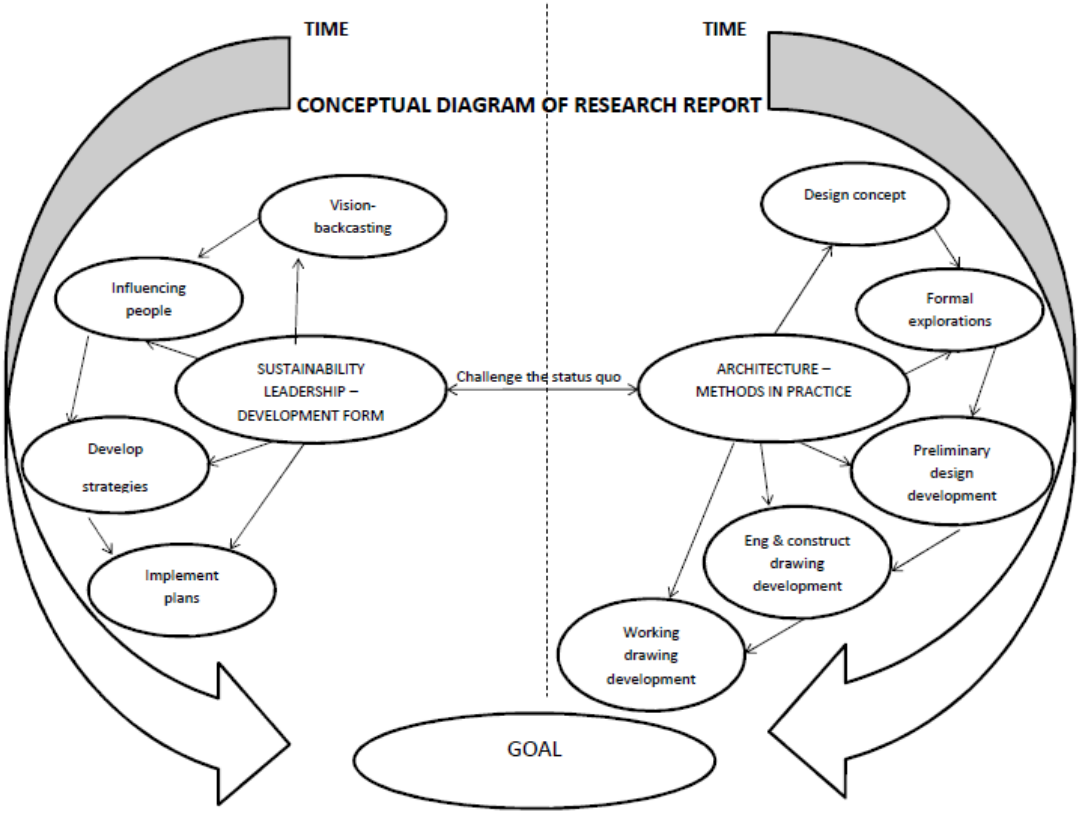


Figure 7.5: Architectural and leadership processes as initially envisioned

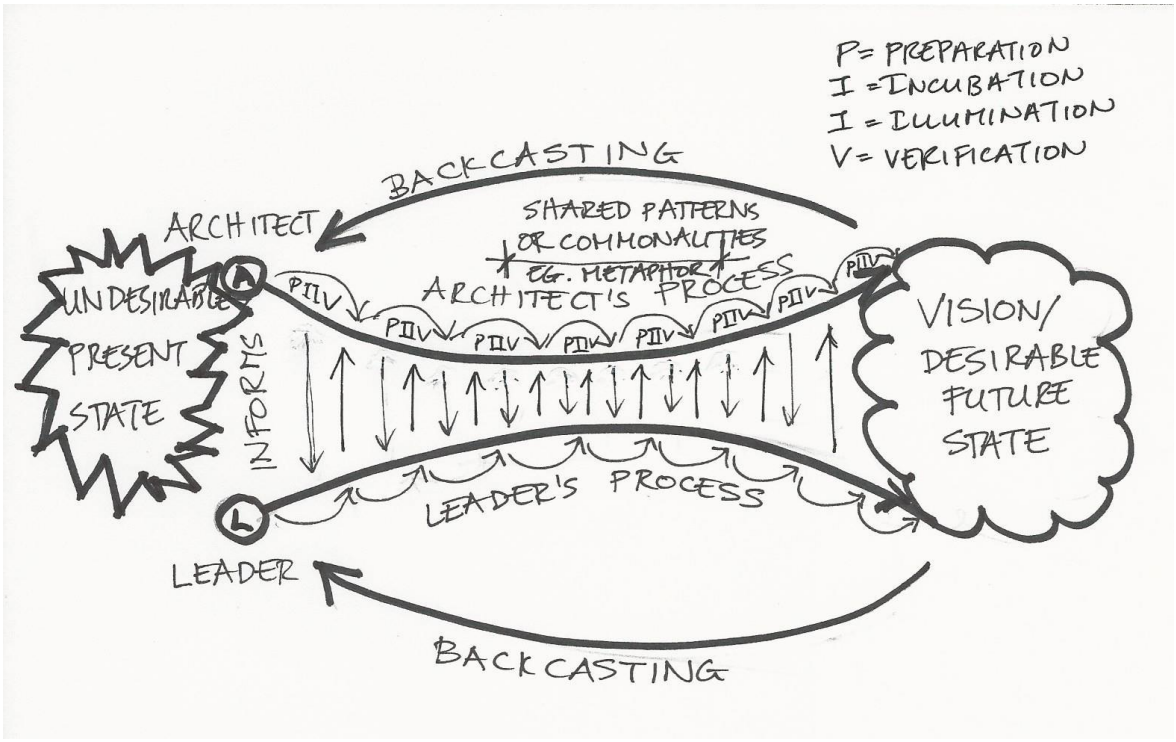


Figure 7.6: Potential for the architectural and leadership processes to contribute to competencies for *sustainable city transitions*

Leadership has an exhaustive amount of literature which tries to clarify what leaders do. Many adjectives are used to describe different types of leadership which generally focus on the leader's attributes. In essence, leadership is about transformation or bringing about change. This study indicates that if leadership is viewed as a process which effects change it can be viewed as a creative process and, therefore, can be developed into a systematic process that all leaders can follow. The originality of the solutions results from the creative traits and capabilities within the leaders and their organisations. The process is the vehicle which ensures that the actions taken within the process bring about change. This is how the architect's process results in the *realisation* of ideas and, therefore, can apply to leadership as well.

The architect's role is not just about creativity but requires leadership skills in order to attain the built form of the architect's vision. This leadership role needs to be developed and embraced further by architects and to be accepted as a fundamental part of the creative process in architecture. Due to the many shared traits and

capabilities, it can be expected that leadership styles and EQ capabilities amongst others can lead to improvements in architects' leadership roles.

The comparison between leadership activities and capabilities, and architects' creative processes and capabilities indicate that there are sufficient similarities that a relationship exists between the processes and that there is a potential for them to influence one another in a positive way. The differences highlight areas of improvement for both processes. As a result it can be concluded that the working methods of architects can be applied to leadership- development for *sustainable city transitions*.

7.6 Recommendations

The architect's process can be applied to the leadership process due to the many similarities identified in the study. As a result, it is recommended that the systematic process used by architects be applied to the leadership process and a systematic process be developed for leaders to use which includes the creative stages. The purpose of developing this type of systematic approach for leadership would aid leaders to develop innovative solutions when faced with new challenges and in particular leaders in the *sustainable city transitions* arena.

Together with a systematic approach to leadership in general and leadership in *sustainable city transitions* in particular, it is recommended that programmes are developed to enhance the traits, skills and techniques of leaders, as identified in the study in order to improve their creativity.

A further recommendation is to determine whether there are any differences between the manner in which women leaders and women architects work within the processes. There are also a high number of women architects who leave the profession and it is recommended that a study is conducted to determine the reasons in general and in particular if this is related to the processes and experiences as determined in this study.

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APPENDIX A: INTERVIEW QUESTIONS FOR THE ARCHITECT

1. Please give an overview of your design process.
2. When you are given the brief to a project what is your reaction and what are the first steps you take to start the design process?
3. When you first start designing do you try to resolve it rationally or do you immediately think of many alternatives?
4. Is it a smooth process?
5. How does the idea manifest, where and when?
6. How do you translate the idea into a design?
7. How is the design developed?
8. Do others give input in the design process?
9. Does the design process continue throughout the project?
10. At what stage do you feel that the design is resolved?
11. When the project is complete do you review if the initial design idea was appropriate to the final product?
12. If yes, does this reflection inform the next design?
13. Does the process change you in any way?
14. Has your design process evolved over time?

APPENDIX B: INTERVIEW QUESTIONS FOR THE LEADER IN THE BUSINESS WORLD/ ENTREPRENEUR

1. What led to you decide to start the company?
2. Why did you think it was something that you should do?
3. How did the idea come to you?
4. When and where did it come to you?
5. How long did it take for you to decide what you needed to do?
6. How did you translate the idea into something tangible?
7. Did others have input in the development of the idea?
8. Did the idea evolve over time?
9. What did you learn from the process of having an idea to implementing it?
10. Did this experience inform your subsequent decisions?
11. Did this experience change you in any way?

APPENDIX C: INTERVIEW QUESTIONS FOR THE LEADER IN THE SUSTAINABLE CITY SECTOR

1. What motivated you to take a leadership role in implementing the project?
2. How did you decide that you should be the person to spearhead the project?
3. How did you start the process?
4. How long did it take for you to decide what you needed to do?
5. How did the ideas you had manifest?
6. Where and when did these ideas occur to you?
7. How did you develop the ideas?
8. How did you translate the ideas into reality?
9. Did others have input in the development of the ideas?
10. Did the experience of this project influence you subsequent projects?
11. Did the experience change you in any way?

APPENDIX D: ETHICS CLEARANCE CERTIFICATE

SCHOOL OF ARCHITECTURE AND PLANNING
HUMAN RESERCH ETHICS COMMITTEE

SCHOOL OF ARCHITECTURE AND PLANNING

CLEARANCE CERTIFICATE
PROTOCOL NUMBER: SOAP129/15/03/2017

PROJECT TITLE:	The relevance of the creative process of design in leadership-competencies for sustainable city transitions
INVESTIGATOR/S:	Maria Paschini (Student No. 8345554)
SCHOOL:	Architecture and Planning
DEGREE PROGRAMME:	MArch(SEEC)
DATE CONSIDERED:	08 March 2017 – RE-ISSUE
DECISION OF THE COMMITTEE:	APPROVED
EXPIRY DATE:	08 March 2017

CHAIRPERSON _____
(Professor Daniel Irurah)

DATE: 23-03-2017

cc: Supervisor/s:

DECLARATION OF INVESTIGATORS
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to endure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee.

Signature _____ **Date** 24-03-2017

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APPENDIX E: THE LIVEABLE CITY

Liveability assesses which locations provide the best or worst living conditions in the world. Each city is assigned a rating of relative comfort for over 30 qualitative and quantitative factors covering 5 broad categories – stability, healthcare, culture and environment, education, and infrastructure. Each factor is rated as acceptable, tolerable, uncomfortable, undesirable or intolerable. (The Economist's Liveability Ranking 2016).

Melbourne, Australia is rated as the most liveable city of 140 cities surveyed, followed by Vienna, Vancouver, Toronto, Calgary and Adelaide. The top five cities remain unchanged from 2015. Only six cities have shown improved scores for liveability over the past year, due to increased stability. The global average liveability score has declined over the past 5 years which is linked with the global stability score which has decreased by 2.4% over the past 5 years. The five least liveable cities of 2016 are Kiev (Ukraine), Douala (Cameroon), Harare (Zimbabwe), Karachi (Pakistan) and Algiers (Algeria). (*ibid*.)

The cities that scored the best are mid-sized in wealthier countries with relatively low population densities – Australian 3.1 people/km^2, Canada 3.9 people/km^2, Finland and New Zealand ±18 people/km^2, the global average is 57 and the US average is 35. Austria's is 104. (*ibid*.)

APPENDIX F: SUSTAINABLE SETTLEMENT PATTERNS

Sustainable settlements depend on the interaction of four different patterns. The physical structure looks at how it sits within the natural environment and responds to the topography, the spatial relationship between the different parts of the city and the form of the built environment. Utilization patterns are formed by the way the settlement uses its resources and which are described by the infrastructure and services provided. Social patterns which pertain to how people live, learn and work in and relate to their settlement and the opportunities provided by the settlement for meeting these social needs. Operational patterns look at how the settlement functions and are managed. (du Plessis, 2002)

APPENDIX G: HUMAN DEVELOPMENT INDEX

The Human Development Index (HDI) measures the key dimensions of human development. These are a long and healthy life, being knowledgeable and a decent standard of living. The HDI was created to indicate that the development of a country should be assessed according to people and their capabilities and not according to economic growth alone. (UNDP Human development reports). These key dimensions are important factors for people in cities because it gives an indication of what the current status is and where improvements need to be made.