University of
Bedfordshire

Title: ASSESSING THE FEASIBILITY OF USING
SYSTEM DYNAMICS IN THE EVALUATION OF
SHARED SERVICE CENTRES

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PhD

2019

UNIVERSITY OF BEDFORDSHIRE

TITLE OF THESIS

ASSESSING THE FEASIBILITY OF USING SYSTEM DYNAMICS IN THE EVALUATION OF SHARED SERVICE CENTRES

by

Gregory N.S Asante

A thesis submitted to the University of Bedfordshire in partial fulfilment of the requirements for the degree of Doctor of Philosophy

London, January 2019

Academic Thesis: Declaration Of Authorship

I,   Gregory N.S. Asante

declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

TITLE OF THESIS

ASSESSING THE FEASIBILITY OF USING SYSTEM DYNAMICS IN THE EVALUATION OF SHARED SERVICE CENTRES

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Abstract

In order to make businesses more effective and efficient, various approaches have been proposed to improve business structures and processes so as to better support corporate objectives. From the 1990's onwards, enabled by advances in computer technology, one popular approach has been to develop a Shared Service Centre (SSC), whereby various (mostly back office) activities previously organised and attached to separate business units (often) on a national / regional basis, have been consolidated into a single SSC. In common with other business process improvement / re-engineering projects, the success of these transformations have been varied with both successes and failures reported.

From the available literature, it was determined that the SSC transformation process especially with regards to the use of a decision support system such as System Dynamics (SD), that will allow for experimentation by SSC implementers has not been rigorously researched or published and thus this is the gap in knowledge that this research seeks to address.

This research uses a multiple paradigm / mixed method (exploratory sequential) research approach (Case Study and System Dynamics).

This research contends that, given the patchy outcomes, significant cost implications and the adverse impact on organisations when the SSC Transition / Transformation process fails, the current SSC Transition approaches (methodology) have not been effective. Given that the objective of the SSC Transition approach is to ensure a smooth implementation of the proposed Shared Service Centre, this research argues that a simulation approach, grounded in systems thinking, is a credible way of examining the transformation process and evaluating both the transition methodology and the potential outcomes from that process. This research therefore proposes the use of a decision support system (System Dynamics / Simulation) perspective as a credible way of evaluating Shared Service Centres

prior to designing and building them and to enhance the project management methodology for SSCs. Furthermore, the research depicts the cause / effect relationship among the SSC Critical Success Factors. Policy intervention tools can then be generated to mitigate against any adverse findings.

The research findings showed that, the proposed Shared Service Centre is impacted by three main factors, the selection of a service delivery model, SSC Critical Success Factors and the SSC Phases; and that there is a cause / effect relationship among the SSC Critical Success Factors. In addition, the motives and critical success factors for organisational change were also found to be applicable to SSCs; and that during the SSC Transition phase, SSC Critical Success Factors, Staff Management and the Management of Transactional Activities were found to be important for a successful transition.

A further contribution to knowledge is that the use of SD enables the testing of the SSC phenomenon in a new setting.

For future research, the constructed SD model can be used as a basis for future organisational SSC Transitions and policy development.

Acknowledgements

I would like to express my appreciation to all my supervisory team (past and present). I would also like to thank Professor Mike Kennedy and Kim Warren who provided me with useful guidance in pursuit of my thesis.

Furthermore, I would also like to express my thanks to the Research Graduate School, especially Kim Burrows, for her guidance in helping me to navigate the administrative processes of the University.

Finally, a special thanks to my family and friends who supported and incentivized me on this journey.

Publications / Conferences / Courses attended to Date

This page lists a list of peer reviewed publications and/or conference presentations.

1. Asante, G. (2017) 'A Simulation Approach to the Evaluation of Shared Service Centers' [PowerPoint presentation], *British Accounting and Finance Association Doctoral Masterclasses*. Heriot Watt University, Edinburgh, 10 -12 April. Edinburgh: British Accounting and Finance Association.

2. Asante, G. (2016) 'A Simulation Approach to the Evaluation of Shared Service Centres' [PowerPoint presentation], *Annual Conference of the UK Chapter of the System Dynamics Society.* The Shard, London, 14-15 April. London: UK Chapter of the System Dynamics Society.

3. Asante, G. (2016) 'A Simulation Approach to the Evaluation of Shared Service Centres' [PowerPoint presentation], *British Accounting and Finance Association Doctoral Conference.* Chancellors' Building, University of Bath, 20-21 March. Bath: British Accounting and Finance Association, p. 7.

4. Asante, G. (2014) 'A Simulation Approach to the Evaluation of Shared Service Centres'[Poster presentation], *Annual Conference of the UK Chapter of the System Dynamics Society.* London School of Economics. 3-4 April. London: UK System Dynamics Chapter Annual Conference, p. 8.

Conferences / Courses Attended to the Simulation Model

1. National Thought Course on Operational Research (NATCOR) System Dynamics Course, University of Warwick; Warwick 9-11 May 2016.

2. Annual Conference 2013, UK Chapter of the International System Dynamics Society, London South Bank University,7-8 February 2013**.**

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Glossary /Abbreviation

Abbreviation / Word	Corresponds to
ACCOUNTING	This thesis is in the field of Accounting, Shared Services / System Dynamics and not Economics.
ACCA (2002)	Association of Chartered Certified Accountants (Association of Chartered Certified Accountants) refers to the authors Fahy, M., Curry, J. and Cacciaguidi-Fahy, S. (2002), who authored the SSC research report on behalf of the ACCA.
CLD	Causal Loop Diagram
Deloitte	Deloitte /Deloitte and Touche / Deloitte Consulting
DOT	Department of Transport
DSS	Decision Support System
HR	Human Resources
NAO	UK National Audit Office
Paradigm	Worldview
PWC	Price Waterhouse Coopers
PWC Austria	Price Waterhouse Coopers
SD	System Dynamics
SSC / SSCs	Shared Service Centre (er) / Shared Service Centres (res) / Shared Services / Shared Service Implementation /Transition
SEK	All currencies are in SEK (Swedish Kroner unless otherwise stated)
SGA	Sales General and Administrative Expenses
K	For example, 290K means two hundred and ninety thousand
IT	Information Technology
%	Percent

1 Chapter one: Introduction

1.1 Background to the problem

In order to make businesses more effective and efficient, various approaches have been proposed to improve business structures and processes, so as to better support corporate objectives. From the 1990's onwards, enabled by advances in computer technology, one popular approach has been to develop a Shared Service Centre (SSC[1]), whereby various (mostly back office activities) previously organised and attached to separate business units (often) on a national / regional basis, have been consolidated into a single SSC (Fahy, Curry and Cacciaguidi-Fahy[2], 2002; Lacity and Fox, 2008). In common with other business process improvement / re-engineering projects, the success of these transformations have been varied with some successes and other failures reported (Lacity and Fox, 2008; UK National Audit Office, 2008; 2011; 2016; Richter and Brühl, 2017).

Shared Services are collaborative partnerships designed to achieve cost reduction and streamlining of the activities of organisations (Bergeron, 2003; Bangeman, 2005). Shared Services are consolidated within one area to enhance service delivery (Quinn, Cooke, and Kris, 2000; Ulbrich, 2006; Borman and Janssen, 2013).

Schulman et al. (1999, p.9) define shared services as:

> The concentration of company resources performing like activities, typically spread across the organization, in order to service multiple internal partners at lower cost and with higher service levels, with the common goal of delighting external customers and enhancing corporate value.

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[1] SSC and Shared Service, implies Shared Service Centres and all are used interchangeably in this thesis.
[2] Fahy, M., Curry, J. and Cacciaguidi-Fahy, S. (2002) are the authors who authored the SSC research report on behalf of the ACCA (Association of Chartered Certified Accountants).

Various writers concur that the primary motivation for Shared Services are to reduce costs, improve processes, reduce headcount and also to be more customer focused (Fahy, Curry and Cacciaguidi-Fahy, 2002; BearingPoint, 2007; Deloitte, 2011; Miskon et al., 2011; PWC[3], 2011; Paagman et al., 2015). In addition, writers such as Fahy, Curry and Cacciaguidi-Fahy (2002) and Burns and Yeaton (2008) have stated that the advantages of SSCs include; process standardisation and information consistency and disadvantages include; high staff turnover and difficult staff motivation.

1.2 What Is the Problem, Why Is It a Problem, Why it is an Important area of research and Why SD[4] Can Be Used?

1.2.1 What is the Problem?

Current approaches for the design and build of SSCs compartmentalises the SSC Transition model into various stages (Deloitte, 2011; PWC, 2011). Although projects can be done in stages, current approaches do not provide a holistic view of the interdependencies amongst all the various stages of the design and build of SSCs. Furthermore, the success of proposed SSC transformations have been varied and mixed (Fahy, Curry and Cacciaguidi-Fahy, 2002; Deloitte, 2011; PWC, 2011; UK National Audit Office, 2008; 2011; Paagman et al., 2015). Designing and establishing an SSC requires substantial investments, time, and organisational changes (Lacity and Fox, 2008; Deloitte, 2011; Miskon et al., 2011). Therefore, it is appropriate that the right methodology for an efficient SSC Transition approach is employed in order to provide the best outcome for organisations embarking on this project.

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[3] PWC refers to PriceWaterHouseCoopers and both are used interchangeably in this report.
[4] SD implies System Dynamics and both are used interchangeably in this thesis.

1.2.2   **Why is it a problem?**

Organisations have experienced financial losses due to badly designed and implemented SSC transformations (Morgan, 2011; Ballard 2012; UK National Audit Office, 2008; 2011; 2016). While some firms claim that they have made savings with an SSC, it is clear that a failure to get the design and implementation of SSCs right can have significant negative financial consequences for organisations such as the UK Department of Transport, Somerset Council, The UK Research councils etc., (Fahy, Curry and Cacciaguidi-Fahy, 2002; UK National Audit Office, 2008; 2011; Morgan, 2011; PWC, 2011; 2016; Deloitte, 2017). Furthermore, as SSCs tend to be large scale complex projects, the underestimation of the demands and requirements of such large complex projects such as an SSC can also have unintended consequences on employee morale, customer relations etc., (Sterman, 1992; Miskon et al., 2011).

1.2.3   **Why it is an Important Area**

In a competitive, complex and changing world, organisations need to change, adapt or die. Several major companies that were in existence some decades ago are no more. Research suggests that 50 percent to 70 percent of all organisational change initiatives fail (Beer and Nohria, 2000; Hammer and Champy, 2001; Kotter, 2008; Senturia, Flees and Maceda, 2008). There are other numerous cases of organisations who have failed to adapt, consequently, they have either been taken over by other companies or have become insolvent (Beer and Nohria, 2000).

This research contends that, given the high cost implications and the adverse impact on organisations when the SSC Transition process fails coupled to the high failure rates of such projects, it is likely that the current SSC Transition approaches / methodology so far applied have not been effective in many cases.

The objective of the SSC Transition approach is to ensure a smooth implementation of the SSC Transition process. However, evidence available does not always support that this occurs at present or at best the evidence is mixed (Fahy, Curry and Cacciaguidi-Fahy, 2002; Morgan, 2011; PWC, 2011; UK National Audit Office, 2008; 2011). Therefore, other credible alternative approaches need to be explored.

Furthermore, while there is scarcity of empirical evidence relating to SSCs there is still an issue as to why some organisations do embark on SSC projects ill prepared and thus have unintended negative consequences and significant costs overruns (Janssen and Joha, 2006; Farndale, Paauwe and Hoeksema, 2009; UK National Audit Office, 2008; 2011; Ramphal, 2013; Knol, Janssen, and Sol, 2014).

1.2.4 Why SD Can Be Used

Current SSC Models are generally static in nature and generally do not explore the internal operation of change. The System Dynamics (SD) perspective in contrast, provides a holistic and systematic approach to understanding dynamics within a system (Sterman, 2000; Sherwood, 2002; Morecroft, 2015). In addition, SD will allow decision makers to test assumptions, vary the inputs and process. SD has been used for the management of large complex projects (Sterman, 1992). According to Sterman (1992), large scale projects fall in the realm of complex dynamic systems. They have multiple interdependencies, involve multiple feedback loops, non-linear data, and consist of both soft and hard data. Sterman (1992) states that System Dynamics is a useful tool to use in managing these projects and this has been used in various sectors. A lot of SSC projects fall into this category as they have been adopted mainly by large scale government organisations such as the UK Department of Transport and some Fortune 500 companies (Fahy, Curry and Cacciaguidi-Fahy, 2002; UK National Audit Office, 2008; 2011; Richter and Brühl, 2017).

Given that the payback time for an SSC can be as long as four to six years, it is important that organisations are very clear about their strategy and potential costs before they embark on this project (Fahy, Curry and Cacciaguidi-Fahy, 2002). Thus, this research contends that a simulation approach, grounded in systems thinking, is a credible way of examining both the transformation process and evaluating the transition methodology for moving between the two (current SSC approaches / proposed simulation approach) as well as the potential outcomes from that process. SD as a DSS[5] tool, provides a basis for sensitivity analysis that can help organisations to avoid expensive mistakes and to understand the unintended consequences of their actions (Sterman, 1992).

As most of the activities involved in an SSC affect people (Human Resource[6]), staff management in the SSC Transition phase is key and must be managed carefully (Deloitte, 2011; Miskon et al., 2011). As SSCs normally involve the layoff of some staff and the retrenchment / changes in the career of other staff, it is important to manage this properly (Fahy, Curry and Cacciaguidi-Fahy, 2002; Bergeron, 2003; Bangemann, 2005; Miskon et al., 2011; Paagman et al., 2015). This area is very important as it has a big impact on the SSC transformation process and affects change management within the SSC Transformation process (Fahy, Curry and Cacciaguidi-Fahy, 2002). It has frequently been problematic with existing SSC approaches.

1.3 Some Account of The Costly Failures Which Necessitate Guidelines of How to Actually Implement the Process

There are items of evidence to support the fact that it is necessary to have guidelines on how to actually implement the SSC transformation process. For example, surveys have found that SSCs continue to have problems with staff management (retention), costs, and

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[5] DSS implies Decision Support System(s) and both are used interchangeably in this report.
[6] Human Resource and HR are used interchangeably in this report.

also have a huge focus on transactional[7] activities in terms of scope and functionality (PWC, 2016; Deloitte, 2017). Recent research by Deloitte (2017) emphasise that the areas of transaction processing and employee attrition are important areas.

The 2017 annual SSC survey undertaken by Deloitte (2017, p.3), identified transactional processes as remaining dominant in the SSC adoption process although knowledge-based processes were on the rise. In terms of SSC migration, the 'lift and shift' approach was prevalent, accounting for about 55 percent of total respondents. In effect, processes were standardised after migrating to the SSC (post SSC). About 30 percent of respondents moved processes at the same time as they were migrating to the SSC and 15 percent standardised processes before migrating to the SSC. What this implies is that about 45 percent of respondents would have altered their processes somewhat before migrating. This is a very important phenomenon and thus needs to be looked at in the context of this research.

The 2017 Deloitte survey, surveyed 330 respondents from a wide range of industries, including finance, and represented over 1,100 SSC organisations located in Europe, North America, Asia Pacific and Latin America. Companies of all sizes were represented in this survey. The sizes of companies ranged from less than $1billion USD in revenue (28 percent) to revenue of at least $5billion USD (44 percent) and to revenues of $25billion USD for the larger organisations 'highlighting that the shared services concept can be applied to organisations of varying sizes' and different industries (Deloitte, 2017, p.5).

In another survey undertaken by PWC (2016), consisting of 75 companies from various industries including industrial production (33 percent) and finance (12 percent); 54 percent of survey participants had a turnover of less than 5 billion Euros, 26 percent had a turnover of between 5 billion Euros to 50 billion Euros and only 2 percent had revenues of over 100

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[7] Transactional activities are concerned with transaction processing of items such as supplier and customer invoices, bank payments, general ledger etc.

billion Euros in 2015. The survey shows that about 51 percent of respondents did not fully realise their initial cost reduction objectives. In fact, about 11 percent did not realise any cost reduction at all. The survey also found out that a lot of organisations underestimated the payback period, only about 25 percent achieved the planned payback period. Payback period according to PWC (2016) should be about two to four years. 13 percent of respondents reported a staff turnover over a three-year horizon of over 20 percent and 44 percent of respondents reported a staff turnover of between 11 percent to 20 percent. This is significant from a staff management perspective.

In another survey undertaken by BearingPoint (2011) of companies in the financial industry, they found out that transaction-based services are predominant (46 percent), payback period was between three (3) to five (5) years. About 28 percent of organisations surveyed did not meet their financial target and the main reasons given were due to poor execution problems in the migration and transition of the SSC, poor quality of staff management within the SSC process, insufficient standardisation and harmonisation of IT and the SSC processes (transaction and technology management).

In the public sector, the UK National Audit Office (2008) review of the Department of Transport and its agencies such as the DVLA, found out that the department will be £80 million pounds worse off than its forecast project savings. The report identified that SSC implementers did not have realistic goals about what can be achieved (UK National Audit Office, 2008).

Another review carried out by the UK National Audit Office (2011) of the seven research councils who were establishing an SSC to streamline their back-office functions identified that the project did not provide any value for money for tax payers. In fact, by March 2011, the project was £51 million pounds over budget and it was expected to be over £73 million pounds over the budget by the time it was completed. The report identified a flawed business

case and an additional longer project implementation period of two (2) years as part of the issues. In addition, there were no other options or alternatives for re-evaluating the financial models advanced for the SSC.

The UK National Audit Office (2016) review of the cabinet office reported that the cabinet office failed to manage the risks around the move to two independent shared service centres. In addition, the delays in the project implementation had not kept pace with technological change. It proposes that the programme will only achieve value for money only if the cabinet office assumes leadership and the government accepts the need for responsible and flexible behaviour from departments. Hall (2016), writing in The Register newspaper, cites the UK National Audit Office's (2016) claim that the cabinet office instead of saving £128 million pounds, rather incurred incremental costs of £4m. The key stakeholders were not consulted, and several departments were not involved with the process. Critical among this failure was bad programme design and major delays in implementing the change.

In Australia, the findings from the Public Service Shared Services report by the Australian National Audit Office, pointed to an SSC implementation that three years on, did not show any value for money for clients. In fact, the Public Service Shared Services Centre in Canberra had payroll services costs costing three times higher than some of the best performing government departments (Towell, 2016).

Given some of the examples of the evidence outlined above, relating to large financial losses, issues with staff management, SSC transition and management of the SSC transactions due to poor SSC implementation, it is evident that there is a need for having guidelines to help with the implementation of the SSC. A DSS tool grounded in systems thinking (SD) can help SSC implementers to experiment with before embarking on the costly SSC journey, thereby helping to mitigate some of these risks. According to Morecroft (1994,

p.5), DSS models can be seen as maps that 'activate and capture team knowledge'; can be used as a framework for filtering and organising knowledge; and as a micro or miniature world for experimentation, learning and co-operation. System Dynamics used as a Decision Support System (DSS) tool exhibit such characteristics.

1.3.1 Gap in knowledge (SD as a decision support system)[8]

As discussed in the preceding sections, in order for organisations or SSC implementers to better understand the factors and variables that affect the SSC implementation, it is vital that they have the use of a decision support system that allows for experimentation by the implementers. This area has not been rigorously researched or published and thus constitutes the gap in knowledge (Janssen and Joha, 2006; Farndale, Paauwe and Hoeksema, 2009; UK Office of Government Commerce, 2009; Gleich, Mosig and Reinwald, 2011; Ramphal, 2013; Knol, Janssen, and Sol, 2014). The developed SD tool is expected to address this gap.

1.3.2 Aims and objectives[9]

From a study of the literature, it was determined that the SSC transformation process has not been rigorously examined especially with regards to the use of SD as a Decision Support System (DSS) in this process and this is the current gap in knowledge that this research seeks to address. The main aim of this research project is to develop a research methodology and framework to evaluate the Shared Service Transition / Implementation Process using a System Dynamics (simulation) approach as a decision support system that allows for experimentation by the SSC implementer. This it is expected will complement

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[8] See also sections 2.5 for further elaboration.
[9] See also section 4.5 for further discussions and Appendices A and B.

current SSC Transformation approaches. Based upon the above discussions, the aims and objectives of this research are:

a)   To identify the factors and variables that are critical to the design and implementation of the case study SSC and how the results compares to the current SSC literature.

b)   To establish whether SD has been used as a DSS tool in the implementation of the SSC under consideration in this research and, if so, if it was beneficial.

c)   To design, build and develop a DSS tool based upon SD to be used in the implementation of the SSC.

d)   To identify and determine the reasons for establishing the SSC under consideration in this research (i.e. the case study) and to determine if any benefits were achieved and how those benefits compare with the current SSC literature.

e)   To determine whether the benefits envisaged during the SSC life cycle stages (being opportunity identification, management review, design and build, pilot stage, implementation and post implementation), with respect to the SSC under consideration in this research, have been achieved and how those benefits compare with the current SSC literature and finally

f)   To add to the literature regarding the management of SSCs and the use of SD as a DSS.

1.4   Structure of the Thesis

The following chapters in the thesis aim to assess the utility of an SD based DSS for assessing and managing the implementation of Shared Service Centres from a theoretical and practitioner-based perspective. It starts by discussing the relevant literature and theoretical underpinnings pertaining to this research (i.e. SSCs). Then, a suitable research

design is developed and adopted using both quantitative and qualitative elements while the resulting data and findings emanating from the data and case study are evaluated.

Chapter Two evaluates and sets out the existing theoretical literature from an academic and practitioner perspective relating to this thesis. The basis for the theoretical hypotheses are also discussed and analysed. This Chapter addresses organisational change, the SSC system; Systems Theory; Simulation and Decision Support Systems; SD as a Decision Support System; Systems Thinking and SD as an offshoot of the Systems movement. The use of SD as a policy and strategy tool as well as the gap in knowledge are also addressed.

Chapter Three reviews the relevant research methods. It then discusses which method has been chosen and why. Furthermore, it discusses the methodology of SD.

Chapter Four lays out the conceptual framework for the research based on Chapters Two and Three. It further expands on the gap in knowledge and thereby the aim and objectives of this research to fill this gap and the role of SD is also emphasised. This Chapter outlines what the purpose of the constructed SD model is, precisely who it is intended for, who will use it, what are its outcomes and how it would benefit the various stakeholders.

Chapter Five describes how the SD model was built. It spells out or identifies key variables from Literature search and the author's personal experience; describes how the initial Causal Loop Diagram was built; how feedback was identified; how the Causal Loop Diagram was revised; how agreement was obtained from relevant managers that this is reasonable and accurate (also for verification purposes) and, finally, how the revised model was used to build the Stock and Flow Diagram. This Chapter in addition, identifies and explains the key loops in both the Causal Loop Diagram (CLD) and Stock and Flow Diagram (SF).

Chapter Six discusses the verification and results of the model. The model is shown to be satisfactory using the Sterman (2000) tests. Furthermore, the model is verified (validated)

abductively based upon the work of Peirce (1865-1967). This Chapter also discusses the verification process using feedback. In addition, four scenarios are explored from within the model, showing the effect on costs, staff and transactions. Finally, the relation to the implementation process is also discussed.

Chapter Seven discusses how the finished work met the objectives and provides recommendations and suggestions for future work.

2   Chapter Two: Literature review

In order to further understand and address the problem, a review of relevant research and writings both from a theoretical and practitioners' perspective by various writers is undertaken. This Chapter discusses organisational change and the causes of success and failures in organisational change; the Shared Service Centre (SSC) and the causes of success and failures in Shared Services. This Chapter also compares the drivers of organisational change and SSCs. In addition, it discusses Systems Theory, Simulation and Decision Support Systems including the use of SD as a Decision Support System as well as discussing Systems Thinking including SD as an offshoot of the Systems movement and its use as a policy and strategy tool.

The Chapter is organised as follows:

2.1   Organisational Change.

2.2   The Shared Service Centre (SSC).

2.3   Systems Theory, Simulation and Decision Support Systems including the use of SD as a Decision Support System.

2.4   Systems Thinking including SD as an offshoot of the Systems movement and emphasis of its use as a policy and strategy tool.

2.5   Gap in Knowledge.

2.6   Conclusion.

2.1 **Organisational Change (Drivers or Reasons)**

In a competitive, complex and changing world, organisations need to change, adapt or die. Several of the major companies from some decades ago no longer exist. Research suggests that 50 percent to 70 percent of all organisational change initiatives fail (Beer and Nohria, 2000; Hammer and Champy, 2001; Kotter, 2008; Senturia, Flees and Maceda, 2008). An example is Rover, the UK car production giant, that is no more because it failed to adjust to its environment (Griffiths, 2005). There are other numerous cases of organisations who have failed to adapt, consequently they have either been absorbed by other companies or have failed (Beer and Nohria, 2000). According to Hawsons (2016), BHS failed to react to the changing needs of its customers and thus was unable to survive like Woolworths.

According to Beer and Nohria (2000, p.133):

> Most traditional organizations, have accepted in theory that they must either change or die… Despite some individual successes, however, change remains difficult to pull off, and few companies manage the process as well as they would like. Most of their initiatives-installing new technology, downsizing, restructuring, or trying to change corporate culture-have had low success rates. The brutal fact is that about 70 percent of all change initiatives fail**.**

Change can be daunting for a lot of people, especially employees who may lose their jobs. It is argued in this research that, change, such as organisational restructuring and new system implementations are for all majority of cases undertaken through people (staff) and therefore the commitment of staff is vital. This implies that organisational change must be carefully managed from an HR (Human Resource) perspective.

So, despite the 70 percent organisational change failure rates why do organisations still embark on changes? Smith and Graetz (2011, p.19), define change as 'establishing a new

order using bold strategies, structures, systems, processes and often fresh people who personify the new ideology'. This implies that change involves new relationships, structures, and processes etc., that are established. Moran and Brightman (2000, p. 66) define change management as 'the process of continually renewing an organization's direction, structure, and capabilities to serve the ever-changing needs of external and internal customers'. Burnes (2004) argues that change occurs at both a strategic and operational level and both are intertwined. As a result, organisational change is intertwined with organisational strategy (Rieley and Clarkson, 2001; Burnes, 2004).

If this is the case, then the question to pose is what drives change? According to Todnem By (2005), for organisations to survive, effective change management is a pre-requisite. However, he argues that current theories regarding organisational change lack empirical evidence and are sometimes contradictory. Todnem By (2005) states that change may be either discontinuous, incremental, smooth incremental or continuous incremental. With these approaches change can occur due to rapid changes in the market, or the organisational context. Change can also be planned, directed, emergent or by how it comes about (Todnem By, 2005). According to Bamford and Forrester (2003) and supported by Todnem By (2005), Lewin (1947), in the last five decades introduced the planned approach to change to the change literature. For change to be successful, three steps must happen. This involves the unfreezing of the present level, then moving to the proposed or new level and finally the refreezing of this new level. Examples of emergent approaches have been postulated by (Kanter, Stein and Jick, 1992; Luecke, 2003; Kotter, 2008).

Change can also be characterised by scale. In this regard, there is a widespread acceptance within the community that change can be fine-tuned or incrementally adjusted. Change can also be a modular transformation or can involve a corporate wide transformation (Dunphy and Stace, 1993; Todnem By, 2005). Other writers such as Van de Ven and Poole (1995)

proposed that the causes of organisational change can be ascribed to teleological, life-cycle and dialectical theories. A teleological perspective emphasises that organisational change strives to achieve an ideal state by for example, continuous goal setting, evaluation etc., while the life cycle theory argues that the organisation goes through a life cycle stage, of birth, growth, maturity and death. Finally, the dialectical theory advocates that organisations are like a society with contrasting values and that the culture of one particular group may dominate over the other.

Smith and Graetz (2011) state that there are nine (9) main change philosophies that drive change in organisations. These are: Rational, Biological, Institutional, Resource, Psychological, Systems, Cultural, Critical and Dualities philosophies.

Rational philosophy sometimes referred to as the strategic approach according to Smith and Graetz (2011, p.6), is the philosophy that 'pursues an alignment between the organisation's structure, its competencies and the environment'. With this approach change happens because of 'linear and strategic thinking" of agents of change and senior executives. It is the leaders and management who make change happens.

It is argued in this research that for a strategic approach to be adopted, the organisation must have a vision and clear strategy, otherwise it would be very difficult if not impossible to implement the change. This also applies to SSCs. Furthermore, as the SSC has significant risks as well as benefits, it is important that senior management buys into this, as without their involvement the SSC may even be a non-starter. One would need finances etc., to have the SSC and this can only be committed by senior management. Therefore, in the pursuit of 'linear and strategic thinking' it is important that the organisation has a coherent strategy and a clearly articulated plan. Strategy, in the view of this researcher, is key in achieving the organisational or the SSCs goal of change. Getting the strategy and planning right will help ensure positive plan design and execution. If the strategy is inadequate, it can

have disastrous consequences for the organisation in terms of costs etc. Although organisational (SSC) change may involve other variables such as for example, the design / build, deployment and project execution in the establishment of the SSC architecture, strategy sets out what direction and what the organisation needs to do.

Koch (2006) argues that strategy helps businesses to differentiate, identify needed resources, customers etc. He opines that strategy should be crafted at the appropriate level. For example, business unit managers should craft operational strategies and chief executives, boards etc. should craft corporate strategies.

Grant (2005, p.18) defines strategy 'as concerned with planning how an organisation or an individual will achieve its goals.' He argues that when the goal is more specific then the definition of strategy can be clear. In effect, there are different levels of strategy depending on the situation we find ourselves. Grant (2005) argues that strategy has various roles within the firm and that strategic management fulfils three (3) key roles, which are decision support, acting as a device for co-ordination and finally strategy acting as a target (forward looking).

It is argued in this research that all the above have implications for the SSC architecture. Those managing the SSC implementation need to understand the environment with effective decision support and that the designs, plans etc., are successfully coordinated (project management); executed effectively (co-ordinating device); and finally, to be forward looking and know where it wants to be in their future use (optimisation phase and continuous improvement).

According to Grant (2005, p.7), for a strategy to be successful the following elements will influence the strategy: these are 'Effective implementation; long term simple and agreed objectives; profound understanding of the competitive environment and objective appraisal of resources.' These elements are shown in Figure 1 below.
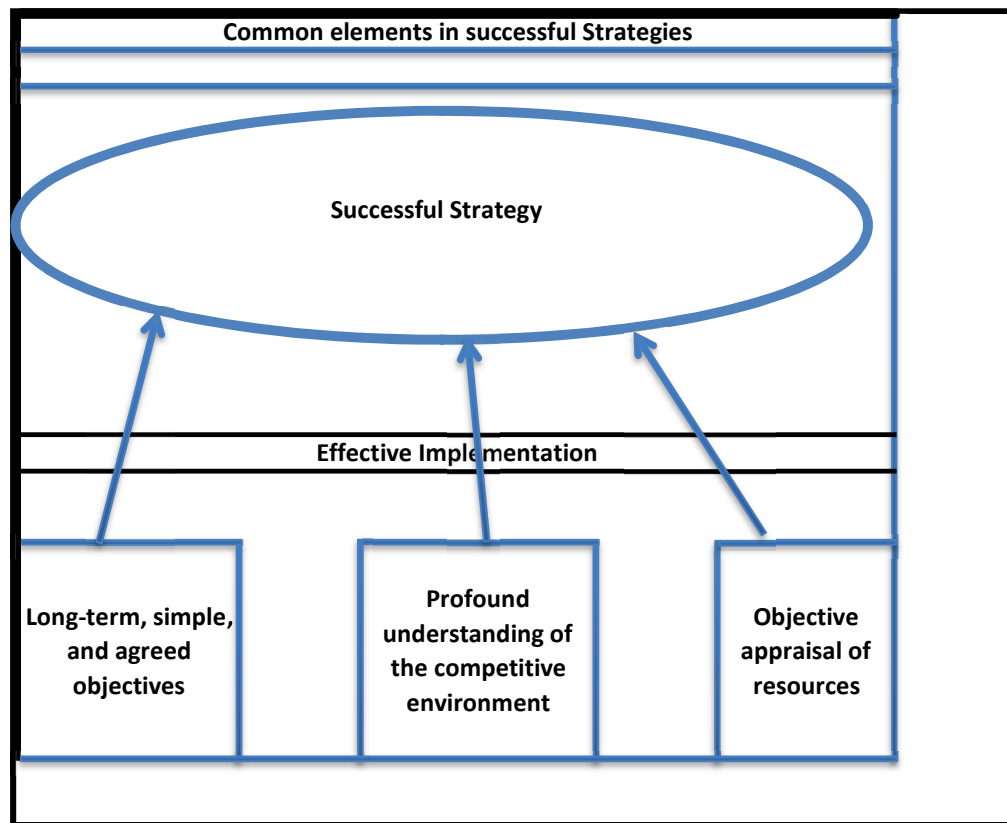
Figure 1 Common elements in Succesful Strategies
Source: Adapted from Grant (2005, p.7)

This has major implications for SSCs as all the above variables are elements of the SSC architecture. From Grant's (2005) arguments, it appears that it is the common elements stated above that determines the successful strategy. While this analogy would make sense, it is argued that it is rather the successful strategy that will have a direct impact on the common elements. This is because the overarching vision of the company needs to be defined first and the common elements as identified by Grant (2005) will be analysed and put in a business plan for example. It is argued in this research that it is this business plan / key strategic document that will provide the guidelines for the common elements to operate. Therefore, a well-defined strategy has a direct impact on the common elements and this will have implications for the SSC, it is argued. An SSC with a well-defined and excellent strategy, coupled with a good execution of the common elements, stands a much better

chance of having an effective implementation. Therefore, it is suggested that strategy is a key component / bedrock of the SSC architecture.

Biological philosophy, another determinant of organisational change according to Smith and Graetz (2011), assumes that organisational change evolves from a biological perspective; as for example species adapt or evolve overtime. Industrial Change is incremental and the focus of change is within the industry rather than the specific organisation, a so called 'population ecology of organisations' (Hannan and Freeman, 1977, p.929). On the other hand, organisations go through a life-cycle approach to change. This theory explains changes in organisations, from conception, growth, maturity and decline (Van de Ven and Poole, 1995; Kezar, 2001).

Institutional philosophy emphasises how organisations change because of pressures from the environment. According to this philosophy, the pressure to change does not always originate from the market but also from agents such as regulatory bodies etc. Political and regulatory changes occur due to new legislation or changes in the regulatory environment such as new parliamentary laws, new tax laws etc. Thus, for example, financial firms must conform to certain regulatory practices, therefore, they are structured in a similar way. Pressure to change might be in the form of regulatory, legal or financial conditions (Powell and DiMaggio, 1991).

The Resource philosophy, according to Pfeffer and Salanic (1978), is that pursuing resources or wealth helps drive change and makes this the most important determinant for surviving and becoming prosperous. Successful organisations are able to deploy their resources intelligently to make profits. Thus, for example, the pursuit of economic resources by organisations helps drive change. This may be for example, the pursuit of natural resources like oil or an organisation deciding to enter new markets. Economic or financial

changes occur due to issues like competitor actions, market actions such as interest rate changes, new product introduction, unemployment rates etc. Thus, for example, the International Environment (globalisation) such as the reduction in commodity prices (oil, gold etc.), world trade agreements etc., do have an impact on organisational change.

With respect to the resource philosophy, Beer and Nohria (2000) argue that there are two (2) main types of change models' archetypes (i.e. Theory E and Theory O). Theory E is based upon economic values (which in this research it is argued that it relates to the Resource Philosophy) and Theory O (which in this research it is argued that it relates to the Psychological and Cultural Philosophies) has its basis on the capacity of the organisation. Theory E is referred to as the hard approach. This involves the 'heavy use of economic incentives, drastic layoffs, downsizing and restructuring' (Beer and Nohria, 2000, p.134). Shareholder value is the only legitimate measure of success. Theory E change strategies are much common than Theory O. It is argued in this research that the Shared Service Centre will mainly fall in the Theory E category, as it involves organisational restructuring, staff layoffs, etc. Theory O advocates have the belief that focusing solely on the share price or the stock price to drive change will in the long run harm the organisation. Therefore, they advocate for the softer approach by developing 'corporate culture and human capability through individual and organisational learning' (Beer and Nohria, 2000, p.134). In their view, very few companies adopt one method exclusively but companies are most likely to adopt a mixture of both methods. The models and their applicability to Shared Service Centres are shown in Table 1 below.

Table 1 Dimensions of Change

Dimensions of Change	Theory E	Theory O	Theories E & O Combined	Shared Service Centres
Goals	Maximize shareholder value	Develop organizational capabilities	Explicitly embrace the paradox between economic value and organizational capacity	Combination of Theory E &O is used
Leadership	Manage change from top down	Encourage participation from the bottom up	Set direction from the top and engage the people below	Mainly Theory E approach is used
Process	Plan and establish programs	Experiment and evolve	Plan for spontaneity	Mainly Theory E approach is used
Reward System	Motivate through financial incentives	Motivate through commitment-use pay as fair exchange	Use incentives to re-inforce change but not to drive it	Combination of Theory E &O is used
Use of consultants	Consultants analyse problems and shape solutions	Consultant support management in shaping their own solutions	Consultants are expert resources who empower employees	Combination of Theory E &O is used

Source: Adapted from Beer and Nohria (2000, p.137).

Psychological philosophies focus on the individual experience of people as change is imposed. This links with the human relations and human development etc., of the organisation. The individual is the most important and focuses on experiences that individuals experience in the organisation (Lewin, 1947). People are extremely important in the management of the affairs of the organisations. In principle, without staff the organisation will fail or find it extremely difficult to function. Even where robots are used, people still need to service these robots, so they can function (Sutevski, 2016).

Systems philosophies see organisations as the combination of its parts rather than as a single unit. It looks beyond the simplistic cause-effect views of management as it views organisations' as consisting of systems (Forrester, 1961; Sterman, 2000; Sherwood, 2002). For system thinkers the organisation is made up of parts and they are interrelated. As such the organisations generates its own 'energy' that is not the same as the sum of the parts.

Cultural Philosophy sees change as responding in a normal manner to their environment (Morgan, 1997). Given that most employees and managers have their own ways of doing things, when change is imposed, this involves fighting these set of values. Cultural change can result in 'fragmentation, controversy and inconsistency' (Smith and Graetz, 2011, p. 13). Social and Cultural changes occur when the organisation has to adapt to a different socio-cultural context such as operating in different national markets with different cultural perspectives, people habits and norms etc., (Sutevski, 2016).

Critical philosophies see change as a clash of ideas (Morgan, 1997). During the clash of opposing forces, human beings generate conflict, which then acts as a driver to change. According to Bolman and Deal (1991), the concept of conflict implies that change involves activities such as influencing, persuading, exhibition of power and bargaining. It is argued in this research that all organisations have some form of structure. This defines the various relationships at work and therefore allow for the effective working of the organisation. Without these structure(s), there will be complete chaos in the organisation. When these structures come into conflict, this creates a clash of ideas and brings about, or contributes to change.

The Dualities philosophy is proposed by Smith and Graetz (2011, p.19). Citing Eisenhardt (2000, p.703), Smith and Graetz (2011, p.19) propose that to manage change, it is important to recognise that:

A multi-philosophy approach recognizes the centrality of contradiction in organizations, and that it is not only possible but desirable for two inconsistent states to exist simultaneously.

They argue against using only one philosophical or theoretical approach. In their view, change implementation is not simple and given the failed amount of change

implementations, change management should not be just about change for the sake of change. It is argued that change is continuous and dynamic, and this implies managing and balancing the tensions between the human interactions that elicit change, such as systems, routines, etc. Smith and Graetz (2011) therefore, call for balancing and reconciliating conflicting philosophies to achieve an optimum outcome. Having discussed the drivers of organisational change, the next question is to explore the causes of success and failures in organisational change.

2.1.1 Causes of Success and Failures in organisational change

There are various change models regarding successful change management in the literature, as for example, Lewin's (1947) three (3) step model, Kotter's (2008) eight (8) step processes, Luecke's (2003) seven (7) Steps and Kanter, Stein and Jick's (1992) ten (10) commandments for successful change management (Todnem By, 2005).

The common theme amongst these models relating to the factors that cause success or failures in organisational change management include effective change management, culture, investment, clear vision and a clear strategy, buy in of important stakeholders (management and employees), clear leadership, using people with the right skills, effective communication, and change measurement (i.e. measuring change initiatives). Table 2 below highlights these four (4) main change models.

Table 2 Change models

Change factors (Authors own Summary of Literature Review)	Kanter, Stein and Jick's (1992) Ten Commandments for Executing Change	Kotter's Eight-Stage Process for Successful Organisational Transformation (2008)	Luecke's Seven Steps (2003)	Stage of Change in Lewin's (1947) Model	Lewin (1947) 3 step change management model(Added by author)- Change Type
Understanding	1) Analyse the organisation and its need for change		1) Mobilise energy and commitment through joint identification of business problems and their solutions	Unfreeze	Understand what needs to change
Vision and Strategy	2) Create a vision and a common direction	3) Developing a vision and strategy	2) Develop a shared vision of how to organise and manage for competitiveness	Unfreeze	Create change needs
	3) Separate from the past			Unfreeze	Address doubts and concerns
	4) Create a sense of urgency	1) Establishing a sense of urgency			
Support from Senior Management and Leadership	5) Support a strong leader role		3) Identify the leadership	Unfreeze	Have support from Senior Management
	6) Line up political sponsorship	2)Creating a guiding coalition			
Strong Project Management	7) Craft an implementation plan				
Adequate Investments and IT infrastructure	8) Develop enabling structure	5) Empowering broad-based action		Change	Empowering People
				Refreeze	Provide training and support
Effective Communication	9)Communicate, involve people and be honest	4) Communicating the change vision		Change	Efective Communication
				Change	Involving people
				Change	Quash rumuors (Communication)
Change Measurement	10) Reinforce and institutionalise change	8 Anchoring new approaches in the culture or making change permanent	6) Institutionalise success through formal policies, systems, and structure	Refreeze	Institutionalise the change in the culture
		7) Consolidating gains and producing more change	4) Focus on results, not on activities	Refreeze	Sustain the gains (change)
		6) Generating short-term win	5) Start change at the periphery, then let it spread to other units without		
			7) Monitor and adjust strategies in response to problems in the change process	Refreeze	Celebration of success

Source: Adapted from Todnem By (2005, p.376)

Even though a lot of organisations' change initiatives fail, it is quite strange that this has not attracted a lot of questioning and attention (Buchanan et al., 2005). Beer and Nohria (2000, p.133) assert that 'the brutal fact is that about 70 percent of all change initiatives fail.' Understanding the process of change is very important to achieving success. Hammer and Champy (2001, p. 221) argue that:

> Our unscientific estimate is that as many as 50 percent to 70 percent of the organizations that undertake a reengineering effort do not achieve the dramatic results they intended.

Kotter (2008, pp.12-13) argues that:

> From years of study, I estimate today more than 70 percent of needed change either fails to be launched…but the pain goes in all directions: to employees, customers, our families.

Senturia, Flees and Maceda (2008, p.1) state that:

> People have been writing about change management for decades and still the statistics haven't improved. With each survey, 70 percent of change initiatives still fail- and the world is getting more complicated.

According to research by McKinsey & Company (2008) as cited by Burnes and Jackson (2011), about 70 percent of all changes in all organisations fail. On the other hand, Hughes (2011) argues that on the contrary, 70 percent of organisational change initiatives do not really fail. Hughes's (2011) reasoning is that there are ambiguities in organisational change management. He argues that writers such as Beer and Nohria (2000), Hammer and Champy (2001), Kotter (2008) and Senturia, Flees and Maceda (2008) neglect the various varieties of organisational change. Furthermore, they do ignore the unanticipated outcome of

organisational changes, while assuming that the significance of a 'single change initiative can be isolated and separately measured' (Hughes, 2011, p.460). Hughes (2011) argues that the above writers do reduce the influence of organisational cultures in the organisational change initiatives. Hughes (2011) states that these theories are of the assumption that with time and the right strategies the 70 percent failure rate can be reduced. Furthermore, he asserts that one cannot ascribe a specific inherent success or failure of a particular organisation to all types of organisational change as the context in which this occurs within an organisation may vary from one organisation to the other. Therefore, in his view, 70 percent of organisations do not fail in their change programmes.

From the ensuing discussions it is apparent that change can fail for a variety of reasons and by understanding the critical success factors to a proposed change an organisation will have a chance of success? Therefore, what are the critical success factors for organisational change?

The critical success factors for organisational change have been depicted as: Effective Change Management, Culture, Understanding the process of change (Having a clear vision and a clear strategy), Effective communication, Strong Project Management Skills, Buy in of important stakeholders (Senior Managers), Clear Leadership, Using people with the right skills (Kanter, Stein and Jick, 1992; Pugh, 1993; Beer and Nohria, 2000; Hammer and Champy, 2001; Senturia, Flees and Maceda, 2008; Kotter, 2008; Maurer, 2010; Burnes and Jackson, 2011).

Effective Change Management is a pre-requisite for successful change management. According to Hammer and Champy (2001), using a bottom up approach in making reengineering happen, or having someone not understanding the change or reengineering to lead the reengineering effort, can be problematic for the change effort.

Culture is another key to change management. In implementing change, it is important to build a culture that supports the organisation and change process. The organisation should not allow the existing culture of the organisation to get in the way of reengineering (Hammer and Champy, 2001). Furthermore, failing to instill the change in the culture of the corporation can affect the organisation (Kotter, 2008). Senturia, Flees and Maceda (2008) argue that for change initiatives to be successful it is important to build a culture that supports change. Failing to take into account the values of people and their beliefs also has an impact on organisational change management (Hammer and Champy, 2001, p.225).

Having a clear vision and a clear strategy is another critical factor for successful change management. Beer and Nohria (2000) advocate that for change to be successful it is essential to keep focus and know what you are intending to do (planning). They advocate for understanding the process of change. A major cause of failures in change initiatives, is when the change approach is not clear or there are too many initiatives. Beer and Nohria (2000) argue that in their experience, a lot of failures occur in change initiatives due to the fact that corporate managers in their haste to enact changes have so many competing ideas and options, lose focus and what they do is at best muddled. As a result, employees and company resources suffer. They argue that the executives of corporations need to better understand the change process. In effect, 'Leaders need to crack the code of change' (Beer and Nohria, 2000, p. 133). According to Hammer and Champy (2001, p.221), the 'key to success lies in knowledge and ability, not in luck'. It is important to avoid repeating the same errors all the time. Kotter (2008; 2012) argue that organisational change fails when the power of vision is underestimated. Senturia, Flees and Maceda (2008) advise that organisations must plan and define the point of departure and arrival by spelling out key action imperatives and initiatives. Kanter, Stein and Jick (1992) talk about creating a vision and a common

direction, whereas Luecke (2003) talks about developing a shared vision of how to organise and manage for competitiveness.

Effective communication is another major determinant for successful change management. Kotter (2008) argue that failing to communicate the vision effectively or under communicating the vision is one of the main causes of organisational change failures. According to Kanter, Stein and Jick (1992), it is important to communicate by involving people and being honest.

Strong Project Management Skills is another major factor. According to Beer and Nohria (2000), organisational change initiatives fail because managers are doing multiple change initiatives and the change initiative is not well structured. Beer and Nohria (2000, p.133) argue that in effect the reasons why organisations fail in change management are managers ending 'up immersing themselves in an alphabet of soup initiatives'. In effect, managers are doing multiple change initiatives and the change initiative is not well structured. Furthermore, Hammer and Champy (2001, p.224) argue that excluding or ignoring everything except the process design also leads to organisational change failures. In the UK National Audit report, Amyas Morse, head of the UK National Audit Office (2016, p.11) opined that:

> The Cabinet Office's failure to manage the risks around the move to two independent shared service centres from the outset means that the programme has not achieved the significant anticipated savings and benefits to date. The Cabinet Office has begun to find its role in leading the programme but the delays have meant that technology has moved on significantly. The programme will only achieve value for money in future if the Cabinet Office shows clear leadership, and government accepts the need for collaborative and flexible behaviours from all departments involved.

Furthermore, according to Hall (2016) citing the UK National Audit Office (2016), the cabinet office Shared Services Centres were supposed to save £128m but ended up saving £0 and rather had a cost overrun of £4m. Stakeholders were not consulted, and several departments are unhappy. Critical among this was bad programme design and major delays.

Buy in of important stakeholders (Senior Management) is another major determinant. Kotter (2008; 2012) argues that organisational change failures can occur if there is an inability to bring together major stakeholders with enough authority to lead the change and work together. It is important to have the buy in of senior management and major stakeholders who have an interest and would be affected by the project. Furthermore, the buy in of employees as stakeholders is also very important.

According to Burnes and Jackson (2011, p.158), one of the major reasons for organisational change failure 'is a lack of alignment between the value system of the change intervention and of those members of an organization undergoing the change'. Thus, it is argued that where for example there is not a strong alignment between the employees (members) undergoing the change and the values system of the change organisation, this can create chaos or an imbalance in the change process. Burnes and Jackson (2011, p.137) argue that successful change involves the 'value alignment of three factors those involved in the change intervention, the objective of the intervention and the approach to change'. By aligning the values of the organisation to the change event, there is a likelihood that the change may succeed. Lewin's (1947) change model also argues for the need to have support from Senior Management.

Leadership is another major determinant of successful change management. Senturia, Flees and Maceda (2008, p.1) argue that it is important to 'fire up the troops', make difficult decisions and making people accountable for their actions. Kotter (2008; 2012) argues against allowing obstacles to disrupt the change initiative and Hammer and Champy (2001,

p.233) advises not to be afraid of change resistance. According to Kanter, Stein and Jick (1992), it is important to have a strong leadership support role. Furthermore, Luecke (2003) argues for identifying leadership change management.

Using people with the right skills is another major determinant of successful change management. Senturia, Flees and Maceda (2008, p.1) argue that it is important to 'find your champions'. According to Hammer and Champy (2001, p.229), having someone not understanding the change or reengineering to lead the reengineering effort can cause organisational change failure. Hammer and Champy (2001, p.221) further assert that the 'key to success lies in knowledge and ability, not in luck'.

Providing adequate resources is another determinant of successful change management. Hammer and Champy (2001) argue that one of the failures of organisational change is when the organisation does not provide adequate resources. Kanter, Stein and Jick (1992) talk about developing an enabling structure.

Lengthy implementation periods are another determinant of successful change management. According to Hammer and Champy (2001), organisational change fails due to lengthy implementation periods or abandoning the project too early. Therefore, there is a need to strike a balance.

Change Measurement (i.e. measuring change initiatives) is another key determinant of successful change management. Prominent among these writers are Hammer and Champy (2001) who argue for not settling for insignificant results, Kotter (2008 ;2012) advocated for creating short-term wins and Senturia, Flees and Maceda (2008) advocated holding people accountable and putting in explicit accountability measures in place. Senturia, Flees and Maceda (2008) argue for tracking, measuring performance and acting on the results, thereby raising the bar to ensuring organisational change successes. Luecke's (2003) advises to

focus more on the results or outcome of the change process and not the activities while monitoring and adjusting strategies to the change process as problems arise.

The successful change management factors described above it is argued applies to Shared Services. Shared Services arise as a result of responses mainly to the internal / external environment of an organisation. Understanding why the company needs to change, how to do this change and what to accomplish is very important. Therefore, the key success criteria regarding organisational change relate to the Shared Service Centre. As argued earlier, SSCs are organisations, and organisational change strategies do have effect on SSCs. Therefore, the next section looks at what are the drivers / reasons / motives for having Shared Service Centres?

2.2   The Shared Service Centre (Drivers / Reasons / Motives for having Shared Services)

The motives or reasons of having SSCs it is argued can be ascribed to a combination of the different philosophies of organisational change. However, it is argued that the dualities philosophy advanced by Smith and Graetz[10] (2011), which calls for using a combination of the various philosophies is applicable to SSCs. The process of building the SSC is strategic (Rational); can be biological (the life cycle of the organisation); determined by internal and external factors such as competitor pressure (Institutional); a need to streamline processes and improve shareholder value (Resource); will affect people (Psychological); and has cultural implications (Cultural).

The main primary motives of SSCs are cost reduction, process improvements, headcount reduction, and centralisation of routine processes according to (Bergeron, 2003; Bangeman,

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[10] See also discussions in Section 2.1 above.

2005; Janssen and Joha, 2006; Walsh, McGregor-Lowndes and Newton, 2006; Burns and Yeaton 2008; Deloitte, 2011; Miskon et al., 2011; PWC, 2011; Paagman et al., 2015).

Cost reduction has been identified as the most important factor for creating SSCs. In a review of 13 key motives for the introduction of SSCs, Paagman et al. (2015) identified that the cost or economic motive was the main driver. Cost reduction can occur in various forms, such as headcount reduction etc., (Fahy, Curry and Cacciaguidi-Fahy, 2002; Janssen and Joha, 2006; Burns and Yeaton, 2008; Miskon et al., 2011; Paagman et al., 2015; Raudla. and Tammel, 2015; Tammel, 2017). Bangeman (2005) calls it cost leadership (optimisation of costs) and Bergeron (2003) calls it the reduction of costs.

Process Improvements according to Fahy, Curry and Cacciaguidi-Fahy (2002), is one of the main motives for establishing the SSC. Bergeron (2003) calls it the improvement of services, whilst to Bangeman (2005) this is Quality Leadership, i.e. the delivery of quality services. The establishment of SSCs allow for the improvement in processes. According to Goh, Prakash, and Yeo (2007, p.251), driven by the need to reduce costs and improve service quality, some organisations have adopted the SSC governance model in managing their staff activities.

Customer Focus is another determinant. By re-aligning services, SSCs are supposed to be more customer focused. Bangeman (2005) identifies this as developing customer relationship both internally and externally.

Centralisation of routine processes is another motive for undertaking the SSC. According to Fahy, Curry and Cacciaguidi-Fahy (2002), centralisation of routine processing of transactions is one of the main reasons for having the SSCs. By centralising the routine processes, economies of scale are achieved and there are fewer distractions from core competencies (Bergeron, 2003; Deloitte, 2011; PWC, 2011). Furthermore, Janssen and

Joha (2006) ascribe to similar motives such as strategic and organisational; economic and technological motives such as better access to IT and consolidation of the IT infrastructure.

Shared Services Centres are described as having both advantages and disadvantages. According to (Fahy, Curry and Cacciaguidi-Fahy, 2002; Bergeron, 2003; Bangeman, 2005; Janssen and Joha, 2006, Miskon et al., 2011; PWC, 2011; Paagman et al., 2015), the advantages of Shared Service Centres include:

A Clear separation of responsibilities: In this regard SSCs are accountable for their unit and contribution to the organisation.

Quality assurance: Quality of work and customer service is effectively assured, monitored and can be rectified as and when required.

Process Standardisation: SSCs allow for processes to be standardised where possible. For example, accounts payable and receivables are processes that can be standardised. According to PWC (2011), eliminating deficiencies and improving processes achieve advantages.

Service Level Agreements: Customer relations are maintained by clearly defined customer supplier relationships based upon service level agreements.

Information Consistency: A consistent level of information is provided as most of the SSC functions are now carried out under a span of control that allows the information to be monitored and standardised thereby ensuring consistency.

Improved decision making: SSCs allow for improved decision making, as information can be easily collated and analysed from one location rather than multiple locations.

Headcount reduction is a major factor in the SSC concept (Fahy, Curry and Cacciaguidi-Fahy, 2002; Burns and Yeaton, 2008; Deloitte, 2011; Miskon et al., 2011; PWC, 2011;

Paagman et al., 2015). Bergeron (2003) calls it decreased personnel requirements. It is argued in this research that as there are many people performing the same tasks, by re-aligning the tasks there is a need for fewer people, thus, the concept of headcount reduction. When the SSC works in an enabling context then SSCs can help enable a reduction in the back-office headcount (Tammel, 2017).

According to a study by Fahy, Curry and Cacciaguidi-Fahy (2002), most shared services implementations have been done by multinationals' although governments are now actively involved. The study finds out that staff turnover was very high during the implementation process as most of the activities were transaction based. There could be frequent misunderstandings in culture and communication norms and that staff motivation was very difficult. It is argued that the effective management of staff turnover is very key to the Shared Services. Based upon this discussion the following hypothesis is advanced:

Hypothesis 2b:[11]

The inefficient management of staff turnover can lead to further increases in costs.

Potential disadvantages of creating shared services include the lack of proper plan implementation and management (UK National Audit Office, 2008; 2011; 2016). The UK National Audit Office in 2008 performed an audit of the Department of Transport regarding its shared services. The findings showed that plan implementation and proper management was required for an effective shared service centre implementation. In their findings, they found major changes to cost assumptions during the process and the inadequate management of the Shared Service Centre.

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[11] The hypotheses for this research are developed starting from Hypotheses 1 to 3 in Chapter Four; 'Conceptual Framework' in Section 4.5. This is also shown in Figure 14 'Case Study Research Design for this research' and also in Figures 19 and 20 'Conceptual Framework' of the two strands.

SSCs can provide significant savings. 'If managed properly, shared services reduce costs, improve services, and can even generate revenues' (Lacity and Fox, 2008, p.17). According to PWC (2011), on average there are considerable savings that can result from having a shared service centre. As shown in Table 3 below, the level of savings ranges from a low of 0.2 percent to a high of 40 percent.

Table 3 SSC Savings Potential

Business function	Finance	Human resources	Procurement	IT
Target costs	0.5%	0.2%	0.2%	0.6%
Median	1%	0.4%	0.3%	1%
Lowest quartile	1.6%	0.9%	0.5%	2%
Savings potential as a percentage of total costs	30-50%	30-50%	25-40%	25-40%

Source: PWC (2011, p.5)

2.2.1 Comparison of drivers of Organisational Change and SSCs

Having discussed the reasons and motives for organisational change and SSCs, a comparison of drivers of organisational change and SSCs is discussed below. Table 4 below compares the drivers of organisational change and that of Shared Services. From Table 4 below, it can be seen that the drivers of organisational change are similar to that of Shared Services.

Table 4 Comparison of drivers of Organisational Change and SSCs

Philosophy	Nature of Change	Strengths	Weaknesses	Management focus	Shared Services
Rational	Directed and Planned	Emphasises Controllable aspects of Change	Ignores or sidesteps external pressures	Strategy and Planning	Senior Management Support
Biological	Ecological, organic and evolutionary	Explains life cycle fitness and survival	Heavy emphasis on environment; fails to explain deliberate change	Environmental positioning; find industrial niche; progression of organisation through the life-cycle; growth	Can be argued as life cycle of business

Philosophy	Nature of Change	Strengths	Weaknesses	Management focus	Shared Services
Institutional	Determined by institutional (industry) pressure	Reveals importance of industrial environment and pressures to conform	Lack of focus on need to find advantages against competitors	Industrial Standards and Benchmarks	Response to Industry demands
Resource	Determined by access to resources	Shows need to acquire resources to initiate and sustain change	Assumes change cannot occur without internal resources	Acquiring and discharging resources; core competencies, particularly of management	Cost Reduction, Headcount Reduction
Psychological	Embedded in minds of those affected	Highlights individual impacts and stresses of change	Can ignore systemic aspects of change in organisation	Managing employee transitions and psychological adjustments to change	Employee and HR Management
Systems	Interconnected with all aspects of organisation	Avoids the trap of assuming that change is contained in one organisational area	Complexities of keeping track of relationships between organisational variables	Change to all constituents and components of an organisation	IT systems, Centralisation of Routine Processes
Cultural	Determined by entrenched values	Shows importance of collective beliefs and norms	Difficult to address directly	'Deep' rites, rituals and values	Organisational Culture and Industry Culture
Critical	Conflict and Power based; rejection of universal rules	Demonstrates role of power and clashing ideology; juxtaposition of old and new explains contradiction in change	Assumes all change manifests through power; can result in no approach to change at all confusion about nature of change	Acquiring power bases; flexibility, empowerment and responsiveness	Senior Management
Dualities	Dynamic, Complex	Abandons the need for balance in favour of performance	Demands an understanding of all philosophies	Managing the tensions between change and continuity	Various Stages, Build and Design

Source: Adapted from Smith and Graetz (2011, pp. 16-17)

Having identified the drivers of change in SSCs and compared it to organisational change drivers, the next step is to identify the causes of failures in SSCs. As argued earlier, SSCs

are part of organisations and therefore the causes of success or failures in organisational change do impact on the SSCs.

2.2.2 Causes of Success and Failures in Shared Services

Even though SSCs have been promoted as providing benefits and savings, there are quite a number of SSCs that have failed (Janssen and Joha, 2006; Lacity and Fox, 2008; UK National Audit Office, 2008; 2011). In order to explore this, the determinants of success and failures from an SSC perspective are discussed. According to Walsh, McGregor-Lowndes and Newton (2006, p.5), researchers investigating the private sector shared services phenomenon have identified common critical success factors. These relate to implementation and the ongoing operations. In the implementation phenomenon six key factors were identified and these are: having top level management support; determination of the type of services to move into the shared service centre; personnel management issues; governance of the shared service; having balance between business process redesign and reshaping of people's roles and responsibilities; and finally embedding a new culture. For the ongoing management of the operations the key success factors are 'monitoring and managing costs; accountability issues; use of service level agreements; and performance accountability' (Walsh, McGregor-Lowndes and Newton, 2006, p.7). Five main success or critical factors were found by (Burns and Yeaton, 2008) which supports the above.

According to Fahy, Curry and Cacciaguidi-Fahy (2002, p.5):

> The key critical success factors are a clear vision, strategy and support from senior management. Support from senior management is particularly important as this type of project cuts across the power base of the organisation and, as with any moving of one set of responsibilities to another location, there will be resistance. When this

resistance appears, senior management support ensures that the project moves forward. Furthermore, Lacity and Fox (2008) support these assertions.

They argue that if SSCs are managed successfully they can create major savings. However, it has been shown from surveys that the expected outcomes have not been achieved.

Miskon et al. (2011) in a survey of literature review on SSCs regarding IT (Information Technology)[12], identified nine success and five failure factors regarding SSCs successes and failures. Success factors are the factors that contribute positively to achieving the goals of the SSC. Failure factors are factors that inhibit the SSC objectives from occurring or leads to the abandoning of the project partially or totally (Rockart, 1979; Sedera and Dey, 2007; Miskon et al., 2011). Miskon et al. (2011) citing Grainger et al. (2009) state that there are five failure factors that are of essence and need to be managed. These include partially or completely abandoning the project; failing to meet the specifications and goals; failing to implement the project in a timely and cost-efficient manner; not meeting the expectations of stakeholders and finally not supporting positive user behaviour.

Therefore, following on from the above discussions, what are the critical success factors or reasons why SSCs fail or succeed? These are now discussed below.

Strong Information Technology (IT) skills or capabilities is a major determinant. Miskon et al. (2011) identified Information Technology as one of the main factors. Having Strong IT capabilities helps with the ease of implementation. Borman (2008) talks about working effectively with the IT provider. Fahy, Curry and Cacciaguidi-Fahy (2002) advocate for the right level of investments to be made available for organisational change management and technology. An excellent IT infrastructure is important. Companies must ensure that they invest in a robust IT platform, which is not fragmented, but robust and meets the purpose

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[12]IT means and Information Technology and are used interchangeably in this research

for which it was designed as it is necessary for the launching of an SSC (PWC, 2012). For Deloitte (2011), Information Technology involves what IT systems and applications are needed or should be changed. Lacity and Fox (2008) argues that one of the main components of organisational / SSC design is technology enablement.

Effective Change Management is a key determinant in the success of SSCs. Any new change in organisational structure involves the concept of change management. Without this, it could be difficult for the organisation to be able to push through its reforms (Miskon et al., 2011). It is argued that this also applies to the creation of an SSC as this is a form of change.

Therefore, all stakeholders need to be effectively informed and issues addressed so as not to endanger the change process.

Borman (2008, p.9) asserts that 'It is necessary to carefully manage the change for the employees of the SSC and the rest of the organisation'. According to Burns and Yeaton (2008), a strong change management and phased approach to the implementation of Shared Services is required.

Effective Communication is another key determinant in the success of SSCs. This theoretical perspective argues that as the concept of SSC is new to the organisation a very effective level of communication is required. Issues such as retrenchment or hiring of staff, need to be addressed (Miskon et al., 2011). According to Fahy, Curry and Cacciaguidi-Fahy (2002), communication can impact on the SSC. There must be ongoing communication / periodic meetings between the SSC staff and the local staff. PWC (2012) argue that communication is key to the SSC and this must be effective at all levels. The calibre of SSC managers / directors is also very important as this can also increase the chances of succeeding. In effect, it is important to communicate the necessary changes needed at the

right time to stakeholders (Burns and Yeaton, 2008). According to Janssen and Joha (2006), communication is a key ingredient that has an impact on the SSC users and the SSC; and this can affect the process performance of the SSC.

Implementation of standardised processes is another key success factor. According to Miskon et al. (2011), one of the fundamental theoretical arguments found in the literature survey is the implementation of standardisation. Standardisation in itself means having common processes and ways of doing things. In implementing standardisations, the organisation should be clear about what is being standardised (Fahy, Curry and Cacciaguidi-Fahy, 2002; Bergeron, 2003; Deloitte, 2011; Janssen and Joha, 2006; PWC, 2012).

Knowing what activities to transition or share is a key determinant of the success of SSCs (Miskon et al., 2011, p.4). Citing Borman (2008), Miskon et al. (2011) argue that knowing 'what is to be shared' involves having a methodological approach in determining what to include and not to include in the SSC. It is vital for SSCs to understand what their capabilities are and what they need to do to ensure that they enhance the business goals. Furthermore, understanding the type of delivery model required is key for the SSC design (Lacity and Fox, 2008; Deloitte, 2011; PWC, 2012).

From the preceding paragraph, in terms of knowing 'what' is to be shared, it is argued that as most of the tasks taken over by SSCs relate to transactional activities, it is imperative that there is a clear understanding of what transactional activities need to be considered. It is argued that if there is no concept of this, then the SSC will have significant issues. Based upon the preceding discussions the below hypothesis is espoused.

Hypothesis 3:

The inefficient management of transactional activities or errors created in the transactional activities can lead to increased costs for the organisation.

Another key success determinant for SSCs is **having strong project management capabilities**. It is argued that a key criterion to managing the SSC includes strong project management skills and practices. As the creation of an SSC is a project, it requires project management techniques to ensure that the project is done on time and all variables that impact or are key to the project are acquired and implemented.

Miskon et al. (2011) argued for having strong project management attitudes and processes in place. Burns and Yeaton (2008) argue that strong project management skills are required. According to Deloitte (2011), as SSCs are projects undertaken within the organisation, it is important to understand and address how the projects will be managed.

Top management support is another key determinant. According to Becker, Niehaves and Krause (2009, p.2) and supported by Miskon et al. (2011):

> Management support and leadership are crucial success factors for the implementation of shared services and… the role of such key actors has to be taken into account when examining the emergence of shared services.

Top management will have to provide the resources and help guide the SSC on its way. Therefore, it would be difficult without their support. Fahy, Curry and Cacciaguidi-Fahy (2002) argue for the support of Senior Management. Deloitte (2011) calls for understanding how change will happen and be managed in the organisation.

According to PWC (2012), the buy in of senior management is a must. It is important to get the buy in of senior management in the organisation as well as support from the main

stakeholders. Burns and Yeaton (2008) argue that senior-level support is a must and must be sought.

Cultural and people issues are another key determinant. In a survey conducted by PWC (2012), they argue that to succeed organisations should give priority to cultural and people issues as they will have a higher chance of success. Survey participants warned about the challenge of change management that is required.

Furthermore, **Organisation and Human Resources (HR) is another key determinant**. As most of the activities involved in an SSC affects people, the Human Resource function (HR) is very key and must be managed carefully (Deloitte, 2011; Miskon et al.,2011).

As a consequence, from the above discussions, the below hypothesis is thus espoused.

Hypothesis 2:

The performance of a newly established SSC is strongly determined by the ability to retain its staff.

Another key determinant is the selection of the optimal site location. It is important that a convenient site is selected, which allows for the right level of skilled employees and facilities / infrastructure to be available. It is not conducive to site an SSC in a place where for example, transportation facilities are not good (Fahy, Curry and Cacciaguidi-Fahy, 2002; Deloitte, 2011; PWC, 2012).

Having a clear vision and strategy is another key determinant. Fahy, Curry and Cacciaguidi-Fahy (2002) call for a clear vision and strategy. Lacity and Fox (2008) advocate for adopting the right type of transformation, identifying the right processes for the shared services, understanding the cost attributes and getting the business units and internal staff to cooperate regarding the SSC initiative.

Borman and Janssen (2013) using a reconciled approach of critical success factors for Shared Service identified three (3) main critical success factors (categories). These are: outcome, implementation process and operating environment characteristics. According to Borman and Janssen (2013, p. 390), even though there is an increasing use of SSCs by both public and private entities, the aspect of 'implementation has often proved to be difficult and the factors which are critical to success are not yet well understood'. They thus advocated for two (2) approaches. The first approach was to determine the factors that a specific individual requires to achieve their outcome and the second approach was to determine the general factors that allows for implementing a specific project. When these two approaches are reconciled, they opine that the result is more beneficial.

Having discussed the key success factors for the SSC, the next step is to discuss the factors that contribute to failure for an SSC. Failure Factors identified within Shared Services (SSC) include:

Mismanagement of potential staff retrenchment. This is a failure factor according to (Deloitte 2011; Miskon et al., 2011; PWC, 2012). It is argued that as SSCs involves the unfortunate layoff of staff and retrenchment / changes in the career of some staff, it is important to manage this properly. For example, if staff, especially staff who are supposed to be laid off, are the same staff required to provide training to the new staff and they are not managed or treated properly, this can easily disrupt the smooth handover of work. This has the possibility of increasing staff costs as new replacements may have to be found and this may delay implementation. Fahy, Curry and Cacciaguidi-Fahy (2002) state that this area is very important as this has a big impact on the SSC transformation.

Rigid staff arrangement also contributes to the failure factors. Change management both inside and outside the organisation, such as obtaining the agreement of staff, substantial changes in the roles of staff are seen as some of the inhibitors to the establishments of

SSCs (Miskon et al., 2011). It is recommended that these issues are addressed satisfactorily within the organisation as this can contribute to significant resistance. According to Fahy, Curry and Cacciaguidi-Fahy (2002), the motivation of employees during work-shadowing is key as work-shadowing is very stressful. Furthermore, local personnel working away from their home countries need to be provided with support during the work-shadowing process.

Based upon the above discussions the below hypothesis is advanced.

Hypothesis 2a:

Staff capacity during the establishment of a new SSC is strongly dependent on the ability to manage workloads and keep turnover down to a minimum or low rate.

Another potential failure factor is **lengthy or long implementation periods.** If SSC projects are not managed properly this can lead to long implementation times. The argument is to propose mechanisms where management can see the investment trade-offs and also by ensuring that organisational efficiency / effectiveness is not sacrificed or reduced (Fahy, Curry and Cacciaguidi-Fahy, 2002; Bangemann, 2005; Deloitte, 2011; Miskon et al., 2011).

Another failure factor is **the right level of investment.** SSCs require heavy upfront investment and this needs to be justified. In effect, how will these upfront costs be recouped? It is important to make a case for this via the business case. According to Miskon et al. (2011), failing to understand the realisation of the benefits and costs can be seen as a failure. Furthermore, (Deloitte, 2011; PWC, 2012) argue for the right level of investments.

Based upon the above discussions, it is very clear that the main critical success factors for an SSC are: Having a clear vision and a clear strategy, (What is the vision and Strategy of the organisation?); Buy in from senior management (This is needed to drive the process forward); Effective Communication (Effective communication of change and issues are required); Effective Change Management (Change in the organisation must be managed

effectively); Robust IT Architecture (The IT infrastructure is a key component); Strong Project Management Skills (As SSCs are projects it is important to have people with the right skills to manage the process); Organisation and HR, (As most of the activities involved in an SSC affects people, the Human Resource function / HR is very key and must be managed carefully); Site Location, (It is important a convenient site is selected, which allows for the right level of skilled employees and facilities / infrastructure to be available. It is not conducive to site an SSC in a place where for example transportation facilities are not good); and Adequate Investments (This needs to be provided for an SSC to be successful).

It is thus concluded that the success / failure factors identified for the SSCs are similar to the key success factors that organisations' need to muster to succeed at managing organisational change.

The similarities and differences between the Critical Success Factors of SSCs and Organisations are shown in Table 5 below.

Table 5 Comparison of the Critical Success Factors of an SSC and Organisations from a practitioner and Academic perspective

Number	Critical Success Factors Criteria (SSCs)	Academic-SSC	Practitioner-SSC	Critical Success Factors Criteria (Organisational Change)	Academic Organisational Change	Practitioner Organisational Change
1	Robust It Architecture	(Borman, 2008; Lacity and Fox, 2008; Deloitte, 2011; Miskon et al., 2011;PWC, 2011)	Deloitte (2011) and PWC (2011)	Provision of Adequate Resources	(Lewin, 1947;Luecke, 2003; Kotter, 2008; Lacity and Fox, 2008)	Senturia, Flees and Maceda (2008)
2	Effective Change Management	Burns and Yeaton (2008), Borman (2008) and Miskon et al. (2011)	Deloitte (2011)	Effective Change Management	(Lewin, 1947;Kanter et al., 1992; Pugh, 1993; Hammer and Champy, 2001; Luecke, 2003; Maurer, 2010; Burnes and Jackson, 2011)	Senturia, Flees and Maceda (2008)
3	Location	Fahy, Curry and Cacciaguidi-Fahy (2002)	Deloitte (2011)	Location (Adequate Resources)	Kotter (2008)-Implied from Provision of Adequate Resources	
4	Culture	Fahy, Curry and Cacciaguidi-Fahy (2002), Burns & Yeaton (2008) and Miskon et al. (2011)	Deloitte (2011), PWC US (2011) and PWC (2012)	Culture	(Kanter et al., 1992; Pugh, 1993; Hammer and Champy, 2001; Kotter, 2008; Burnes & Jackson, 2011)	Senturia, Flees and Maceda (2008)
5	Having a Clear Vision	Fahy, Curry and Cacciaguidi-Fahy (2002), Lacity and Fox (2008) and Miskon et al. (2011)	Deloitte (2011) and PWC (2011)	Having a Clear Vision (Understanding the Process of Change)	(Kanter et al., 1992; Pugh, 1993; Beer & Nohira,2000; Hammer and Champy, 2001; Rieley and Clarkson, 2001;Grant, 2005; Koch, 2006; Kotter, 2008; Burnes and Jackson, 2011)	Senturia, Flees and Maceda (2008)
6	Effective Communication	Fahy, Curry and Cacciaguidi-Fahy (2002), Janson and Joha (2006), Burns and Yeaton (2008) and Miskon et al. (2011)	Deloitte (2011) and PWC (2011)	Effective Communication	(Kanter et al., 1992 ,Pugh, 1993; Janson and Joha, 2006; Borman, 2008; Kotter, 2008; Burnes and Jackson, 2011)	Senturia, Flees and Maceda (2008)

Number	Critical Success Factors Criteria (SSCs)	Academic-SSC	Practitioner-SSC	Critical Success Factors Criteria (Organisational Change)	Academic Organisational Change	Practitioner Organisational Change	This Research Paper: Phase I & II Results
7	Strong Project Management Skills	Burns and Yeaton (2008) and Miskon et al. (2011)	Deloitte (2011)	Strong Project Management Skills	(Lewin, 1947;Kanter et al., 1992; Pugh, 1993; Hammer and Champy, 2001; Luecke, 2003; Maurer, 2010; Burnes and Jackson, 2011)	Senturia, Flees and Maceda (2008)	*Effective SSC Design and Buil, dOther-Infrastructure and Project Management, Project Execution*
8	Buy in from Senior Management	Fahy, Curry and Cacciaguidi-Fahy (2002), Burns and Yeaton (2008) and Miskon et al. (2011)	PWC (2011)	Buy in of Important Stakeholders	Lewin (1947), Luecke (2003) and Kotter (2008)		Other-Strategy,Support from Senior Execs and Project Execution
9	Organisation and HR (Human Resources)	Fahy, Curry and Cacciaguidi-Fahy (2002), Burns and Yeaton (2008) and Miskon et al. (2011)	Deloitte (2011)	Using People with right skills	(Lewin, 1947; Kanter et al., 1992; Pugh, 1993; Hammer and Champy, 2001; Luecke, 2003; Kotter, 2008; Burnes & Jackson, 2011)	Senturia, Flees and Maceda (2008)	*Human Resources*
10	Change Measurement	Fahy, Curry and Cacciaguidi-Fahy (2002), Jansson and Joha, 2006; Burns and Yeaton (2008) and Miskon et al. (2011)	Deloitte (2011) and PWC (2011)	Change Measurement-Measuring Change Initiatives	(Lewin, 1947; Kanter et al., 1992; Pugh, 1993; Hammer and Champy, 2001; Luecke, 2003; Kotter, 2008; Burnes & Jackson, 2011)	Senturia, Flees and Maceda (2008)	*Costs, Effective Organisation, Benefits*
11	Other Factors	Fahy, Curry and Cacciaguidi-Fahy (2002), Janson and Joha (2006) ,Burns and Yeaton (2008), Lacity and Fox, (2008) and Miskon et al. (2011)	Deloitte (2011) and PWC (2011)	Other Factors	(Lewin, 1947; Kanter et al., 1992; Pugh, 1993; Hammer and Champy, 2001; Luecke, 2003; Kotter, 2008; Burnes & Jackson, 2011)	Senturia, Flees and Maceda (2008)	*Costs, Effective Organisation, Benefits*
12	Adequate Investments	Fahy, Curry and Cacciaguidi-Fahy (2002), Lacity and Fox (2008) and Miskon et al. (2011)	Deloitte (2011) and PWC (2011)	Provision of Adequate Resources	(Lewin, 1947; Kanter et al., 1992; Pugh, 1993; Hammer and Champy, 2001; Luecke, 2003; Kotter, 2008; Burnes & Jackson, 2011)	Senturia, Flees and Maceda (2008)	*Costs, Effective Organisation, Benefits, Other Infrastucture*

Source: Author's summary of various writers from organisational change and SSCs from Literature Review

Based upon the above discussions the below hypothesis is espoused.

Hypothesis 1b:

There are some key (critical success factors) associated with SSCs that influence the design / build and implementation of SSCs.

2.2.3 **SSCs and SSC Delivery Models, build / design / implementation, key SSC criteria and weaknesses in current SSC models.**

2.2.3.1 SSCs and Service delivery model

For SSCs, selecting the right delivery model is key (Deloitte, 2011). Organisations have principally two (2) main service delivery models open to them. This is either through the SSC / outsourcing route or through the Centralisation Service Delivery route (Deloitte, 2011; PWC, 2011). The differences between SSC / Outsourcing and Centralisation delivery models are shown in Table 6 below.

Table 6 Differences between SSC / outsourcing and Centralisation

Attributes	SSC or outsourcing	Centralisation
Orientation and accountability	Business Units	Corporate
Key Performance Targets	Service Excellence and continuous improvement	Cost reduction and central control
Use of key performance indicators, Service Level Agreements, Service Costing	Widespread	Rare
Likely Location	Neutral location separate to business unit	Corporate
Classification	An independent unit	Another corporate function
Run by	An entrepreneur/external service provider	An accountant

Source: Deloitte (2011, p.5)

Under the SSC Service Delivery Model, there are five (5) stages and under the Outsourcing Service Delivery Model, there are six (6) stages. This reflects the fact that under the outsourcing service delivery model normally an outside firm will be delivering this service and therefore a contract is needed for the provision of services. However, the processes and implementation in both models are somewhat similar.

Begeron (2003) goes further by identifying four (4) main types of service delivery models which are shown in Table 7 below. According to Begeron (2003), the advantages and disadvantages are a function of the type of service model chosen.

Table 7 Service delivery model types

	Decentralized	Centralized	Outsourcing	Shared Services
Revenue Returned to	Corporation	Corporation	Vendor	Business Unit
Reporting to	Department	Corporation	Vendor	Business Unit
Reward Returned to	Department	Corporation	External	Customer Satisfaction
Management	Department	Corporation	External	Business Unit
Advantage	Flexibility	Control	Low Start-up Cost	Efficiency
		Consistency		Downsizing
		Latest Technology		Latest Technology
Disadvantage	Detracts from Core Competency	Inertia	Dependency	Culture Change
			Loss of Control	High Start-up Cost

Source: Bergeron (2003, p.16)

Before selecting the type of service delivery model, it is important to understand the value chain of the organisation. The organisation's current value chain needs to be considered in addition to considering 'how supplier and customer interactions can be facilitated within a shared services or outsourcing environment' (Deloitte, 2011, p.6). Furthermore, it is important to understand the benefits that you will derive from the implementation and the chosen service delivery model before proceeding (Deloitte, 2011). In Bergeron's (2003) view, you need to understand how much potential savings that is to be achieved. He further argues that the cost of establishing / implementing the SSC and length of time it takes to recoup the investments must be understood before embarking on establishing the SSC. The organisation in addition, needs to ensure that the delivery model chosen is a good fit for its profile in order to succeed (Deloitte, 2011). In establishing the SSC, Senior Management Support is very key as it can be problematic without their support, as Senior Management are required to drive through these changes (Fahy, Curry and Cacciaguidi-Fahy, 2002; Deloitte, 2011; Miskon et al., 2011; PWC, 2012). The organisation should have also considered whether the delivery model aligns with their

strategic objectives and other planned company activities. This is in ensuring that the vision and strategy of the company is attained (Fahy, Curry and Cacciaguidi-Fahy, 2002; Bangemann, 2005; Lacity and Fox, 2008; Deloitte, 2011). For Bergeron (2003), the organisation needs to understand the potential improvements / effectiveness of current processes that the SSC will be able to achieve. Having selected the correct delivery model, SSC implementers need to understand the transition process of design / build and implementation of SSCs. This is discussed next.

2.2.3.2 Design / Build & Implementation (SSC Phases / Stages[13])

PWC (2011) provide four to five (4 / 5) basic stages in the implementation of a shared service centre. BearingPoint's (2007) SSC model contains five (5) stages for the design and build of the SSC. Deloitte (2011) also advocate for a five (5) phase approach to the design and build of Shared Services. Lacity and Fox (2008, p.17) argue that 'four change programs: business process redesign, organizational redesign, sourcing redesign, and technology enablement' are required to be integrated and co-ordinated when establishing SSCs. These phases / stages are now discussed below.

The PWC (2011) model is shown in Figure 2 below.
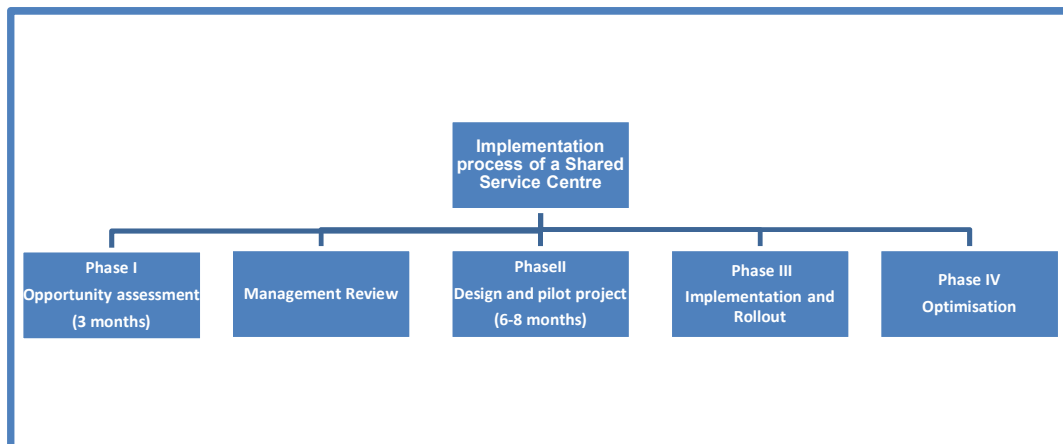
Figure 2 Implementation Process of Shared Service Centres
Source: PWC (2011, p.6)

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[13] Stage(s) and Phase(s) are used interchangeably where applicable to the SSC Design / Build and Implementation as different writers refer to it as either stage(s) or phase(s).

a) The Opportunity Assessment Phase defines the main base line for which the activities will be undertaken. These include, defining the business case etc. This should normally take about three (3) months (PWC, 2011). BearingPoint (2007, p.6) calls this stage the 'strategy' phase. This relates to the vision and strategy of the business and the development of the business case and the framework of approach to be adopted. This includes Corporate and Leadership strategies. Deloitte (2011, p.7) calls this phase the 'assess feasibility' stage. According to Deloitte (2011), most organisations start the feasibility stage with no clear vision on what they can achieve. They opine that this stage should be used to develop their vision and define how processes, technology etc. will function and to choose the appropriate strategy, either outsourcing or shared services.

b) Management Review allows management to review and provide authorisation, project funding, etc., (PWC, 2011).

c) For the Design and Pilot Project, this is the stage / phase where detailed analysis, such as operating procedures, required staff levels, service level agreements etc. are carried out. This should normally take about six to eight (6-8) months (PWC, 2011). According to BearingPoint (2007), the design stage is the stage where the plans are designed, including, staff hiring, location, business architecture etc. Furthermore, during this stage, the plan is put in place by for example, the training of staff, building the solutions and creating workforce transition plans. According to Deloitte (2011), this is the stage where you build a detailed view of the future processes to use. During this stage all stakeholders such as employees are to be kept informed / engaged. Service Level Agreements are then designed during this phase.

d) Implementation and Rollout phase is the phase where the entire plan is rolled out to the organisation. This phase according to PWC (2011), is determined in phase one. For BearingPoint (2007, p.6), this is called the 'deploy' stage. This is the stage where the plan is implemented, go live situations and the processes are rolled out. This phase, according to Deloitte (2011), is the stage when everything is brought together, users, operators and testing of the new processes. Furthermore, Deloitte (2011) argues that the implementation and rollout phase is the stage where the solution is activated in a live environment. This is the stage where it is determined whether the business is in a ready state to transition and whether to adopt a 'big bang' or gradual approach.

e) The Optimisation Phase is the phase that involves the continuous improvement of the shared services, technologies and re-engineering of the processes etc., (PWC, 2011). This is post plan implementation and results in continuous improvements, service managements etc., (BearingPoint, 2007). Deloitte (2011, p.7) calls it the 'optimise' stage. This is done once the SSC is stabilised and it is the stage for continuous improvements. These assertions are supported by other writers (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Bergeron, 2003; Bangemann, 2005).

Based upon the above definitions and stages, it is clear that the SSC design has four to five (4 / 5) main stages. Table 8 below summarises these stages.

Table 8 SSC Stage (Phases) Summary

SSC Stages (Research findings)	PWC (2011, p.6)	Deloitte (2011, p.5)	Bearing Point (2007, p.6)	Lacity & Fox (2008, p.17)
Feasibility Stage	Opportunity Assessment/Management Review	Assess Feasibility	Strategy	Adopt the right transformation approach
Design Stage	Design & Pilot Project	Design	Design	Identify processes for shared services by analysing costs, attributes, and

SSC Stages (Research findings)	PWC (2011, p.6)	Deloitte (2011, p.5)	Bearing Point (2007, p.6)	Lacity & Fox (2008, p.17)
				readiness of process activities.
Build Stage	Design & Pilot Project	Build and Test	Build	Identify processes for shared services by analysing costs, attributes, and readiness of process activities
Implementation Stage	Implementation & Rollout	Implement and Rollout	Deploy	Get business unit clients and internal staff to co-operate and embrace the shared services
Continuous improvement/Optimise Phase	Optimisation	Optimise	Operate	

Source: Author's summary and interpretation of Literature Review

2.2.4 Key criteria/variables in the design/build and implementation of a Shared Service Centre

From the earlier discussions, it is argued and concluded that there are three key criteria / variables associated with the establishment of the SSC as shown in the SSC models and literature review above. These are: the selection of a service delivery model, the SSC Critical Success Factors and SSC Phases / Stages. Therefore, it is argued in this research that there are three main tenets (characteristics) of the shared services. These three main characteristics are shown in Figure 3 below.

Area	Activity
Selection of service delivery model	Understand risks and benefits including the value chain of the Organisation
Critical Success Factors	Vision
	Strategy
	Effective Communication
	Effective Change Management

Area	Activity
	Senior Management Buy-in
	Strong Project Management Skills
	Organisation and HR (Human Resources)
	Site Location
SSC Phases/Stages	Feasibility Studies
	Design/Build
	Build/Pilot Stage/Test
	Roll out and Implementation
	Optimise or continuous improvement

Figure 3 Summary of Key criteria/variables in shared service

Source: Author's own interpretation of Literature Review

2.2.5 Weaknesses / Gaps in current SSC models

Although the organisational and SSC literature discussed above lists or highlights the factors that cause successes or failures in an organisation or SSCs, they fail to highlight the cause and effect relationships among these factors. For example, how does not having a good employee management plan in place affect costs? This is where System Dynamics (Simulation) can be applied. Although SSCs can be beneficial there can be negative consequences if SSCs are designed and implemented wrongly. It is therefore important to understand the cause-effect relation between / amongst the key variables. This is because current approaches for the design and building of SSCs compartmentalises the SSC model into various stages (BearingPoint, 2007; Deloitte, 2011; PWC, 2011). Although projects can be done in stages, the current approaches do not provide a holistic view of the interdependencies amongst all the various stages of the design and building of SSCs. Therefore, there is a need to look at other approaches that can help to address this situation. As discussed in section 1.2.2 above, some organisations have experienced financial losses due to badly designed SSC models

(Morgan, 2011; Ballard, 2012; UK National Audit Office, 2008; 2011; 2016). This therefore calls for reviewing the current SSC architecture concept and examine other ways of building the SSC. While some firms claim that they have made savings with an SSC (Fahy, Curry and Cacciaguidi-Fahy, 2002, PWC, 2011), it is argued that a failure to get the design and implementation of SSCs right can have excessive financial consequences for organisations such as the UK Department of Transport, Somerset Council, Research councils etc., (Morgan, 2011; UK National Audit Office, 2008; 2011; 2016).

In addition, the underestimation of the demands and requirements of large complex projects such as an SSC can also have unintended consequences, on employee morale, customer relations (Sterman, 1992). Due to the amount of time and resources required for SSCs the lack of belief among stakeholders can also limit the appetite to undertake shared service projects (Flinders, 2011).

As a consequence of the above discussions the below hypothesis is espoused.

Hypothesis 1:

There is a cause effect relationship between / amongst the various (key /critical success) factors influencing the design / build and implementation of Shared Service Centre.

Consequently, to better understand the cause-effect relationship between / amongst the key SSC variables, it is important to understand Systems Theory, Simulation and Decision Support Systems, which are discussed in the next section(s).

2.3 Systems Theory, Simulation and Decision Support Systems

2.3.1 Pre-Systems Theory: (A brief review of the Development of Organisational Theory Prior to the Evolution of Systems Theory)

According to the Encyclopedia of Small Business (2017, para.1) and Burke (2014), modern organisational theory began during the Industrial revolution of the late 1800s and 1900s. Prominent among these theoretical proponents was Max Weber (1864-1920), the German sociologist who advanced the theory relating to organisational bureaucracies. For Weber, the organisation derives its existence from legal and absolute power, logic, policies, rules and behaviour. Like other theories, this theory showed organisations as impersonal. Among the impersonal theorists of organisations included Henri Fayol and Frederick Taylor (1856-1915). Henri Fayol espoused the strategic aspects of management planning, employee motivation and recruitment etc. Taylor's theory based upon scientific principles, emphasised the area of employee selection, training, incentives and the performance of the organisation.

In the 1930's, these impersonal approaches started to be challenged. For example, the Hawthorn studies in the mid 1920's and 1930's conducted by Elton Mayo which mainly concluded that the inner forces of the human being had more impact than the mechanistic approaches emphasised earlier. Abraham Maslow's hierarchy of human needs reflected this focus on the needs of human beings. This was further espoused by Douglas McGregor who came with the concept of theory X (which saw employees as requiring mechanistic, directional approach and preferred financial security over everything else in the mid-1900s) and theory Y (which reflected the new view of considering the innate feelings of employees, that humans want self-actualisation).

Following on from this, systems theory / thinking was developed to allow for a more holistic viewpoint to be exercised. This discussion involves, System Thinking and the Evolution of the Systems movement (primarily SD as an offshoot of the systems movement), which are discussed in sections 2.4 and 2.4.3.

2.3.2 **Systemic changes**

Burke (2014) argues that the main objective for change is systemic. The change objective is systemic, because any change will affect the other parts of the system. Furthermore, change is based upon our knowledge to bring change about, as for example, by training and the third relates to the open systems nature of importation of energy and negative entropy. Burke (2014, p.61) argues that open systems theory is a 'part of a large set of theories' that constitutes a paradigmatic shift from physics to life sciences' which was used to explain the change phenomena. Capra (1996, p.6 cited in Burke, 2014), argues that 'the new paradigm may be called a holistic worldview seeing the world as an integrated whole rather than a dissociated collection of parts'. Alternatively, this may be viewed from the point of ecology ('deep ecology') as all societies and humans are dependent on each other and are subject to the variations that occur in nature (Capra, 1996 cited in Burke, 2014, p61).

2.3.3 **Simulation (System Dynamics) and hypothesis testing**

This research uses simulation System Dynamics (a form of Simulation Modelling) as opposed to reductionist analysis such as hypothesis testing. This section starts by identifying what simulation is, then reviewing the literature on hypothesis testing. Finally, a justification for the use of simulation is then espoused.

2.3.3.1 SIMULATION

Various scholars have argued that simulation is a powerful methodology for advancing theory. For example, 'Simulation modelling provides a powerful methodology for advancing theory and research on complex behaviours and systems' (Harrison et al., 2007, p.1229). They argue that the outcomes of organisational and managerial behaviour are as a result of the interdependencies / interactions among many processes. Analysing the interdependent interaction among multiple processes can be problematic even when there is an understanding of the individual processes, due to the fact that the interactions may be non-linear and may operate in an unforeseen way. As a

consequence, using empirical analysis based upon linear models has limited value, given that the samples required may be scarce in the area of the greatest value, they argue. Simulation as a research approach has unique advantages in the study of more complex managerial and organisational behaviour (Taber and Timpone, 1996; Axelrod, 1997; Harrison et al., 2007). Furthermore, it has been argued that simulation is suited for the study of more complex behaviour and for gaining understanding or providing theoretical insights in developing and analysing theory (Cohen and Cyert, 1965; Harrison et al., 2007). According to Davis, Eisenhardt and Bingham (2007, p.480), 'Simulation is an increasingly significant methodological approach to theory development in the literature focused on strategy and organization' The Society for Simulation in Healthcare (2016, para. 1), defines simulation as 'the imitation or representation of one act or system by another'. Goldsim Technology Group (2018) describes simulation as the creation of a model to mimic, understand and identify the factors that control a system or process so as to be able to predict or understand how the process or system will behave in the future. Wood (2005) argues that simulation approaches used for statistical inferences and probability estimation have major advantages over the use of traditional or conventional approaches. They are less technical but can provide students with powerful and transparent approaches to conventional ones. In effect, they are easy to use.

Simulation supports decision analysis by helping to evaluate, compare, analyse and optimise alternative options, plans and policies and as a consequence, it helps in explaining decisions to various stakeholders (Davis, Eisenhardt and Bingham, 2007; Goldsim Technology Group, 2018). Furthermore, it has also been suggested that when the potential outcomes of a potential action or plan cannot be observed or immediately viewed or known directly and when the consequences of an action have time delays and it is very expensive to test or use alternatives as well as not being practicable or efficient to execute, then simulation is normally used (Davis, Eisenhardt and Bingham, 2007; Goldsim Technology Group, 2018, para. 9).

According to Goldsim Technology Group (2018, Problem Solving and Decision Making with Simulation Software, para. 3), simulation is the obvious tool to use when there is a major decision to be taken and its outcome is uncertain. The use of a probabilistic simulation allows you to deal with the uncertain outcome by quantifying it. Simulation can be used to bring together or integrate various functions or disciplines.

Due to the powerful nature of simulation tools there are a number of tools and approaches that exist (Goldsim Technology Group, 2018). There are simulation tools that simulate specific system types such as a water simulation tool. There are also generalist types of simulation tools. These are used for a general purpose in order to simulate a very wide variety of systems. For example, a simple simulation tool is the spreadsheet. Various writers such as (Harrison et al., 2007; Goldsim Technology Group, 2018, Types of Simulation Tools, para. 1) advocate that the general-purpose tools (Simulators) can be broadly categorised as follows:

a. Discrete Event Simulators

These rely on a transaction-flow approach in the modelling of systems. They are designed for simulating processes such as call centres, shipping facilities and factory operations. Their design is not meant to model continuous materials such as water or mimic continuous systems characterized by differential equations. These tools have been employed by Janssen, Joha and Zuurmond (2009) in modelling alternative arrangements of a Shared Service. However, the approach that is being adopted in this research is to model the Shared Services attributes that is evolving or moving smoothly and continuously, rather than in infrequent discrete steps or packets.

b. Agent-Based Simulators

These are types of discrete simulators where the mobile entities are referred to as agents. According to Goldsim Technology Group (2018) in a traditional discrete event

model, entities only have attributes or properties that controls how they interact with control elements or resources. However, in agent-based simulators, agents 'have both attributes and methods [such as] rules for interacting with other agents' (Goldsim Technology Group, 2018, Types of Simulation Tools, para. 6).

c. Continuous Simulators

According to Goldsim Technology Group (2018, Types of Simulation Tools, para. 7), Continuous Simulators are able to solve differential equations and are able to represent continuous systems. They are appropriate for modelling information that is described as moving smoothly or evolving and continuous. They can also be used for discrete simulation if there are a large number of entities and thus treated as a flow. One common class of simulators that are continuous are the system dynamics tools developed by Professor Jay Forrester in the early 1960's. This class of tools solves differential equations that describe the evolution of a system using continuous equations. These types of simulators are most appropriate if the material or information that is being simulated can be described as evolving or moving smoothly and continuously, rather than in infrequent discrete steps or packets. For example, a continuous simulator can be used as a simulation approach to simulate the movement of water through a series of pipes and reservoirs. Continuous simulators can also be used to simulate systems consisting of discrete entities if the number of entities is large so that the movement can be treated as a flow. A common class of continuous simulators are system dynamics tools, based on the standard stock and flow approach developed by Professor Jay W. Forrester at MIT in the early 1960s.

d. Hybrid Simulators

Hybrid simulators are a combination of continuous and discrete simulators such as goldsim (Goldsim Technology Group, 2018, para.8). They can solve differential

equations, but discrete events can be superimposed on the constantly or continuously changing system**.**

ADVANTAGES OF SIMULATION

Simulation offers valuable imitation of real-life events that are less expensive but valuable simulation provides detailed feedback and results may be easily evaluated. It is argued that real life events do not allow for actual detailed feedback and with simulation the process can be repeated and evaluated (Cohen and Cyert, 1965; Taber and Timpone, 1996; Axelrod, 1997; Davis, Eisenhardt and Bingham, 2007; Harrison et al., 2007; Goldsim Technology Group, 2018). In effect, Simulation allows for one to make mistakes and learn from them. These mistakes are less costly than real life events. For example, simulating a shared service environment is easier than spending resources on this environment. Simulation allows for the customisation of the learning experience. With simulation, various types of learners can be accommodated. These include novices to experts, in real life one cannot take this chance. This allows novices to gain experience overtime whilst experts can also hone their skills.

Disadvantages

According to Goldsim Technology Group (2018), Simulations can be expensive to develop and maintain. However, it is argued in this research that the cost of failure for an SSC is significantly higher than the simulation (System Dynamic) model constructed.

Davis, Eisenhardt and Bingham (2007, p.480) have argued that 'on the other hand, some researchers maintain that simulation methods often yield very little in terms of actual theory development'. Davis, Eisenhardt and Bingham (2007, p.480) as supported by Chattoe (1998) and Fine and Elsbach (2000) state that simulations are simply 'toy models' and can be simplistic so that they do not provide valuable theoretical insights.

'The results of research using simulation methods can also be dynamically indeterminate and overly complex' (Fichman, 1999 cited in Davis, Eisenhardt and Bingham, 2007, p.480). According to Davis, Eisenhardt and Bingham (2007, p.480), this controversy regarding the use of simulation methods for theory development partially arises 'from a lack of clarity about the method and its related link to theory development'.

2.3.3.2 Hypothesis Testing

'Hypothesis testing is one of the most widely used, and some may say abused, methodologies in statistics' (Snijders, 2001, p.7121). In reality, it might occur that the data available determines the hypotheses used, the α-level to choose might be ignored, multiple test statistics may be calculated and a lot of changes could be made to the formal process or procedure. As a result, these changes or modifications could invalidate the method and can cause bias in the process (Snijders, 2001).

Hypothesis testing is one of the key tools that researchers use in the social and behavioural sciences and can be used to validate conclusions even where there exists no scientific theory. 'The controversy about hypothesis testing is dominated by the tension between simple explanations and the complexity of the world we live in' (Kadane, 2016, p.199).

The difficulty associated with reasoning based upon uncertain data has led to the many misunderstandings in the use of the hypothesis test. In addition, hypothesis testing has further drawbacks, for example, the use of the null hypothesis testing is obviously false on a priori grounds (Warner College of Natural Resources, 2016). Warner College of Natural Resources (2016) further assert that, added to these issues are the fact that hypothesis testing has an estimation problem, effect issue (i.e. what is the differences and their size) and a model selection issue (how big should the differences be to justify their inclusion in the model to be used as inference?). They note that the use of the alpha level (0.1, 0.05 or 0.01) has no theory or theoretical basis behind it and there is an

arbitrariness about it. Under hypothesis testing, distribution of the test statistic is unknown under the null hypothesis in observational studies.

While the null hypothesis significance testing (NHST) can provide critical information, it is inadequate for statistical purposes to be used as the main tool and no justification for the research may be offered even when the null hypothesis is successfully rejected (Dyckamn, 2016). Certain critics advocate not using the null hypothesis significance testing (Dyckman, 2016). According to Wilkinson (1999), due to the raging controversy regarding significance testing, bodies such as the American Psychological Association strengthened their review. In addition, certain medical journals in order to combat publication bias have recognised the need to publish results that are not statistically significant. Wilkinson (1999) notes that a journal devoted solely to the publication of these results has been established (Journal of Articles in Support of the Null Hypothesis). It has also been suggested that the biggest criticism of the hypothesis test is the fact that you either have a H_o or H_1 or can only be reported that either one of them has been accepted at an already selected **α** level. In effect, the conclusion reached is the same if H_o is barely rejected or the H_1 is resoundingly rejected (Snijders, 2001). Most people believe that 'it is important information that this should be reported, and thus, it is almost required to also report the *p*-value of the Hypothesis Test' (Snijders, 2001, p.7121).

2.3.3.3 Justification for using simulation (system dynamics) as an alternative to hypothesis testing (application to the thesis)

Harrison et al. (2007, p.1233) argue that:

> Hypotheses are not normally offered in simulation research, since the consequences of the complex interactions of the model's components are not logically obvious (if they were, a simulation would not be necessary); instead, the model's consequences are determined computationally, and the findings may themselves be regarded as hypotheses or theoretical conclusions.

Therefore, from Harrison et al.'s (2007, p.1233) view:

The entire simulation process constitutes a methodology for theory development or theory advancement, starting with assumptions and model construction and ending with predictions of the theory (findings).

Harrison et al. (2007, p.1233) as supported by Carley and Gasser (1999) and Cohen and Cyert (1965) state that 'the resulting model not only is the outcome of theoretical development but also is the theory in the sense that it embodies the theoretical ideas'.

This research is essentially to describe the complex feedback loops that exists within the shared service transformation. This is a representation of reality in a complex world. Based upon the literature review ascribed, there are considerable drawbacks with the use of hypothesis testing to represent a complex real-world situation. The model represents a continuous flow and therefore a simulation (System Dynamics) approach is important to use. The system under consideration (Shared Service Centres) has complex interactions and requires input from multiple disciplines such as accounting, statistics, System Dynamics etc. Therefore Simulation (SD) is the most credible tool to use.

As stated earlier in this report, current approaches for the design and build of SSCs compartmentalises the SSCs into various stages. Since organisations are systems, an understanding of the connections of the parts within the system is warranted for the SSC architecture. This is where System Dynamics comes into play. Section 1.2 in Chapter One advanced the argument why System Dynamics can be used. Furthermore, the use of a simulation model (system dynamics-based approach) helps us to understand the impact of the shared services architecture on the business process. System Dynamics is the most credible tool available to use in developing a continuous model. Table 9 below demonstrates that SD is the best tool for this research.

Table 9 Model Attributes demonstrating that SD is the best tool for this research

Required Attributes	Simulation (System Dynamics)	Simulation (Discrete Event)	Soft Systems (Cognitive mapping, Soft Systems methodology)	Hypothesis Testing
Holistic	Yes	Yes	Partially	Partially
Continuous	Yes	No	No	No
Complex Variables	Yes	Yes	No	Partially
Uncertainty and modelling into the future	Yes	Yes	No	No (can predict)
Dynamic Model	Yes	Yes		No
Interaction with different aspects of the system	Yes	Yes	Yes	No (Can show relationship but not feedback structure)
Quantitative	Yes (In Stock and flow but qualitative in Causal Loop)	Yes	No	Yes
Combine descriptive or judgmental data as well as numerical data	Yes		No	No
flexibility, ability to deal with variability and uncertainty	Yes			Partially
feedback and control approach	Yes	Yes	No	No
Information and resources	Yes			
Rates and levels (Flows and stocks)	Yes			

Source: Author's summary of Literature Review

2.3.4 OVERVIEW OF DECISION SUPPORT SYSTEMS

'Decision Support Systems (DSS[14]) represent a concept of the role of computers within the decision-making process' (Keen,1980, p. 23). For DSS to be meaningful, it must facilitate learning, adaptability and continuous evolution (Keen,1980). These characteristics, differentiate it from traditional model building. DSS has been defined as information systems that are designed to support decision making in organisations or businesses (Power, 2002). In this context, they facilitate or enable decision makers to understand and make informed decisions especially relating to problems that are dynamic, uncertain and unstructured in nature. In effect, dealing with challenges that are unstructured or can occur within a business with little warning. DSS systems can either be computerised or they can be powered manually. In addition, they can also have elements of both manual and computerised characteristics.

According to Keen (1980), the term DSS is not clearly defined. Furthermore, some users of DSS classify it as a tool used in facilitating organisational processes such as being used interactively by managers whereas many academics have viewed it as a system to support decision making in organisations and is located in the field of management science.

According to Sprague (1980) DSS:

1. helps senior management in addressing problems that are uncertain in nature, less structured or less specified.
2. DSS combines both analytical techniques and models with the traditional data retrieval and access functions.

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[14] Decision Support Systems is referred to as DSS in this thesis and both are used interchangeably in this thesis.

3. One of the advantages of DSS is that professionals who are not very well versed in the use of computers can use the system with ease and finally

4. DSS are flexible, adaptable and can be used for scenario or what if analysis.

When designed properly, DSS act as interactive tools that help decision makers to identify, draw conclusions or make decisions based upon a variety of information received from different sources such as mental models, archived business data etc. DSS applications can provide information on areas such as sales data, financial history and can also be used as a forecasting tool and include knowledge based systems (Sprague, 1980).

The DSS concept came about due to studies from the Carnegie Institute of Technology in the 1950s and early 1960s (Keen and Morton, 1978). In the 1970s, DSS was a well-researched area and executive information systems, group decision support systems and organisational decision support systems evolved out of the single user DSS model. Power (2002; 2007) provides a taxonomy for DSS. According to him, DSS can be communication driven, document driven, knowledge driven and model driven.

- Communication driven DSS assists organisations by supporting multiple individuals in performing a shared task, such as google documents etc. In this context communication and networking technologies are employed.

- Data driven DSS places emphasis on having access to and the manipulation of company data (both internal and external) overtime (time series).

- Document driven DSS places emphasis on data retrieval, management and manipulation of unstructured data.

- Knowledge driven DSS focuses on the provision of specific types of problem-solving techniques based upon facts, figures and rules.

- Model driven DSS places emphasis on gaining access to for example, statistical, financial, simulation model or information and manipulating the data. This type of

DSS makes use of data provided by users to help decision makers in analysing situations.

Furthermore, DSS can be divided by scope into an enterprise wide DSS (connecting multiple users) and single user desktop serving an individual (Power, 2002; 2007). According to Sprague and Carlson (1982) and Power (2007), DSS architecture has three core components which are:

- the database, which is knowledge based,

- the model, which involves the context of the decision and user criteria and finally

- the user interface where the users are also an important part of the architecture.

Holsapple and Whinston (1996) classify DSS using a six-framework approach. According to them, DSS applications are text oriented, database oriented, spreadsheet oriented, solver oriented, rule oriented and compound oriented. Compound oriented is a hybrid system that involves any of the other five structures outlined above and is the most popular.

DSS has been applied in many areas including System Dynamics (Sterman, 2000). In fact, DSS can be built in many areas or knowledge domain(s). DSS has been used and still is used extensively in the business and management fields (Zhang and Babovic, 2011). DSS allows for information to be synthesised and represented in charts etc.

2.3.5 THE USE OF SYSTEM DYNAMICS (SD) AS A DECISION SUPPORT SYSTEM

According to the System Dynamics Society (2018, para. 1):

System Dynamics is a computer-aided approach to policy analysis and design. It applies to dynamic problems arising in complex social, managerial, economic, or ecological systems–literally any dynamic systems characterized by interdependence, mutual interaction, information feedback, and circular causality.

In effect, SD is a DSS tool and has a lot of DSS applications. According to Sterman (2000, p.41), System Dynamics has been used and applied in many areas, such as corporate strategy, diabetes dynamics and management, the cold war race between the US and USSR, the human system and combating of HIV, and has been applied in the world of business and corporate strategy in many areas ranging from aircrafts, to zinc and management of aids.

In the world of logistics for example, Tako and Robinson (2012) reviewed a total of 127 journals to analyse the frequency with which System Dynamics and Discrete Event Simulation have been used as decision support tools of modelling or Decision Support Systems in logistics and supply chain management.

Furthermore, in a book edited by Richardson (1996), further examples of the application or use of System Dynamics as a Decision Support System are provided.

Examples of areas that have used System Dynamics as a Decision Support System include energy modelling, sustainable economic development, health policy and school finance.

- **Energy Modelling**

Under energy modelling, Sterman and Richardson (1985) carried out an experiment to detect the robustness and accuracy of two main methods for forecasting the amount of natural resource (petroleum) that can be extracted from the earth.

In addition, Ford (1990) estimated the impact of electric energy standards and efficiency in America Northwest Electric System.

Ford and Bulls (1989) used System Dynamics for conservation policy analysis in the Pacific Northwest.

Naill (1992) applied System Dynamics to model the US energy supply and demand under the US National Energy Policy described as FOSSIL2.

System Dynamics as a DSS is also used in the work of Mashayekis (1993), who investigated the advance transition of solid waste in New York State.

- **Sustainable Economic Development**

Under Sustainable Economic Development, Saeed (1987) modelled the economic problems of developing nations re-evaluating efforts in alleviating hunger and poverty using System Dynamics as a DSS.

- **Health Policy**

In health policy, Homer (1987) used System Dynamics to model the diffusion of emerging medical technologies as well as Wolstenholme (1993) who used System Dynamics models as a DSS in community-based care.

- **School Finance**

System Dynamics has been applied in public policy and management (school finance). Richardson and Lamitite (1989) showed the unanticipated tendency in the equalisation of tax rates instead of per pupil expenditure in the Connecticut state guaranteed wealth formula by using System Dynamics.

In addition, the work of Andersen (1990) using three different models (system dynamics, econometric model and database management) by comparing their ability to influence political decision making in the New York State School Finance System is discussed.

It can therefore be shown from the above that System Dynamics has been used as a Decision Support System in many areas of life.

2.4 SYSTEMS THINKING

2.4.1 The Case for Viewing SSCs as Enterprises That Create Value and as Systems

Given the current weaknesses inherent in the design and build of SSCs as argued earlier (see section 2.2.5), this research argues that SSCs are viewed as systems that help enterprises or organisations to achieve their aim of, for example, maximising shareholder

value. It is argued that the aim of organisations' are to create value for their shareholders or owners and that the ultimate aim of SSCs are to provide value for their shareholders / owners or enterprise. They deliver this by meeting customer requirements etc. SSCs like any organisation aim to add or create value not just reduce costs for the sake of doing so. It is thus argued that there is a value chain associated with the creation, implementation and operation of an SSC. Furthermore, it is argued that the stages that are used in building SSCs help to create this value, but they do not independently achieve or create optimum value themselves. It is the total combination of all processes and departments within the firm (system) that creates the value. In this research, it is further argued that the sum of the individual parts of the system is not equal to the whole system. There are certain properties within a system that is derived due to the system functioning as a whole rather than the functioning of the individual parts of the system. Porter's (1985) value chain depicts that all the various parts acting together provide benefits to the organisation (See Figure 4 below).
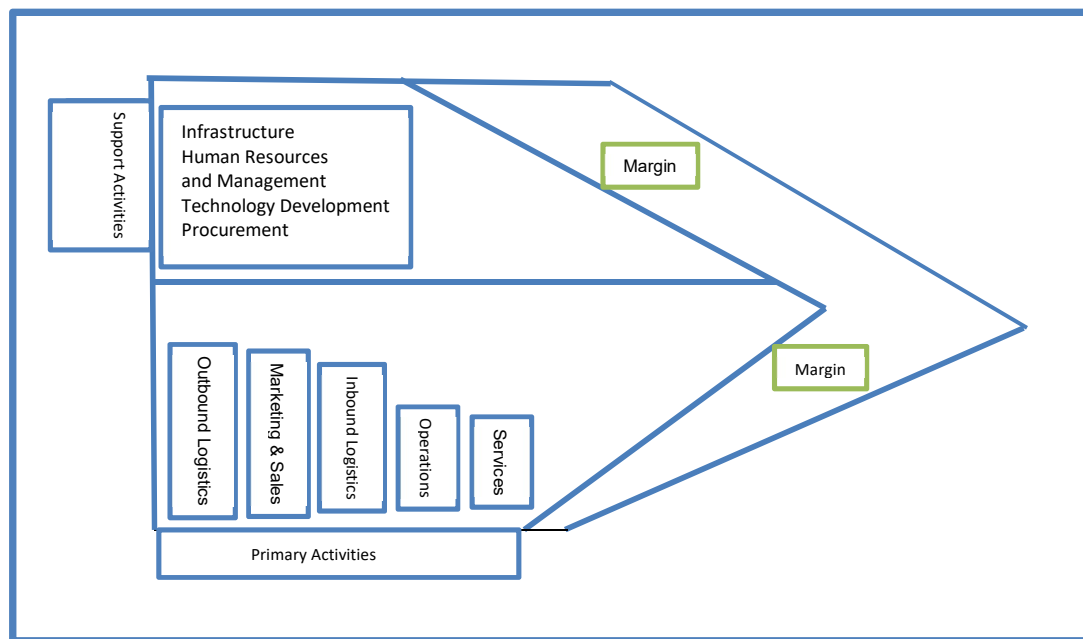
Figure 4 Michael Porter's Value Chain Model
Source: Adapted from Porter (1985, p.60).

According to Porter (1985), it is the effective working of all the primary and secondary activities in unison that creates value for the organisation. Furthermore, this researcher argues that since SSCs can be said to be providing support activities for a firm, their activities will come under support activities either in HR or finance / legal. It is important that their activities are not stand alone but do support the overall corporate goals of the organisation. It is argued in this research that SSCs are part of the organisational system and that this organisational system is a whole made up of parts. Each part can affect the way the other parts work and the way all parts work together will determine how well the system works. In effect, it is argued in this research that from a system perspective all parts of the system are connected. To understand the system, we need to understand the linkages among the various components of the system. It is only by doing this that we can prescribe better solutions for the system. Thus, all the inputs, outputs, processes and feedbacks must be understood.

According to Seddon (2008, p.70):

> To take a systems view is to think about the organisation from the outside-in, to understand customer demand and to design a system that meets it. To enable control in this high-variety environment, it is necessary to integrate decision-making with work …and use measures derived from the work.

According to Sterman (2001) and Sherwood (2002), the system thinking perspective is emphasised by the fact that organisations are systems; processing and adaptive systems; organisational goals must be in conformity with the goals / reality of the organisations overarching system (super-system); it involves the alignment of primary processes in line with customer and organisational goals and the alignment of support processes with primary processes. In effect, all processes within the organisation must be aligned to the customer and organisational goals.

They contend that there are 2 system laws:

1. The first law is that all systems / processes are knowingly or unknowingly designed in a way to achieve the results obtained.

2. The second law is that putting competent people in a badly designed system process will always ensure one outcome. The system / processes will always be the winner.

By understanding the system and interconnectivity between / among the various functions or processes, one is able to design and build a better organisation that creates value. In effect, all inputs, outputs, processes and feedback mechanisms need to be understood to create a better value for the organisation. In effect, we must think in a systemic way.

Systems' thinking is defined as understanding the cause / effect relationship within an entity. For example, the human body is a system consisting of many parts which act together and in unison. It is by understanding the interrelationships between / among these parts that we can best understand the human being (Sterman, 2000; Sherwood, 2002). The eco-system (the air we breathe, food we eat) is an example of a system and for an organisation, it is the people, processes and structures that make up the system.

Systems Thinking was influenced by the General Systems Theory advanced by Ludwig von Bertalanffy (1950;1972) in the 1940's, Ross Ashby in the 1950's (Ashby, 1947;1961) and this was further developed by Jay Forrester (1961) and Peter Senge (1990). It is by definition one of the approaches to solving problems. Principally, this views the parts as part of the whole system. According to Sterman (2001), there is a dynamic complexity associated with systems. According to him, systems change, they change overtime, they are tightly related, are ruled by feedback, have non-linear relationships, are history dependent, are self-organising mechanisms, adapt to change, have trade-off characteristics, are counterintuitive, in that cause and effect are distant in time and space and finally systems are policy resistant. As organisations are systems themselves,

System Dynamics (Simulation) can help with understanding these aspects of an organisation especially by using Causal Loop Diagram (CLD) and Stock and Flow models. The use of models is a convenient way by which System Dynamics can contribute to understanding this aspect of organisations'.

System Dynamics (Simulation) uses primarily models to represent reality. According to Ackoff and Sasiemi (1968) models are a representation of reality. However various people will view reality in different ways. One person's view of reality may be very different from another's.

Pidd (1996, p.13) argues that a model must basically consist of three (3) main stages:

- The representation of reality

- The model must be intended for some specific purpose and finally

- It must be of use in understanding or managing change.

Pidd (1996, p.15) therefore defines a model as 'an external and explicit representation of part of reality as seen by the people who wish to use that model to understand, to change, to manage and to control that part of reality'. In Pidd's (1996, pp.16-17) view, models are needed, because we need to have:

- a control mechanism, such as cost and time, in that we do not have the time to try out all the alternatives open to us;

- replication, in that we need to be able to replicate the reality of the situation, thus we can have a benchmark;

- legality, as this allows us to replicate various situations without breaking the law and

- finally, to avoid danger as this allows us to do things that may be dangerous but in a controlled environment rather than causing harm to people.

This researcher infers in this research that models on the other hand may be just a simplification of real-life situations, whereas life may be more complex, the models may be concrete, but real-life situations may be subtle. Models may be well defined, but real-life situations may not be so.

So then, what are some of the modelling approaches including simulation (System Dynamics) available to a researcher?

2.4.2 Modelling Approaches and Simulation (System Dynamics)

Modelling approaches can be hard or soft (Checkland, 1981; Pidd, 1996). Table 10 below adapted from Pidd (1996) outlines the differences.

Table10 Soft and Hard Approaches

	AREA	HARD APPROACHES	SOFT APPROACHES
1	Problem Definition	Seen as straightforward	Seen as problematic
2	The organisation	Taken for granted	Has to be negotiated
3	The model	A representation of the world	A way of generating debate and insight about reality
4	Outcome	Product or recommendation	Progress through learning

Source: Adapted from Pidd (1996, p.121)

There are various modelling approaches opened to a researcher and some of these are briefly described below.

a. Soft Systems Methodology (SSM)

Checkland (1981) developed Soft systems methodology (SSM) as a result of the fact that he believed hard systems methodology had limitations. There are basically two (2)

main ways that it is used. Firstly, it provides a framework or a set of rules that guides how studies may be conducted using the soft systems methodology. Secondly, SSM provides a belief and framework that embodies the basic ideas of soft systems, although these rules are not action based. In effect, soft systems operate on the premise that they are pluralistic and interpretative. It invariably accepts that there will be alternative viewpoints and the analyst must look to develop underlying definitions of alternative systems.

b. Cognitive Mapping

Eden, Ackermann and Cropper (1992) used cognitive mapping and SODA (strategic options development and analysis). Basically, cognitive mapping is an approach that can be adopted to allow people to think through various alternatives that they face. This is based upon the theory of personal constructs by Kelly (1955) as cited by Pidd (1996). The approach involves the drawing of graphs of ideas that are then linked together in means / ends relationships. SODA is individualistic and is based on a set of assumptions. SODA expresses actions and the approach aims to work with the expressed ideas of people.

c. Optimisation Modelling-Linear Programming (Mathematical Modelling)

According to Pidd (1996), linear programming is a subset of mathematical programming. The basic idea is to optimise some measure of performance. Normally it has to work with constraints and optimisation. It is normally expressed in monetary terms.

d. Visual Interactive Approaches-Discrete Event Simulation and Heuristics Approaches

These are mainly computer simulations. They are normally dynamic, displaying distinctive behaviour that varies overtime. They are also interactive and complex. The system consists of a number of components that interact with each other and need to be analysed carefully (Pidd, 1996).

e. System Dynamics

Forrester (1961) is the originator of System Dynamics. His original work depicted how the models and the structure of the human system and the control policies used to control the human system helped to foster understanding of how the system operated and behaved. He went further by developing the tools and approaches used for simulation, which is now referred to as System Dynamics. Various writers and developers such as Wolstenholme (1990) have developed and used similar tools and model types in their work. System Dynamics operates on the feedback and control approach, i.e. the system feeds back information and the information is used to control the entire system. Sherwood (2002, p.14) has argued that systems display characteristics that are properties of the system as a whole and are not characteristics of any individual component parts. Since these special properties exist only at the system level, no amount of study of the component parts can identify their existence. System Dynamics operates on two (2) basic tenets described below (Pidd, 1996; Sterman, 2000; Sherwood, 2002). These are:

a. Information and Resources

This is fundamental to system dynamics. Information is the non-physical means as compared to resources, which is physical. Resources are for example, the products for a manufacturing company (physical) and Information is the basis by which the decisions on how best to optimise the resources or transform the resources are used.

b. Rates and Levels (Flows and Stocks)

Rates refer to the flow of resources within the system, which may give rise to an increase in the levels of the resources. The levels here mean the total accumulation of resources in the system. For example, an increase in the products of the manufacturing company (rates / flows) will give rise to an increase in the number of finished products (levels / stock) for sale. Thus, the state of the system at a current point in time is expressed as a level.

As argued earlier, the SSC models and literature do not depict the cause / effect relationship. Furthermore, it has also been argued earlier that System Dynamics (Simulation) can be used as a credible tool in addressing this research work. Invariably the researcher could have used hypothesis testing as a major component of the work, however given the research question and the interactive nature of addressing the problem, System Dynamics (Simulation) is used.

2.4.3 SD as an offshoot of the systems movement and example of its use as a policy and strategy tool

According to Schwaninger (2006), System Dynamics is an offshoot of the systems movement. To Schwaninger (2006, p.1), the 'systems movement' which is normally referred to as 'systemics' is an all-encompassing term considering the fact that there is no one all-embracing systems approach but a range of approaches. Schwaninger (2006) argues that the System Dynamics community suggest that it is a methodology in its own right; however, SD is not the only system thinking approach and that there are a number of systems thinking theories and methodologies that complement SD.

- **Emergence of the Systems Approach**

Schwaninger (2006) opines that the systems approach has a long history and some of its roots originated from ancient Greek times. In his view what is referred today as the 'systems approach' started from the first half of the twelfth century.

Schwaninger (2006) notes that two important people who advanced this approach are:

- Ludwig von Bertalanffy (1945), an American biologist who brought the idea that organisms (wholes) that are organised should to an extent possible be describable, explainable by some means of categories and formal approach. His theory of General Systems led to a whole movement brought together by the concept of general systems theory.

- Norbert Wiener (1948), another American mathematician at Massachusetts Institute of Technology, who published his work on cybernetics in co-operation with Bigelow (an IBM Engineer) and a physiologist, Rosenblueth. This work provided the foundation for the interdisciplinary approach of a new science of capturing, control, design and communication approaches in different kinds of dynamic systems. Cyberneticists are interested in concepts as for example, communication, information, self-organisation, control etc.

Schwaninger (2006) cites various writers who helped developed the General Systems Theory such as (von Bertalannfy, 1945; Gerard, 1953; Boulding, 1956; Miller,1978; Rapoport, 1986); and in Cybernetics for example (Wiener, 1948; Ashby, 1956; McCulloch,1965; Pask, 1961). According to Schwaninger (2006), there are several routes, strands or, different kinds of system theories that have been developed overtime. He cites this in various fields such as in Mathematics, Logic, Biology, Engineering, Human and Social Sciences / Economics.

The above area of the systems movement focused in the area of feedback and control between organisations, society and as well as technical systems. It is multi-dimensional in nature and occurs at different levels (multi-levels and complexities).

With regards to theory building and methodological approaches, these have occurred at the individual / family level such as family therapy, organisational / societal levels such as the cybernetics of management (Schwaninger, 2006).

From the above, it can be noted that various kinds of system theories and methodologies have occurred overtime. With regards to SD, a notable theory of dynamical system is that of Forrester's (1961) theory and SD methodology. This focuses on feedback and control; stock and flow variables and addresses the structure / role and how they relate to the dynamic behaviour of the system.

Table 11 below sourced from Schwaninger (2006), shows a selection of writers within the system movement and how SD developed overtime.

Table 11 Milestones in the evolution of System Dynamics and the System Movements in General

Milestones in the evolution of the System Movements		Year
Foundations of General Systems Theory		
Bertalanffy	Zu eiener allgemeinen Systemiehre	1945
	An outline of General System Theory	1950
	General System Theory	1968
Bertalanffy, Boulding, Gerard, Rapoport	Foundations of the Society for General Systems Research	1953
Boulding	General Systems Theory—The Skeleton of Science	1956
Kilr	An approach to General Systems Theory	1968
Simon	The Sciences of the Artificial	1969
Pichier	Mathematische Systemtheorie	1975
Miller	Living Systems	1978
Mesarovic & Takahara	Abstract Systems Theory	1985
Rapoport	General System Theory. General system theory: essential concepts & applications (Vol. 10). CRC Press.	1986
Foundations of Organisational Cybernetics		
Macy Conferences (Josiah Macy, Jr. Foundation)	Cybernetics. Circular Casual, and Feedback Mechanisms in Biological and Social Systems	1946–1951
Wiener	Cybernetics or control and communication in the animal and in the machine	1948
Ashby	An introduction to Cybernetics	1956
Pask	An approach to Cybernetics	1961
Von Foerster, Zopf	Principles of Self-Organization	1962
McCulloch	Embodiments of Mind	1965
Foundations of Organisational Cybernetics		
Beer	Cybernetics and Management	1959
	Towards the Cybernetic Factory	1962
	Decision and Control	1966
	Brain of the Firm	1972
Von Foerster	Cybernetics of Cybernetics	1974
Foundations of General Systems Theory		
Forrester	Industrial Dynamics	1961
	Principles of Systems	1968
	Urban Dynamics	1969
	World Dynamics	1971
Meadows et al.	Limits to Growth	1972
Richardson	Feedback Thought in Social Science and Systems Theory	1991
Systems Methodology		
Churchman	Challenge to Reason	1968
	The Systems Approach	1968
Vester & von Hester	Sensitivitatmodell	1980
Checkland	Systems Thinking, Systems Practice	1981
Ackoff	Creating the Corporate Future	1981
Ulrich	Critical Heuristics of Social Planning	1983
Flood & Jackson	Total Systems Intervention	1991

Schwaninger	Integrative Systems Methodology	1997
Gharajedaghi	Systems Thinking	1999
Selected Recent Works in System Dynamics		
Senge	The Fifth Discipline	1990
Barias & Carpenter	Model Validity	1990
Vennix	Group Model Building	1996
Lane & Oliva	Synthesis of System Dynamics and Soft Systems Methodology	1998
Sterman	Business Dynamics	2000
Moscardini et al.	Using System Dynamics to analyse interactions in duopoly competition	2000
Warren	Competitive Strategy Dynamics	2002
Wolstenholme	Archetypal Structures	2003

Source: Adapted from Schwaninger (2006, pp.583-594)

2.4.4   Use of SD as a policy and strategy tool

In section 2.3.5 above, I have highlighted SD as a DSS and some of its uses as a strategy and policy tool. In addition, Moorecroft (1985) for example, writes about the use of System Dynamics modelling and administrative theory as a dual conceptual framework in designing policies and programs for supporting new strategic moves and being used to provide policy analysis and a policy framework.

In another example, Morecroft (1988) argues that System Dynamics and its tools are now more widely available to both the academic community and policy makers. There have been major developments and improvements in software and simulation structure development regarding system analysis. Morecroft (1988, p.301) states that these developments enable modelers to recreate and:

> create computer-based learning environments (or microworlds) for policymakers / implementers to 'play-with' their knowledge of business and social systems and to debate policy and strategy change.

Lyneis and Ford (2007) argue that the use of System Dynamics in managing projects (project management) has been one of the most successful areas of application of the System Dynamics methodology when measured in terms of revenue, number of practitioners etc.

Barlas (2007) writes that System Dynamics has been used to model and provide feedback for policy analysis. Given that the world faces challenges in a dynamic and complex environment, System Dynamics has been used or applied to address long-term policy and dynamic problems. According to Barlas (2007), SD has been applied in many areas as for example, its use for national economic problems, project management, supply chains, politics, psychology, healthcare, etc.

2.5   Gap in Knowledge

From the ensuing discussions above, it is clear that Shared Services Centres are similar to large complex projects, in that they are dynamic organisations, complex, contain multiple feedback loops (Sterman, 2000). According to Sterman (2000), dynamism implies that processes and knowledge evolve continually and thus for organisations or SSC implementers to understand this phenomenon and provide better decisions and interventions, they need to understand the causalities and feedback. Furthermore, Section 1.2.1 discussed the current problem, in that current SSC Transition approaches compartmentalises the SSC Transition model into separate phases, instead of viewing the factors as linked (Deloitte, 2011; PWC, 2011). Given the dynamic and uncertain nature of the information flow, decision makers are faced with a large degree of uncertainty and need a good DSS tool to address this. This context applies to Shared Services implementations. Thus, a good DSS tool is necessary to support this implementation otherwise SSC implementers will have difficulties in understanding the changing dynamics within the SSC implementation.

Alter (1977) argues that DSS applications can range from a spectrum of data retrieval to assisting in designing policies or making decisions. According to Dane and Pratt (2007), decision makers in organisations very often make their decisions based upon their mental models. Furthermore, decision makers in organisations also rely on experts in specific subject areas in helping to provide a larger base of knowledge (Tako and Robinson, 2012). As a consequence, organisations need to develop both their

knowledge of their external and internal environments (Bergman, Jantunen and Saksa, 2004).

In developing knowledge about their external and internal environments, as Sterman (2000) opines, the problems of business management originate also from dynamic complexity, the un-structuredness of the problems encountered, the effect of feedback overtime and the not so tacit knowledge of causal factors. These problems also apply to the implementation of the Shared Services. As a consequence, there is a need to use a methodology and a DSS tool to be able to address some of these business challenges.

According to Gleich, Mosig and Reinwald (2011), several papers within the decision support literature investigate dynamic effects or complexity. For example, writers such as Yim et al. (2004) write about the use of SD in knowledge-based decision support with special emphasis on strategic concerns. Even though they talk about how mental models could be transformed to specific knowledge, feedback and causality is absent from this research.

In addition, Janssen, Joha and Zuurmond (2009) used discrete event simulation in modelling alternative arrangements of a Shared Service, although the approach that has been adopted in this research is to model the Shared Services that is evolving or moving smoothly and continuously, rather than in infrequent discrete steps.

This researcher however, rarely found research relating to the use of SD with regards to knowledge-based decision support with special reference to Shared Service Centre implementation as evidenced in the writings of for example, (Lacity and Fox, 2008; Janssen et al., 2009; UK Office of Government Commerce, 2009; Deloitte, 2011; G Gleich, Mosig and Reinwald, 2011; Miskon et al., 2011; PWC, 2011; Richter and Bruhl, 2017).

Searches were done using Google Scholar and the University of Bedfordshire search tool "Discover" which searches multiple databases such as science direct, academic

search elite, various academic journals and publications. This was searched by relevance. The results showed very little information regarding the topic of decision support systems or System Dynamics used for Shared Service Centre implementation.

The search type was based upon keywords and included statements such as:

- System Dynamics as a Decision Support Tool for Shared Service Centre Implementers.
- Shared Service Implementation and Decision Support Systems.
- Shared Service Centres and Decision Support Systems.
- Decision Support Systems and Shared Service Centres.
- System Dynamics and Shared Service Centres.
- Decision Support Systems for Experimentation by Shared Service implementers.
- System Dynamics as a Decision Support Tool for Shared Service Centres.

From the above discussions and from the literature review, it was determined that the SSC transformation process especially with regards to the use of a decision support system such as SD, that will allow for experimentation by SSC implementers has not been rigorously researched or published and thus this is the gap in knowledge that this research seeks to address.

2.6 Conclusion

This Chapter has discussed the literature review relating to the motives and the critical success factors for organisational change. An appraisal of the motives for the creation of Shared Service Centres and the critical success factors required for the establishment of the SSC was also discussed and identified in this Chapter.

This Chapter also demonstrated that the motives and critical success factors for organisational change are applicable to that of SSCs.

Furthermore, this Chapter addressed the issue of systems theory, simulation and decision support systems including System Dynamics. The Chapter discussed how SD has been used as a decision support system in many areas. The gap in knowledge in this research was also identified and discussed.

In addition, this Chapter also established that SD is an offshoot of the systems movement.

The next Chapter reviews various research approaches available to the researcher and justifies the choice of research methodology / methods applied in this research.

3 Chapter Three: Research Methods

Chapter Overview

This Chapter provides an explanation of the research methods / methodology available to the researcher (i.e. paradigms, methodology, research techniques and data analysis), an explanation / justification of why the researcher chose a research approach and the researcher's philosophical assumptions (paradigms). The first part reviews the research methods. Then the methodology of SD is discussed. The final part concludes by discussing the research method that has been chosen and the reasons why it was chosen.

This Chapter is organised as follows:

3.1 Review of Research Methods.

3.2 Methodology of SD and its justification for this research.

3.3 Choice of Research Methods used.

3.1 Review of Research Methods

Table 12 below summarises the research approach used in this research.

Table 12 Summary of Research Design / Approach

Area	Definition	This Research (my research)
Research Paradigm	Philosophical framework governing how scientific research should be conducted (Positivism / Interpretivism/ Transformative / Pragmatism)	Multiple Paradigm (Interpretivism & Positivism)
Research Methodology	Approach to the process of research encompassing a body of methods	Mixed Methods Research –Exploratory Sequential (Case study approach and Simulation)
Research Methods	Technique for data collection	Questionnaire, interviews (as follow up questions), Qualitative and Quantitative analysis which involves for example, the use of Causal Loop Diagrams, Stock and Flow Diagram, parameter estimation, sensitivity analysis and the use of SD and Statistical Software Vensim, Sysdea and SPSS
Research Techniques	See Research Methods	See Research methods

Source: Adapted from Collis and Hussey (2009)

3.1.1 Framework for Research

Creswell (2014) identifies a framework for research, shown in Figure 5 below.
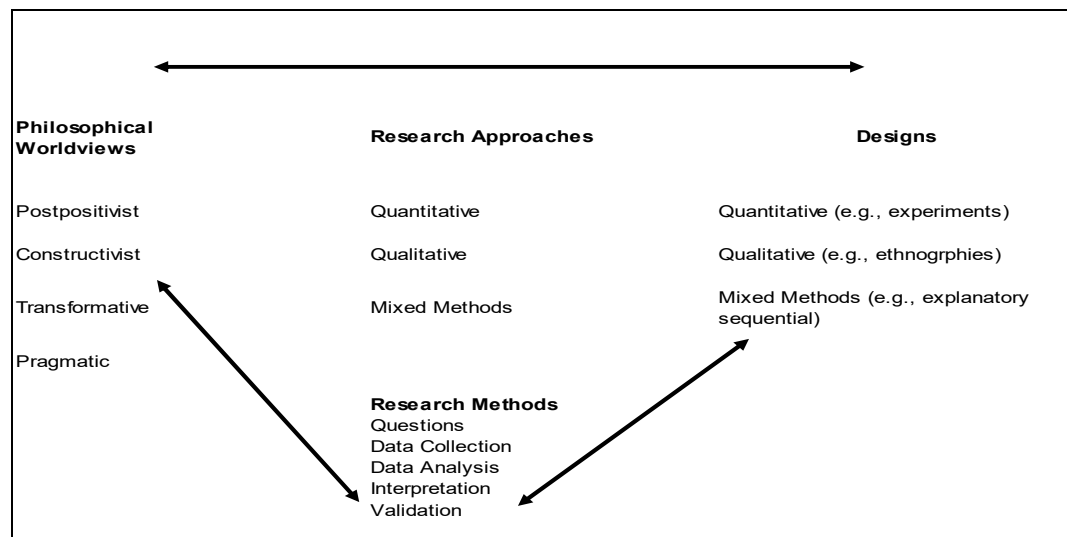
Figure 5 A Framework for Research-The interconnection of Worldviews, Design, and Research Methods

Source: Adapted from Creswell (2014, p.5).

Similarly, Crotty (1998) advocates for four levels of conducting research shown in Figure 6 below.
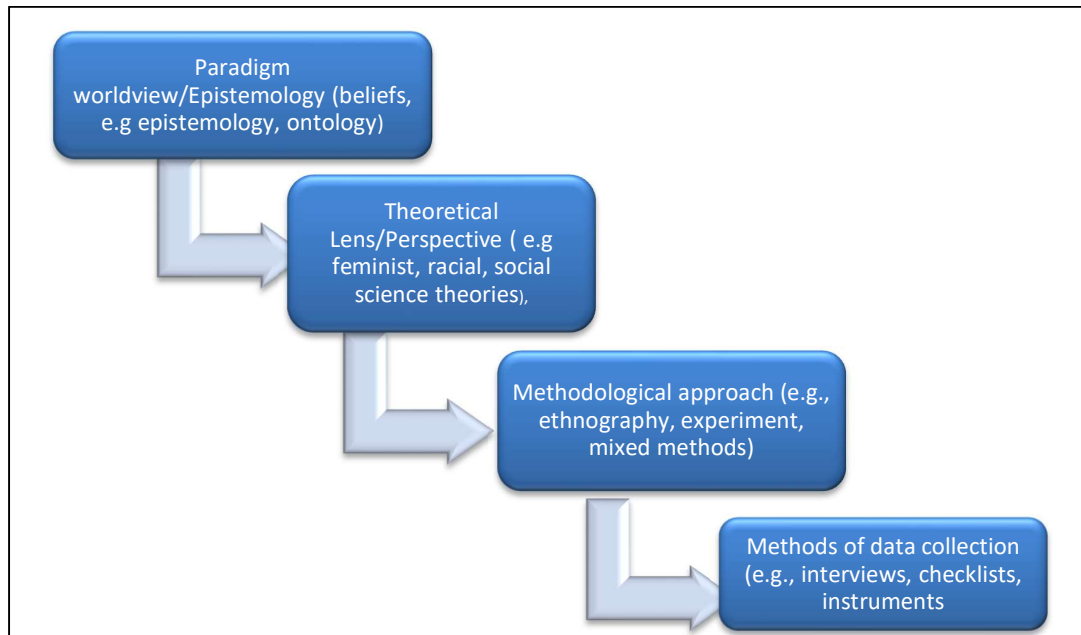
Figure 6 Four Levels of developing a Research Study

Source: Adapted from Crotty (1998, p.5 as cited in Creswell and Clark, 2014, p.39).

According to Creswell (2014, p.6), it is important for individuals preparing a research proposal or plan to espouse the following about their research. Firstly, they must state 'their philosophical worldview of the proposed' study (paradigms); secondly, provide a 'definition of basic ideas of that worldview' and thirdly, 'how the worldview shaped their approach to research'. Creswell (2014) states that worldviews are the beliefs that the researcher brings to the study. They arise based upon subject disciplines, orientation, previous research experiences. These worldviews or philosophical assumptions (paradigms) have a strong impact on the research.

3.1.2 Research Paradigm (Overview of discourse)

Research Paradigms (Worldview)[15]

Guba and Lincoln (1994, p.107), define a paradigm:

> As a set of basic beliefs (or metaphysics) that deals with ultimates or first principles. It represents a worldview that defines, for its holder, the nature of the "world," the individual's place in it, and the range of possible relationships to that world and its parts, as, for example, cosmologies and theologies do.

Some scholars have argued that it is the theoretical framework rather than the distinct theory that is referred to as the paradigm and this influences how knowledge is interpreted and studied (Bogdan and Biklen, 1998; Mackenzie and Knipe, 2006; Mertens, 2015). The choice of paradigm sets out the intent of the researcher, his / her motivations and research expectations. According to Mackenzie and Knipe (2006, p.2), 'without nominating a paradigm as the first step, there is no basis for subsequent choices regarding methodology, methods, literature or research design'. Clearly then, it is of utmost importance to select the correct paradigm. This will help identify the motives and intent of the research and provide a basis for the choice of paradigm. What is clear from these definitions is that a paradigm provides the orientation and thinking of the research. According to Creswell and Clark (2011), there are four (4) main worldviews of research philosophies. Worldviews differ in the nature of reality (ontology), how we gain knowledge of what we know (epistemology), the role values play in research (axiology), the process of research (methodology) and the language of research (rhetoric). These different interpretations influence how researchers conduct research. (Mackenzie and Knipe, 2006; Creswell and Clark, 2011; Creswell, 2014) highlight four (4) main philosophical assumptions (paradigms)[16]. These are:

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[15] In this research paradigm(s) and worldviews are synonymous and are used interchangeably.
[16] See Appendix F for the Assumptions of The Major Paradigms.

Positivism /Post-positivism (scientific method)

They are deterministic in nature. They attempt to identify and explain causes that influence outcomes such as in experiments. It is a cause and effect relationship. Knowledge is based upon careful observation and the measurement of objective reality. Guba and Lincoln (1994) argue that this reality is made up of independent parts and can be seen and categorised. Mackenzie and Knipe (2006) argue that Positivism (Post-Positivism) is sometimes referred to as the 'scientific method' or 'science research', and is 'a deterministic philosophy in which causes probably determine effects or outcomes' (Creswell, 2014, p.7).

In the context of this research, it can be argued that the line of inquiry being researched requires the collection and building of both qualitative (case study information) and quantitative data (System Dynamics). However, the quantitative approach complements the initial qualitative approach adopted. In effect, a mixed method research approach is employed in this research. Therefore, there is a case for using a multiple paradigm approach and the positivism paradigm can be placed into this category.

Constructivism / Interpretivism

Individuals develop meanings of their experiences with the world which are varied and complex. Creswell (2014) states that the researcher attempts to understand the views of the individuals, so the research becomes broad and varied. It is called interpretivism by Collis and Hussey (2009). Guba and Lincoln (1994, p.111) argue that the inductive nature of this approach requires the researcher to be a participant in this. This research work as stated in this work[17] involves also the exploration of a social phenomenon and requires the researcher to understand in an in-depth manner, the characteristics and establishment of the SSC. According to Mackenzie and Knipe (2006), the aim of

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[17] See also sections 3.17 (a); 3.19 (d) and 3.3.1.

Interpretivist / Constructivist approaches to research is to seek to understand how the world is experienced by humans.

Therefore, in this research a qualitative study (Stages I & II) is adopted as one of the main approaches to support the mixed method research approach. This then allows for the researcher to use the results as a basis to build the quantitative part of the model (System Dynamics). Therefore, as with the argument for positivism, the constructivist theory will fall in the domain of this research using a multiple research paradigm approach.

Transformative / Participatory view

The Transformative / Participatory view holds that research should be mixed with politics and a political change agenda is necessary to address any social levels of oppression regardless of wherever it appears (Mackenzie and Knipe, 2006; Creswell, 2014; Mertens, 2015). In effect, research has an action agenda to help alter the lives of participants / institutions. This approach does not fall into the domain of this research work.

Pragmatist

Pragmatist use all available approaches to understand the requisite research problem at hand (Mackenzie and Knipe, 2006; Creswell and Clark, 2011; Creswell, 2014; Mertens, 2015). It could be argued that the pragmatism paradigm can be used in this research as it adopts a multi-purpose ontology; i.e. the nature of the world is singular and consists of multiple realities.

Its epistemology (relationship of the researcher to that being researched) allows for the use of 'what works' to address the research question (Creswell, 2014, p.10).

3.1.3 Use of a Mixed Methods Research Approach and Multiple Paradigm Philosophical Assumption in This Research

Although the philosophical assumption of the researcher is pragmatism, the philosophical assumption of this research work employs a multiple paradigm (Mixed

Methods) approach instead of a singular philosophical approach (pragmatism). According to Creswell and Clark (2011), pragmatism as a paradigm is best suited for mixed methods research when both quantitative and qualitative data are being collected in a parallel manner. This research collects firstly qualitative data, then using the qualitative information to collect the quantitative data. In effect, using an exploratory sequential mixed method approach. Therefore, pragmatism as a paradigm is not the guiding philosophical orientation, but the mixed methods research decides the guiding philosophical orientation.

Creswell and Clark (2011: p.5) define mixed methods research as:

> a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis and the mixture of quantitative and qualitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches in combination, provide a better understanding of research problems than either approach alone.

According to Tashakkori and Teddlie (1998, p.17), mixed methods combines 'qualitative and quantitative approaches into the research methodology of a single study'. Numerous writers such as (Johnson and Onwuegbuzie, 2004; Greene, 2007) subscribe to this view.

Which Philosophical assumptions fits a mixed method research

Tashakkori and Teddlie (1998) and Teddlie and Tashakkori (2003) have argued for a pragmatic philosophical assumption regarding mixed methods research. According to Shannon-Baker (2016), while recent mixed methods research advocates for researchers to be explicit in the discussion of the paradigmatic foundations of their research, it is also important to have guidelines on how to use these paradigms. Paradigms could be 'mental models' (Greene and Hall, 2010, p.122) or ''stances'' (Greene and Hall, 2010, p.122; Maxwell and Mittapalli, 2010, p.147; Creswell and Clark, 2014, p.38).

Creswell and Clark (2011, p.42), argue that researchers need to understand the alternative stances on worldviews and be able to articulate them. They provide four (4) main worldviews / philosophical assumptions and argue that mixed methods researchers should consider these four main worldviews in the philosophical assumptions section of their research. These worldviews are:

One best worldview (Paradigm)

A oneworld best worldview (paradigm) for mixed methods research. Pragmatism advocates for using 'what works best' using various approaches and ideas. Teddlie and Tashakkori (2003) formally linked pragmatism and mixed methods. They argue that researchers could use both qualitative and quantitative methods in a single study; that it is the research question that is of primary importance and not the philosophical worldview or method; that researchers should abandon the dichotomy of choice between positivism and constructivism; that metaphysical concepts such as reality and truth need to be discarded and finally, methodological choices in a research should be guided by a practical and applied philosophy.

Multiple worldviews (Paradigms)

This approach promotes the use of mixed paradigms in research based upon the researchers' worldview or how the researcher attempts to know the world. However, it argues that the researcher must be upfront about this. Proponents of this approach include Caracelli and Greene (1997).

Multiple Worldviews (Paradigms) based upon the type of mixed methods design

This approach advanced by Creswell and Clark (2011, p. 45) advocates for the use of multiple paradigms based upon the mixed method design rather than based on the worldview of the researcher. With this approach the mixed methods design determines the paradigm used instead of the researcher's worldview. This is the approach adopted in this research.

Worldviews (Paradigms) depend on the scholarly community

Proponents of this approach argue that mixed methods research see paradigms as a 'shared belief systems that influence the kinds of knowledge researchers seek and how they interpret the evidence they collect' (Morgan, 2007 p.50).

3.1.4 Multiple Paradigm, (Worldview) of this research based upon the mixed methods design

This research uses a multiple paradigm approach. It is based upon a qualitative and quantitative worldview. The reason being that the type of research question posed allows for the exploring of a phenomenon (the shared services) via a qualitative study and then using the qualitative study to develop a simulation model (SD) as a complement to understanding shared services transition or this research work. The paradigms are determined based upon the mixed method design (exploratory sequential).

Research Justification for using multiple paradigms (worldviews)

According to Creswell and Clark (2011, p.8):

> Research problems suited for mixed methods are those in which one data source may be insufficient' [and] …a second method or theoretical approach is needed to enhance the primary method.

The following are espoused as the reasons for using mixed methods research:

When One Data source is insufficient

In this research, the use of a qualitative source (case study) is insufficient on its own alone. Using a simulation study will enhance the quality and conclusions drawn from the research.

The need to further explain and understand the results.

The case study approach is used in the first two stages (phases) to provide an understanding of the research questions. Simulation (quantitative) is used as a second

mechanism to reinforce the qualitative stages (phases) and enhance the study further. In this scenario, the simulation methodology (Causal Loop Diagram / Stock and Flow Diagram) complements the initial qualitative stage (phase) of the case study methodology. Table 13 below summarises the justification for the use of multiple paradigms.

Table 13 Research Justification for using multiple paradigms (worldviews)

Positivism (Social Reality is singular objective and not affected by the act of investigating it)	Interpretivism (Social reality is in our minds and is subjective and multiple)	This work-Justification (Worldview)-Multiple Paradigms approach) (Interpretivism)	This work-Justification (Worldview)-Multiple Paradigms (Positivism)	Conclusion
Use of Large samples	Use of Small Samples	Small sample size of one organisation with 6 embedded individual cases	Mixed	Interpretivism
Have an artificial location	Have a natural location	Have a natural setting (work place)	Mixed	Interpetivism
Be concerned with hypothesis testing	Be concerned with generating theories	Mixed. However, this is research work is concerned with theory development and testing	Mixed. However, this research work is concerned with theory development and testing	Mixed
Produce Precise quantitative data	Produce rich subjective qualitative data	Data is mixed (both qualitative and quantitative and relevant to case studies and simulation)	Data is mixed (both qualitative and quantitative; and is relevant to case studies and simulation)	Mixed
Produce results with high reliability but low validity	Produce findings with low reliability but high validity	Validity of findings can be high as for example, confirming that the SSC Transition is influenced heavily by the staff (employees)	Validity of findings can be high as for example, confirming that the SSC Transition is influenced heavily by the staff (employees)	Mixed
Allow results to be generalised to the population	Allow findings to be generalised from one setting to another similar setting	Generalizations from one company to another (settings)	Generalizations from one company to another (settings)	Mixed

Source: Adapted from Collis and Hussey (2009, p.62)

Having discussed the justification for the multiple paradigm approach adopted, the research methodology (method) used is now described.

3.1.5   **Research Methodology**

There are three main research approaches (Mackenzie and Knipe, 2006; Collis and Hussey, 2009; Creswell, 2014; Mertens, 2015). These are: Quantitative, Qualitative and Mixed Methods. Quantitative research tests theories in an objective manner by examining the relationships between / among the variables. Qualitative research explores and tries to understand meanings that individuals or group of individuals ascribe to a social or human phenomenon. A mixed method research integrates the two (2) approaches (qualitative and quantitative) by providing a more complete understanding of the research problem at hand.

Key decisions or criteria in selecting a mixed methods approach

Creswell and Clark (2011, pp.63-68) state that four approaches may be used in selecting a mixed methods approach. The first approach is to determine the level of interaction between the quantitative and qualitative strands. The level of interaction may be independent or interactive (Greene, 2007). In this research approach, the level of interaction is interactive. The causal loop diagram from the qualitative studies is used as a basis to develop the stock and flow diagram. Secondly, the researcher should determine the priority of the qualitative and quantitative strands. Both methods may either have equal priority or one method will be placed before the other. In this research method, the qualitative approach is reinforced by the quantitative approach in addressing the research question. Thirdly, the researcher should determine the timing of the quantitative and qualitative strands. The timing may be either concurrent, sequential or multiphase. This research work uses a sequential timing where the qualitative data is collected first and used as a guiding principle for building the quantitative aspects. Fourthly, the researcher should determine where and how to mix the quantitative and qualitative strands. Creswell and Clark (2011) argue that this is the point where the researcher implements the independent or interactive relationship of a mixed methods study. This happens at the point of interface (stage of integration) or mixing strategy. The

point of interface is the stage where the qualitative and quantitative strands of the research are mixed. Mixing can occur in any of four points i.e. 'mixing during interpretation', 'mixing during data analysis', 'mixing during data collection' or 'mixing at the level of design' (Creswell and Clark, 2011, p.67).

This research work uses a combination of mixing during interpretation, mixing during data collection, where the results of the qualitative strand (causal loop diagram) are used as a basis to develop the stock and flow model in the quantitative part. Mixing is also done at the level of design by using the theoretical framework as a basis for mixing.

3.1.6 Discussion and Justification for choice of Research Methodology

Creswell and Clark (2011, pp.73-76) identify the main 'Prototypical Characteristics of the Major Mixed Methods Types of Designs'. These are shown in Table 14 below. The reason why the exploratory sequential approach is used in this research is also discussed in Table 14.

Table 14 Prototypical Characteristics of the Major Mixed Methods Types of Designs

Prototypical Characteristics	Convergent Design	Explanatory Design	Exploratory Design	Embedded Design	Transformative Design	Multiphase Design	This Research work
Definition	Concurrent quantitative and qualitative data collection, separate quantitative and qualitative analyses, and the merging of the two data sets	Methods implemented sequentially, starting with **quantitative data** collection and analysis in Phase 1 followed by qualitative data collection in Phase 2, which builds on Phase 1	Methods implemented sequentially, starting with **qualitative data** collection and analysis in Phase 1 followed by quantitative data collection in Phase 2, which builds on Phase 1	Either the concurrent sequential collection of supporting data with analysis and the use of the data before, during, or after the major data collection procedures	Framing the concurrent or sequential collection and analysis of quantitative and qualitative data sets within a transformative, theoretical framework that guides the methods decisions	Combining the concurrent and / or sequential collection of quantitative and qualitative data sets over multiple phase of a program of study	This research work uses the **Exploratory Design approach**. In effect it uses a sequential timing where the **qualitative data (stages I & II)** is collected first and used as a guiding principle for building the **quantitative aspects (System Dynamic Model).** This research uses **the exploratory sequential multiple paradigm approach. With this approach the mixed methods design determines the paradigm used instead of the researcher's worldview** Creswell & Plano (2011; p 45).
Design Purpose	• Need a more complete understanding of a topic • Need to validate or corroborate quantitative scales	• Need to explain quantitative results	• Need to test or measure exploratory findings	• Need preliminary exploration before an experimental trial (sequential / before) • Need a more complete understanding of an experimental trial , such as	Need to conduct research that identifies and challenges social injustices	• Need to implement multiple phases to address a program objective, such as for program development and evaluation	• This is to find out or explore how an SD model can be developed as a complimentary model to traditional SSC approaches

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Prototypical Characteristics	Convergent Design	Explanatory Design	Exploratory Design	Embedded Design	Transformative Design	Multiphase Design	This Research work
				the process and outcomes (concurrent / during) • Need follow up explanations after an experimental trial (sequential / after)			
Typical Paradigm Foundation	• Pragmatism as an umbrella philosophy	• Post / Positivist in Phase 1 • Constructivist in Phase 2	• Constructivist in Phase 1 • Post / Positivist in Phase 2	Worldview may reflect the primary approach (e.g., post / positivist or constructivist) or pragmatism if concurrent • Constructivist for the qualitative component and • Post / Positivist for the quantitative component if sequential	• Transformative worldview as an umbrella philosophy	• Pragmatism if concurrent • Constructivist for the qualitative component and post / positivist for the quantitative component if sequential	• Constructivist or Interpretivism in Stage 1 • Post / Positivist or Positivism in Stage 2
Level of interaction	Independent	Interactive	Interactive	Interactive	Interactive	Interactive	Interactive
Priority of the strands	Equal emphasis	Quantitative emphasis	Qualitative emphasis	Either quantitative or qualitative emphasis	Equal quantitative or qualitative emphasis	Equal emphasis	Qualitative emphasis, followed by the quantitative model
Timing of the strands	Concurrent	Sequential: quantitative first	Sequential: qualitative first	Either concurrent or sequential	Either concurrent or sequential	Multiphase combination	Sequential: qualitative first
Primary point of interface for mixing	• Interpretation if independent analysis	•Data Collection	• Data Collection	Design level	Design level	Design level	• Data Collection and analysis of Stages I & II

Prototypical Characteristics	Convergent Design	Explanatory Design	Exploratory Design	Embedded Design	Transformative Design	Multiphase Design	This Research work
	• Analysis if interactive						
Primary mixing strategies	• Merging the two strands • After separate data analysis • With further analyses (e.g., comparisons or transformations) of separate results	Connecting the two strands • From quantitative data analysis to qualitative data collection • Use quantitative results to make decision about qualitative research question, sampling and data collection in Phase 2	Connecting the two strands • From qualitative data analysis to quantitative data collection • Use qualitative results to make decision about quantitative research question, sampling and data collection in Phase 2	Embedding one strand within a design based on the other type: • Before, during, or after major component • Use secondary results to enhance planning, understanding, or explaining of primary strand	Mixing within a theoretical framework • Merging, connecting, or embedding the strands within a transformative theoretical lens	Mixing within a program-objective framework: •Connecting, and possibly merging and / or embedding within a programmatic objective	• Use qualitative results (Stages I & II) to make decision about quantitative research model and data collection in Stage 2 (SD model)
Common variants	• Parallel databases • Data transformation • Data validation	• Follow up development • Instrument development	• Theory Development • Instrument Development	• Embedded experiment • Embedded correlational design • Mixed methods narrative • Mixed methods case study • Mixed methods ethnography	• Feminist lenses • Disability lenses • Socioeconomic lenses	• Large scale program development and evaluation Multilevel state-wide studies Single mixed method studies that combine both concurrent and sequential phases	Theory Development as seen from the hypothesis, conceptual model, explanation of the important and interconnected variables and Instrument Development as seen from the SD model

Source: Adapted from Creswell and Clark (2011 pp. 73-76).

3.1.7 **The exploratory sequential approach**

The exploratory sequential approach was deemed necessary for this research work. This involves firstly, the collection of qualitative data and analysis, which then leads to the collection of quantitative data and analysis and then interpretation. This design starts with the collection and analysis of qualitative data to explore a phenomenon. The next step involves building on the results of the qualitative study by developing an instrument (CLD), identifying variables or starting hypothesis for testing based upon an emergent framework. This connects the initial qualitative stage to the quantitative stage. In the third stage, the instrument developed (CLD) is used for the quantitative stage (Stock and Flow Diagram). Finally, the researcher interprets the results to reflect how they generalise / expand or support the initial findings.

According to Creswell and Clark (2011, p.87), the philosophical assumptions with qualitative research is initially a constructivist view and then when the research moves into the quantitative stage, it becomes a positivist view. 'Thus, multiple worldviews are used in this design, and the worldviews shift from one phase to the other phase'.

This design is used based on the premise that measures or instruments are not available, as in the use of simulation (SD), the main simulation variables are unknown or need to be defined and there is no guiding framework. Because this design begins qualitatively, it is best suited for exploring a phenomenon as in a case study. This method is deemed appropriate for this research as the researcher does not know what constructs are important to the study and the relevant quantitative instruments / model of Simulation (System Dynamics) is not available from the initial stages.

a. Qualitative Strand

Various writers such as (Mackenzie and Knipe, 2006; Yin, 2009; Collis and Hussey, 2009; Farquhar, 2012; Creswell, 2014; Mertens, 2015) suggest that qualitative methodology employ mainly the following research approaches: Hermeneutics, Ethnography, Participative enquiry, Action Research, Grounded Theory and Case Studies. The case study approach was the preferred method chosen. Appendix C discusses the Summary of Alternative Research Methodologies and why the case study methodology was deemed relevant.

According to (Yin, 2009; Farquhar, 2012), case studies are suitable for how, who and why questions and to gain an in-depth insight to contemporary phenomenon when the researcher has little control of the events. Case study research can be explanatory, descriptive or exploratory. Some of the advantages of case studies include the fact that the researcher can gain an in-depth understanding into a particular topic or case. Furthermore, case study data can be both qualitative and quantitative.

Some of the limitations / disadvantages include, generalising the research results to the wider population. Furthermore, a case study approach requires the use of different sources of data and may lack rigour and objectivity (Farquhar, 2012). According to Farquhar (2012, p.10), this can be overcome by a consistent research design, stating the philosophical approach, research strategy adopted, data collection and analysis, protocols and justification for each stage adopted. Another criticism is the issue of generalisation (i.e. generalising to the population). A counter to this argument is that the purpose of case studies is also theory building (hypothesis) and generating theories (Farquhar, 2012).

A third argument is that case study is not quantitative. Yin (2013) and Farquhar (2012, p11) argue that case study is not necessarily a qualitative research, but a research

strategy on its own. To counter this, a clear statement of the research objectives, methods and analysis is required.

Justification for the use of Case Study in this research

Case Study Research is used as the first strand of the mixed methods research strategy in this research. According to Yin (2009) and Farquhar (2012), case study research is preferred when how and why questions are being asked, the researcher has no control of the events, the focus is on a contemporary phenomenon, the phenomenon can be studied in its natural settings where meaningful and relevant theory can be generated and understanding of the phenomenon obtained through actual practice. Case study allows for the answering of the how and why questions by having a relative full understanding of the complexity and nature of the phenomenon. It involves the use of multiple data collection methods (quantitative and qualitative).

Case Study research is used in this research due to the fact that there is a scarcity of empirical studies relating to SSCs and SD models (Janssen and Joha, 2006).

It is argued in this research that, there is a need to investigate the nature and background of why the company embarked on the SSC and whether, they used an SD model in their initial design and whether they are achieving the benefits as designed.

b. Quantitative Strand

Although there are other positivist approaches such as experiments etc., this section focuses on the topic of simulation as the second strand of the research approach.

Simulation (System Dynamics)

Simulation is used in this research for the reasons advanced and espoused earlier in the literature review chapter (Chapter 2).

Having discussed the research methodology, the next step is to discuss the research techniques, and this starts with the sampling and data collection techniques.

3.1.8 Discussion of Research Technique Sampling Method(s) and Justification

The unit of study (organisation) operates multiple regional shared service sites in the world. Therefore, the researcher believes that although this is a case study of one regional shared service centre within the organisation, sampling and data collection criteria can be applied to it. For example, the organisation has approximately, six (6) regional Shared Service Centres operating in Europe, Middle East and Africa.

Sampling and Data Collection Techniques

According to Mertens (2015, p. 319), the research paradigm influences the sampling approach. Positivist (post-positivist) paradigms tend to use some type of probability sampling. This is used to select randomly the sampling units that are representative of the population. The aim is to draw conclusions for the whole population based upon the sample used (Mertens, 2015).

For the constructivist / interpretivist paradigm, Mertens (2015, p.319) citing Collins (2009, p.357) states that:

> Researchers within the constructivist / interpretivist paradigm tend to use a theoretical or purposive approach to sampling. Their sampling activities begin with an identification of groups, settings, and individuals where (and for whom) the process being studied are most likely to occur …[and] when using a purposive sample, the goal is to add to or generate new theories by obtaining new insights or fresh perspectives. Purposive sampling schemes are employed by the researcher to choose strategically elite cases or key informants based on the researcher's perception that the selected cases will yield a depth of information or a unique perspective.

In this research, the first strand (qualitative) focuses on an interpretivist approach; therefore, sampling strategies discussed below are mainly related to the constructivist / interpretivist paradigm.

Population

The population and sample members to study were formulated via the literature review and the researcher's mental models (Mertens, 2015, p.320). These were companies or a company who had been through the design, build and implementation of an SSC or the Shared Service Transition process.

Sample members

Furthermore, the following dimensions were added: it was intended that the people who were involved in the survey were working for or had worked for an SSC. The survey participants should also have several years' working experience working in an SSC. In addition, they should have been involved with the design / build / implementation of an SSC. The survey also focused on getting sample members who had expertise in the SSC field (expert opinion) and sample members who had sufficient authority but were stakeholders in the SSC delivery process. The selection of research participants meeting these criteria was based on purposeful random sampling. The justification for this was that to effectively analyse the research question / objectives posed, it was important to have a representative sample of people with expert opinion and others who were stakeholders in the SSC project.

Sampling Strategies and reasons for selecting the sampling strategy used in this research

As stated earlier, Collins (2009) as cited by Mertens (2015) argues that sampling strategies can be purposive or probabilistic. Constructivist / Interpretivist approach tends to use the purposive or theoretical approach to sampling whilst post positivist (positivist) tends to prefer probabilistic sampling. Another sampling strategy, convenience sampling which is a third way is also often used, but they are not supported by the main proponents of the major paradigms (Mertens, 2015, p. 327).

As this is a mixed methods exploratory sequential approach with a qualitative initial strand, the focus of this discussion will be on the purposive or theoretical approach to

sampling rather than the positivist probabilistic sampling approach. With this approach the aim of the researcher is to select samples that will allow for the initial study of the case in depth.

Patton (1990) and Mertens (2015) identify the below sampling techniques that can be used with qualitative research approaches. These are: Extreme or Deviant Cases, Intensity Sampling, Maximum-Variation Sampling, Homogeneous Sampling, Typical Case Sampling, Stratified Purposeful Sampling, Critical Case Sampling, Snowball or Chain Sampling, Criterion Sampling, Confirming and Disconfirming Cases, Opportunistic Sampling, Purposeful Random Sampling, Sampling Politically Important Cases and Case Study Sampling (See Appendix C for a discussion of the Summary of Alternative Research Methodologies). Each of these sampling strategies were reviewed against the decision-making process (i.e. the unit of organisation and the six individual respondents) as depicted in Figure 7 below. The sampling strategies relevant to this research as identified by Patton (1990) and Mertens (2015) are now discussed.
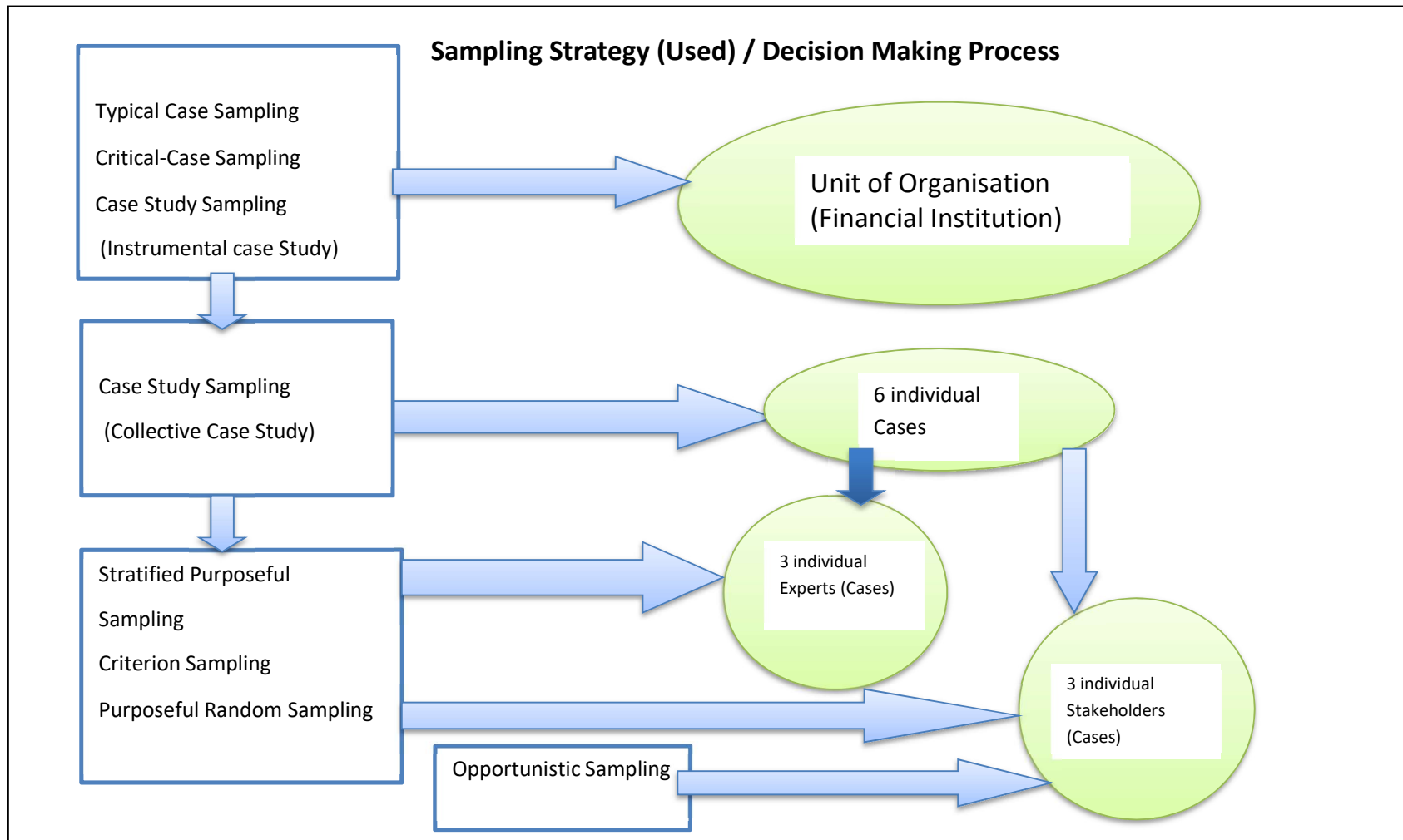
Figure 7 Sampling Strategy (Used) / Decision Making Process

Source: Author's adaptation from Patton (1990), Mertens (2015) and author's research work

a. Typical Case Sampling

This is used for cases that are typical. If the goal is to describe typical cases that have been used or implemented, then this is the sampling of choice. These kinds of cases can be identified by knowledgeable people or by reviewing previous data. This sampling strategy was deemed appropriate for this research. It was used in combination with other sampling strategies described in this section. The reason being that the characteristics of the SSC that was established in this financial institution under study, was not uniquely different to other SSCs that had been established earlier.

b. Critical Case Sampling

According to Patton (1990), a critical case study is one that makes an impact (dramatic impact) and is very important for some reason. Critical case studies can be used as a basis to project unto the population or to other cases. This sampling strategy was deemed appropriate for this research. It was used in combination with other sampling strategies described in this section. The reason being that the use of System Dynamics will be revelatory in nature and will make an impact demonstrating the inter-linkages between / among the important SSC variables as for example, SSC employee management.

c. Criterion Sampling

This involves the researcher setting up or defining a certain criterion and then selecting cases that meet this definition. This sampling strategy was deemed appropriate for this research. It was used in combination with other sampling strategies described in this section.

The unit of analysis selected was a single financial institution with six (6) embedded individual cases consisting of three (3) expert and three (3) stakeholder opinions. There were certain criteria that each of the selected respondents had to meet. For example,

The criteria for Participant Inclusion were as follows:

Expert Opinion

- The participant should have been involved at a senior (management) level with the design / build and implementation of an SSC.

- They must have at least ten (10) years experience in their working lives.

- Respondents must work or must have worked for the organisation used in this research.

Stakeholder opinion

- The participant should have been involved either as an employee, manager (supplier of the service) or service user in the design / build and implementation of an SSC (SSC Transition).

- Respondents must work or must have worked for the organisation used in this research.

- Respondents must work or must have been involved in the design / build and implementation of the SSC under discussion.

d. Opportunistic Sampling

In the Interpretivist / Constructivist paradigm, it is unlikely that the researcher establishes the final sample size at the start of the research (Mertens, 2015). In this instance, as the theory develops and opportunities arise during the research the researcher should decide about the importance of the activity or individual / case study. This sampling strategy was deemed appropriate for this research. It was used in combination with other sampling strategies described in this section. The reason being that when the researcher started the case study the initial intention was to use a pilot study, refine the questionnaire after the receipt of the results of the pilot study and add other candidates for the research. However, based upon the theory and the researcher's mental models, the researcher decided to include stakeholders in different categories to complement the

expert opinions who had different areas of expertise in terms of their involvement in the establishment of SSCs.

e. Purposeful Random Sampling

According to Mertens (2015, p.334), as samples tend to be relatively small in qualitative studies due to the depth of information being sought from the respondent, random sampling strategies can be used to select those that will be included in a 'very small' sample. Mertens (2015) talks about using this in her interviews and although it was not statistically representative of the population this could be defended on the grounds that the selection was not done by administrators who could influence the selection of cases. This sampling strategy was deemed appropriate for this research. It was used in combination with other sampling strategies described in this section. This was based upon the literature review and the mental models of the researcher.

f. Case Study Sampling

According to Stake (2006), as cited by Mertens (2015), selecting the sample for case study research is dependent on the purpose / reason of the case study research. Other things to consider include available resources, the logistics and the likely receptiveness. Stake (2006, cited in Mertens, 2015) espouses that there are three (3) different approaches to case studies which calls for the use of different sampling approaches/strategies.

These are:
- Intrinsic case study: This occurs when a particular case is of special importance or interest and in effect this case has been decided before the commencement of the research. It is important to have a thorough understanding of the case. An example could be the implementation of a new drug programme.
- Instrumental Case Studies: These are studies undertaken to acquire an understanding of the phenomenon and then providing the ability to be able to

project or generalise to other cases as for example race relations. According to Stake (2006, cited in Mertens, 2015), these types of cases should be selected because they provide a learning opportunity. The potential to learn constitutes the importance of the case being studied. In this research, the potential to learn about the SSC establishment and the use of System Dynamics (Simulation) as a tool provides a potential to learn and also to project / generalise this to other similar cases.

- Collective Case Study (multiple case studies): This is an approach used in order to understand the phenomenon in a wider context. This helps to provide a better understanding or provide a basis for theory building regarding a collection of large cases. In this research, there are six (6) respondents stratified according to three (3) expert opinions and three (3) stakeholders. The aim of this is to provide a broader context based upon different categorisations of these respondents to the research question at hand.

This sampling strategy was deemed appropriate for this research. Instrumental and Collective Case Studies are used in this sampling approach. The Instrumental Case Study is the selection of the financial organisation; the Collective Case Study is the use of six (6) respondents (three expert opinions and three stakeholders).

Having discussed the sampling techniques, the next section will review the data collection techniques.

3.1.9 **Data Collection techniques**

The main aim of data collection is to learn about people or things. This focuses on a particular attribute, person or setting (Mertens, 2015). Data collection sources are either primary or secondary. Primary data includes surveys, observation, interviews etc. Secondary data involves data that existed before the initial start of the research. These may include prior research papers, organisational records etc. In collecting data, two (2) main challenges are encountered by the researcher. These are: firstly, identifying the attributes of the data to be collected and secondly, deciding about how to collect data regarding these attributes (Mertens 2015). This is done in this research via the literature review and also using the researcher's prior experience in SSCs as a preliminary guide. The researcher operationalised the concept of collecting data by deciding what data to collect about the identified attributes and how to do this (operationalising). Appendix D describes the Alternative Data Collection Approaches opened to this researcher. The relevant data collection approaches used in this research are now discussed.

a. **Questionnaires / Surveys**

These techniques are used when the researcher needs to have access to a large amount of information from multiple respondents in an easy and non-threatening way (McNamara, 2008; Collis and Hussey, 2009; Mertens, 2015).

Advantages of using this approach include, the fact that respondents can complete the survey anonymously. Questionnaires / surveys are easy to administer to several people and easy to analyse, compare and contrast. Furthermore, they are relatively inexpensive to administer and are a good way of gaining access to a lot of data in addition to several sample questionnaires already in existence. Disadvantages of using this approach include, the fact that they can be impersonal and depending on their wording, respondent responses can be biased. Furthermore, respondents may fail to understand the questionnaire / survey and the researcher may not obtain the complete picture of events.

This data collection technique was deemed appropriate for this research. It was used in combination with other data collection techniques described in this section. The reason being that, in order to meet the goals of this research, it was important to obtain the views of experts in the field and stakeholders. Furthermore, to provide uniformity with the questions posed and to be able to have uniform results that can be easily compared and analysed, it was determined by this researcher that this was one of the most optimal ways to undertake the data collection approach.

The questionnaires were designed based upon the literature review and mental models of the researcher (see Appendix A for questionnaire design). The survey questions (questionnaire) were personally delivered or sent by email to all respondents by the researcher.

b. Interviews

The interview technique is used when the researcher needs to have an in-depth understanding of the experiences / learning of respondents or when the researcher needs to understand the response to a questionnaire (McNamara, 2008; Collis and Hussey; 2009; Mertens, 2015).

Advantages of the interview technique include, gaining an in-depth understanding of the respondents' experiences / answers, developing relationships with the client and applying flexibility to the interview questions posed if applicable. Furthermore, they are relatively inexpensive to administer and are a good way of gaining access to a lot of data and to several sample questionnaires already in existence. Disadvantages include, the fact that interviews can be quite costly as an enormous amount of time is spent on for example, one respondent. In addition, there is a potential of researcher bias. Interviews can also be difficult to analyse as they need to be structured, codified etc. This data collection technique was partially used in combination with other data collection techniques described in this section. This was mainly used as a follow up to the survey

question(s) when the researcher was seeking further clarification or the validation of certain data. This was done for example, with the Finance Director and the Business Analyst / Manager who helped validated some of the data.

c. Document or artefact review

This technique is used when the researcher reviews documents / records regarding the research topic or when the researcher wants to gain understanding of how a programme or research topic operates without interrupting the project (McNamara, 2008; Collis and Hussey; 2009; Mertens, 2015). These are mainly secondary records.

Advantages of secondary records include, the fact that they can provide very detailed information on how the programme or research topic / project operated. It provides detailed historical information which can be used for further analysis. It also provides factual information, in that the information provided is true and there are no or very little biases of this kind of information. Data is also impersonal. Disadvantages include, the fact that it could be time consuming to collect the information if one does not know or understand what type of information to collect. In addition, the data provided may be incomplete and there may be restrictions on access to the data.

This data collection technique was deemed appropriate for this research. It was used in combination with other data collection techniques described in this section. The reason being that, in order to meet the goals of this research, it was important to obtain prior information regarding the organisation as this was to help especially in the System Dynamics modelling process.

d. Case Studies

Case Study techniques are used when the researcher needs to understand in-depth a respondent's experience(s) of a particular research topic or programme and also to perform an in-depth investigation of a particular phenomenon (McNamara, 2008; Collis and Hussey, 2009; Yin, 2009; Farquhar, 2012; Mertens, 2015).

Advantages of Case Studies include, the fact that they allow for a comprehensive understanding of respondents' experiences and can be used as a basis for theory development or testing. Disadvantages include, the fact that they can be very time consuming and sometimes cannot be used to generalise to the population. Case Studies also cover depth rather than the breadth of the subject topic.

This data collection technique was deemed appropriate for this research. It was the main data collection tool used in combination with other data collection techniques described in this section. This was used, since, to meet the goals of this research it was important to obtain the views of experts and stakeholders in the SSC field. Case Study was the unit of choice as the approach in this research was to analyse and explain the SSC phenomenon in depth and to gain access to sensitive information.

The data collection techniques used in this research are shown in Figure 8 below.

Convergence of Evidence (single Study)

Documents
(Review of organisational records and literature review)

Archival Records
(Review of organisational records and literature review)

Interviews
(Used as part of follow up questions to Questionnaire/Survey)

Case Study
Used in this Research

Fact
Cause effect Link between/among the SSC factors. Employees are critical to the SSC Transition

Structured Interviews and Surveys (Questionnaire used in this reseerch)

Figure 8 Convergence of Evidence (single Study).

Source: Adapted from Yin (2009, p.117)

3.1.10 Data Analysis Research Techniques- Qualitative Strand-Stages I & II (One and Two) and Quantitative Strand Stage III (Three)

According to Yin (2009, p.126):

> Data analysis consists of examining, categorising, tabulating, testing or otherwise recombining evidence to draw empirical based conclusions. Analysing case study evidence is especially difficult because the techniques still have not been well defined. To overcome this every case study analysis should follow a general analytic strategy, defining priorities for what to analyse and why. Four analytic strategies [to use include], relying on theoretical propositions; developing case descriptions; using both quantitative and qualitative data; and examining rival explanations. Any of these strategies can be used in conjunction with five specific techniques for analysing case studies; i.e. pattern matching, explanation building, time series analysis, logic models and cross case synthesis.

In this research the following strategies as espoused by Yin (2009) were used:

General analytic strategy (Four Strategies of case study analysis)

a. Analysing based upon Theoretical Propositions.

According to Yin (2009), the first preferred method of analysing case studies is the use of theoretical propositions. This is because the theoretical propositions would have shaped the research, the data collection plan and would have given the basis for the analytic procedure. This was the most appropriate methodology used in this analysis. In this research, the survey results are analysed against the theoretical propositions (hypotheses)[18]. The SD models were built and analysed using the theoretical framework as a basis.

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[18] Yin (2009) uses the concept of theoretical propositions. In this research hypothesis(es) is (are) used. However, the research does not use Hypothesis testing as a method but rather SD.

b. Developing case study description

This approach involves developing a descriptive approach for organising the case study work. According to Yin (2009), this is used when the preferred data analytic strategy does not work. This is a less preferred strategy as an alternative to using the theoretical framework. This approach was not used in this research analysis. This is because the theoretical propositions were clearly defined and therefore the analysis was structured sufficiently to address the research question.

c. Using both qualitative and quantitative data

According to Yin (2009), the use of both quantitative and qualitative data strengthens the analytical part of the research. Firstly, quantitative data may address the events or behaviour of the case study that the researcher is attempting to explain. Secondly, the data could be related to the embedded unit of analysis within the wider context of the case study. Both qualitative and quantitative data can be crucial in explaining or testing the case study's major propositions. As case studies can use a combination of different analytic strategies, this approach was used in this research analysis. For example, the Causal Loop Diagrams were based upon qualitative data (i.e. the literature review and the mental models of the researcher). The survey analysis was based upon descriptive statistics (frequency tables) using a nominal scale. The quantitative part of the System Dynamics (SD) model was shown in the Stock and Flow diagram, where equations and parameter estimate(s) were estimated.

d. Examining rival explanations

This approach involves defining and testing rival explanations. This approach can be used with any of the other three approaches. For example, hypothesis testing can be used for the theoretical propositions. With this approach the data collection will also involve the collection of data for both the null and alternative hypothesis. This then allows for comparisons and rival explanations. This approach was not used in this

research analysis. This is because the theoretical propositions (called hypotheses in this research) were clearly defined and therefore the analysis was structured sufficiently to address the research question. Furthermore, the data collected and tested related to the research propositions.

Five (5) Specific Techniques for Analysing Case studies

The five analytic techniques deal with the issues of internal and external validity and this can be used with the above four case study analytic strategies.

a. Pattern Matching

According to Yin (2009), a desirable analytic technique to use is the logic of pattern matching. With this approach an empirically based pattern is compared to a single prediction or with several alternative predictions. This approach was partially used in this research analysis. For example, the theory proposition (called hypothesis in this thesis) that staff is key to the SSC Transition process, can be compared to the SD model that predicts how staff will react and the impact it will have on the SSC Transition given certain scenarios. This is a form of pattern matching as there is the use of the theoretical propositions regarding the SSC Staff and how the SD model predicts this.

b. Explanation building

This is a form of pattern matching, but the aim of this is to analyse the case study by the building of explanations about the case. In explaining a phenomenon, it may be desirable to specify an assumed set of causal links about how and why they occur (Yin, 2009). Normally these causal links are in narrative forms. This is an iterative process. This approach was mainly used in this research analysis. For example, the development of the Causal Loop Diagram and the Stock and Flow Diagrams (using the literature review, survey results and the researcher's mental models) showed the causal links among several variables regarding the SSC Transition.

c. Time Series Analysis

Another technique is to use time series analysis. This allows for the ability to trace changes overtime and this is a very strong aspect of case study analysis. The main logic regarding time series analysis is the match between the observed (empirical) and either a theoretically significant trend that has been specified at the beginning of the research or some alternative (rival) trend also specified earlier. This approach was used in this research analysis. For example, the SD model involves the use of time series analysis. The proposition specified (empirical trend), is matched against the results of the SD model (theoretical) which allows for further predictions and scenarios regarding change overtime.

d. Logic Models

Logic models depict a chain of events that are complex over an extended time. Logic models depict cause and effect relationships. Events that are observed empirically are compared to events that are predicted theoretically. They are a form of pattern matching. This approach was mainly used in this research analysis. For example, the Causal Loop Diagrams, and Stock and Flow Diagram are forms of Logic models where the proposition specified (empirical trend), is matched against the results of the SD model (theoretical) which allows for further predictions and scenarios regarding change overtime.

e. Cross-Case Synthesis

This technique is used for analysing multiple cases. This analysis strengthens the validity of the case. Empirical findings derived from a number or series of individual cases are aggregated together. Common themes within the research can then be developed and derived and these can help drive the findings of the research. This approach was used in this research analysis. For example, a cross case analysis was used for the three (3) individual cases (expert opinion) and three (3) individual cases (stakeholders). Furthermore, a cross case analysis was used for all the six (6) individual cases (three

expert opinions and three stakeholders). Based upon this certain themes and analysis were developed for the organisation.

The above is illustrated and summarised in Figure 9 below.
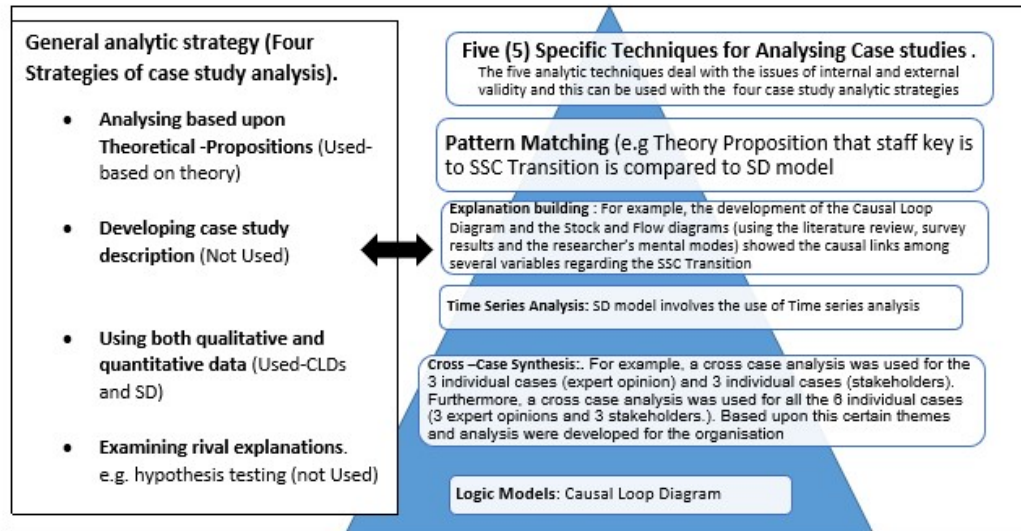
Figure 9 General Analytic Strategy and Specific Techniques for analysing case studies

Source: Adapted from Yin (2009)

Data Analysis Research Techniques-Stage III (Three)

This incorporates a combination of the data analysis techniques for the qualitative strand and has also been addressed in Chapter Five (Building the Model) and Chapter Six (Verification Analysis and Results).

3.1.11 **Reliability and Validity of the case study**

Yin (2009, pp. 116-117) states that there are three (3) main principles of data collection. These are the 'use of multiple sources of evidence', the creation of a 'case study database' and finally 'maintaining a chain of evidence'. The aim of this is to support the reliability and validity of data collection. These principles are discussed below.

a. **Principle 1: Use of Multiple sources**

This involves using data from multiple sources. The ability to be able to call upon or use multiple or alternative sources of evidence is a major advantage or strength of case studies (Yin, 2009; Farquhar, 2012). In effect, a rationale for using triangulation is made. The result is that this supports the facts of the case and strengthens the reliability and validity of the case. In this research, data has been used from multiple sources such as Questionnaire, Archival records, Respondents and Literature review.

b. **Principle 2: Create a case study database (increases the reliability of the case study)**

This is to do with how the collected data is documented and organised. The data or evidence collected is documented in a database (Yin, 2009). In this research, case study documents, case study protocol, thesis report and stock and flow model are developed to reflect this. Furthermore, the investigative report from the research, which may be for example, a research article, research report or book is documented. This research provides a thesis report.

c. **Principle 3: Maintaining a chain of evidence (increases the reliability of the case study).**

According to Yin (2009) maintaining a chain of evidence increases the reliability of the case study. This is demonstrated in this research by the research report, the case study protocol, causal loop diagram and stock and flow diagram. Figure 10 below depicts this.

Figure 10 Maintaining a chain of evidence

Source: Author's compilation of research thesis's chain of evidence

3.1.12 **Criteria for judging the quality of the research design (Qualitative Strand)**

Barnham (2015, pp. 840-841) argues that qualitative research can be made to be more objective by using firstly, the technique of triangulation. Secondly, the methodology of qualitative research can be changed to emphasise the usefulness or importance of the research which he calls 'utility' by adopting the research findings that are the most useful in understanding the problem at hand. Thirdly, one can argue that qualitative research does not seek to be objective but rather the aim or job of qualitative research is to give an account of the respondents' perspectives and experiences about how they see the world.

Various writers such as (Johnson et al., 2006; Yin, 2009; Cassell, 2012; Mertens, 2015) advocate that the assessment criteria for judging the quality of a research design especially a qualitative test using an Interpretivist paradigm should include Trustworthiness, Credibility, Confirmability, Data Dependability, Transferability / Logical Inference and Ecological Validity.

Yin (2009) argues that, because case study is a form of empirical social research, four tests (construct validity, internal validity, external validity and reliability) that are commonly used to evaluate any empirical social research should be applied to it.

Therefore, these four tests are used to judge the quality of the qualitative aspects of this research (Yin, 2009; Farquhar 2012). Construct Validity is the process of correctly identifying the key measures of operation (operational measures) for the concept of study; Internal Validity, is the establishment of causal relationships; External Validity, involves the generalisability of the study and Reliability is the repeatability of the study.

Table 15 below shows the criteria and approach adopted in judging the quality of the research design adopted.

Table 15 Criteria and Approach Adopted In Judging the Quality of the Research Design Adopted

CRITERIA	Description	CASE STUDY TACTIC	STAGE OF RESEARCH IN WHICH TACTIC OCCURS	THIS RESEARCH
Construct Validity	The process of correctly identifying the key measures of operation (operational measures) for the concept of study	• use multiple sources of evidence • Establish chain of events • Have key informants review draft • Case study report	data collection	Multiple respondents/expert opinion used in stages I& II. In addition, secondary data (Secondary Data used for SD Model)
Internal validity	The establishment of causal relationships	• use logic models • do explanation building • address rival explanations • use logic models	data analysis	Causal Loop Diagrams/Gap analysis). Simulation; System Dynamics
External Validity	Involves the generalisability of the study	• use theory in single case studies	research design	Literature review
Reliability	The repeatability of the study	• develop case study database • use case study protocol	data collection	Case study database and protocol developed. Responses/questionnaire etc.

Source: Adapted from Yin (2009, p.41)

Criteria for judging the quality of the research design adopted (Quantitative Strand)

These criteria are discussed under Sterman's (2000) approach in section 3.2 and also in Chapters Five and Six.

3.1.13 Ethical Considerations

Table 16 below summarises the ethical considerations considered and how they have been addressed.

Table 16 Ethical Considerations

AREA	HOW CONCERN WAS/ IS ADDRESSED
Requirement to obtain approval from University of Bedfordshire etc.	Received approval from University of Bedfordshire in 2012 and commenced data gathering in 2013.
Ensure that respondents are aware that data and their responses are confidential	Respondents were informed verbally and also on the questionnaire that all information/responses gathered are confidential
Keep data in a format that is safe	Data is kept on a safe hard disk and USB format
Share data on a need to know basis	Data is only shared with relevant University of Bedfordshire Staff and Company Executives

The next section discusses the methodology of System Dynamics and why it is justified for this research.

3.2 Methodology of System Dynamics and its justification for this research

System Dynamics Model Building; Tools used and SSCs and System Dynamics

3.2.1 Five (5) major steps in System Dynamics model building

Sterman (2000) identifies five (5) main steps in model building, assessment and validation. The below five (5) steps are used.

1. The articulation of the problem, which is also identified as boundary selection. During this stage, the problem is articulated, i.e. what type of problem it is.The key concepts and variables are identified including identifying the time period. In addition, the reference modes are also identified. This involves the evaluation of the historical behaviour of the main variables and concepts and how they might behave in the future.

2. The next step is to formulate the Dynamic hypothesis. According to Sterman (2000), this is the stage where the existing theories regarding the problematic behaviour are reviewed (initial hypothesis generation). There is then the formulation of a dynamic hypothesis which explains the interaction and the feedback structure of the actors or variables arising from within the system (endogenous focus). Furthermore, maps are developed identifying the cause-effect relationships and structure based upon the key variables, initial hypothesis etc. These are done by using tools such as causal loop diagrams, stock and flow maps etc., (mapping).

3. The formulation of the Simulation Model. This involves: structure specification, specification of the decision rules, parameters, estimation of behavioural conditions etc., and tests for consistency in relationship to the purpose and boundary of the topic under discussion.

4. Testing stage. During this stage, the model is compared to the reference modes. This is to verify whether the model reproduces the problem behaviour sufficiently for

the purpose it was initiated. How does the model behave under severe conditions? In effect, how robust is the model. Sensitivity analysis reflects how the model reacts in response to changing assumptions, parameters, model boundary, and initial conditions.

5. The design of Policy and Evaluation. This relates to policy design, what if (sensitivity analysis), scenario specifications and policy interaction. For example, discovering whether there is an interaction of the policies, synergies and responses. Finally, Sterman (2000) concludes that the model is iterative. Sterman's (2000) model is depicted in Figure 11 below.
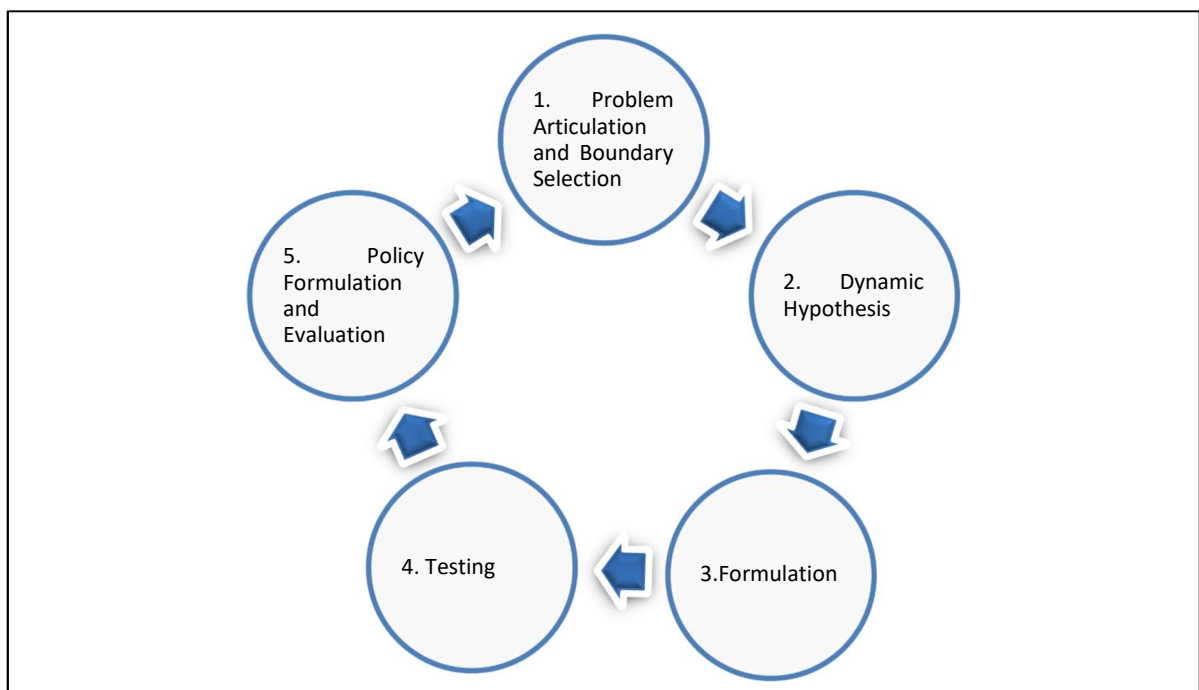
Figure 11 Sterman (2000), Five (5) main steps in model building, assessment and validation

Source: Adapted from Sterman, (2000, p.88)

Other writers such as Davis, Eisenhardt and Bingham (2007) have proposed a roadmap for developing theory using simulation methods. This road map is outlined in Table 17 below.

Table 17 Roadmap for Developing Theory Using Simulation Methods

Steps	Activities	Rationale
Begin with a research question	Determine a theoretically intriguing research question • Look for a basic tension like structure versus chaos, long versus short run	Focuses efforts on a theoretically relevant issue for which simulation is especially effective
identify simple theory	Select simple theory that addresses the research question • Look for intertwined processes (e.g., competition and legitimation), nonlinearities, and longitudinal effects • Look for theory that requires data that are challenging to obtain	• Forms basis of computational representation by giving shape to theoretical logic, propositions, constructs, and assumptions • Focuses efforts on theoretical development for which simulation is especially effective
Choose a simulation approach	Choose simulation approach that fits with research question, assumptions, and theoretical logic	Ensures that the research uses an appropriate simulation approach given the research at hand • If the research does not fit an approach or if the approach requires extensive modification, choose stochastic processes
Create computational representation	• Operationalize theoretical constructs • Build computational algorithm that mirrors theoretical logic • Specify assumptions • Ensure that computational representation allows theoretically valuable experimentation	Embodies theory in software • Provides construct validity • Improves internal validity by requiring precise constructs, logic, and assumptions • Sets the stage for theoretical contributions
Verify computational representation	Replicate propositions of simple theory with simulation results • Conduct robustness checks of computational representation • Confirms accuracy and robustness of computational representation	• Confirms internal validity of the theory • If verification fails, correct theory and/or software coding
Experiment to build novel theory	Create experimental design (e.g., vary construct values, unpack constructs, alter assumptions, add new features) based on likely theoretical contribution and realism	• Focuses experimentation on theory development • Builds new theory through exploration, elaboration, and extension of simple theory
Validate with empirical data	Compare simulation results with empirical data	Strengthens external validity of the theory

Source: Davis, Eisenhardt and Bingham (2007, p. 481)

3.2.2 Tools of System Dynamics

According to Sterman (2001), to understand and manage systems that are complex, tools are needed to demonstrate, capture and understand the time delays, stocks and flows and the process of feedback. Furthermore, these tools should allow for policy generation and the creation of system dynamics structures. Simulation modelling and causal mapping are part of these tools. Sterman (2000) argues that Causal Loop Diagrams are a means to show feedback structures within systems**.** Sherwood (2002) argues that system thinking helps us to simplify the complexity of real systems which evolve overtime. This helps to explain why

a system behaves as it does and helps to provide insights as to the likely behaviour of the system in the future. The key is to understand the chains of causality and the various cause and effect relationships between the various variables within the system. This can be done by using a Causal Loop Diagram to depict the chain of causality. Causal mapping requires the use of Causal Loop Diagrams which is described below.

a)   CAUSAL LOOP DIAGRAMS (CLD)

According to Sterman (2000) and Sherwood (2002) there are two (2) main links; S (+) and O (-). If an increase in the cause drives an increase in the effect, then the link is an S or + and if it is a decrease then it is an O or -. Causal Loop Diagrams of real systems are primarily composed of closed continuous chains called feedback loops. There are two (2) types of feedback loops. These are Reinforcing and Balancing Loops. Reinforcing Loops are characterised by having an even number of O's around the loops and Balancing Loops have an odd number of O's. Reinforcing Loops perpetuate the cycle, in effect, amplifying the effect of each new turn of the cycle. A Balancing Loop on the other hand, helps to slow or reduce the impact of the reinforcing loop or converge on the target if it is used with a dangle. A dangle determines the boundary of the system of interest. According to Sherwood (2002), to build an acceptable causal loop diagram for a system requires a very deep understanding of the system in question. He argues that system thinking and causal loop diagrams offers many benefits, which supports the arguments espoused in Chapter Two of this work. These benefits include, objectivity and not parochialism, it also allows for better communication by allowing us to capture our mental models (our basis of understanding) and comparing it to that of our colleagues (mental models). This is a form of iteration and this can allow us to select the most important candidate for the causal loop diagram.

In mapping a system, Sterman (2001) advises on the use of expert opinion, market research or statistical analysis. Causal Loop Diagrams allow for alternative policy evaluation and also

according to Sherwood (2002), systems thinking can help us withstand the test of time. The above discussions (model building) and tools (such as Causal Loop Diagrams / Stock and Flow models) are associated with or can be used in system dynamics in structuring and understanding organisations as systems.

3.2.3 SSCs and System Dynamics models

There is very little research regarding SSCs and system dynamics models. The closest one comes to is a paper by Janssen, Joha and Zuurmond (2009) where they developed and statistically validated a simulation model for municipalities who wanted to share services, showing that SSCs can provide improved efficiencies. In addition, the vanguard method developed is a system thinking methodology that has been used in some private and public sectors (Seddon, 2008; O'Donovan, 2014). This method has three core tenets:

- **Check- This means understanding your organisation as a system**

- **Plan- Identification of the factors/drivers that will drive change**

- **Do- Taking direct action/intervention on the system**

Having discussed the methodology of System Dynamics and its rationale for this research, the next section discusses the Choice of Research Methods used.

3.3 Choice of Research Methods used

- **Beliefs of this Researcher. Ontological assumption (What is the nature of reality).**

  This researcher believes that research must be seen both from the viewpoint of the participants (inductive) and be deductive. Reality should be seen as multiple and objective from the participants viewpoint. At the other end of the spectrum, reality must be deductive. Reality should be seen as separate from the researcher (objective and singular).

- **A definition of basic ideas of that worldview**

  This researcher believes that the experiences of people drive their worldview. However, researchers must have multiple stances which may be both biased and unbiased stances.

- **How the worldview shaped their approach to research**

  The researcher's background in both quantitative and qualitative methods helped shape this research.

- **Epistemological assumption (what is the relationship between the researcher and that being researched?)**

  The researcher believes that knowledge involves practicality, so that it is important to employ what works best to address the research question.

- **Axiological assumptions (the role of values)**

  The researcher believes that researchers must employ multiple stances which may involve including both biased and unbiased stances.

- **Rhetorical assumption (the language of research)**

  The researcher believes that the language of research must be both formal and informal in that the researcher can both employ formal and informal writing styles.

- **Methodological assumption (the process of research)**

  In terms of the research process, this researcher believes that qualitative and quantitative data can be both collected, combined and mixed.

3.3.1 **Framework for the Case Study Design (This Research)**

Case study research involves single and multiple case studies (Yin, 2009; Thomas, 2011; Farquhar, 2012). The Case study types are shown in Figure 12 below.
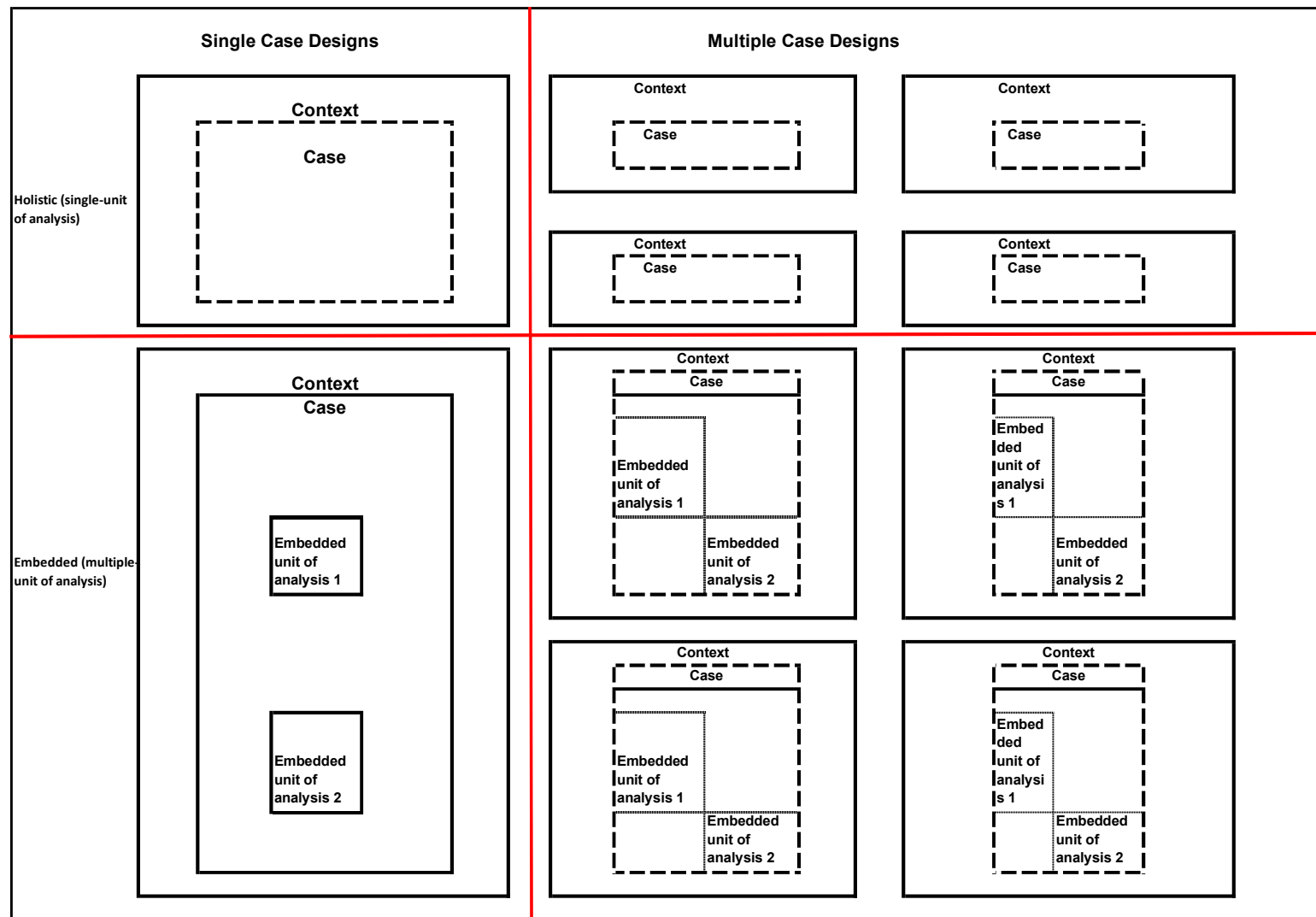
Figure 12 Case Study types

Source: Yin (2009, p.46)

In this research, a single financial organisation with six (6) individual embedded cases / units was used. This has been chosen because the study of an SSC is a typical case study and the current SSC Transition methodology appears to be similar for any established SSC. In addition, the use of SD to evaluate an SSC proposal will be revelatory in nature (Yin, 2009). Figure 13 below shows the context and reasons for the individual embedded case studies used in this research.

CONTEXT : Current approaches for the design and building of SSCs compartmentalises the SSC model into various stages (BearingPoint, 2007; Deloitte, 2011; PWC, 2011). Although, projects can be done in stages, current approaches do not provide a holistic view of the interdependencies amongst all the various stages of the design and building SSCs.

CASE : This case is a Representative or typical case (Shared Service Centres have been established since the 1990's) and revelatory in nature (Use of System Dynamics to evaluate the building of a model as a complementary tool in the build/design and implementation of Shared Service Centres.

Unit of Analysis

Single Financial Organisation- 6 embedded cases

3 Expert Opinions

3 Stakeholder Opinions

Unit of Analysis (Case 1)

Expert Opinion 1- **Respondent 1**

Business Analyst/Manager

Unit of Analysis (Case 2)

Expert Opinion 2- **Respondent 2**

Accounting Manager

Unit of Analysis (Case 3)

Expert Opinion 3- **Respondent 3**

Project Manager

Unit of Analysis (Case 4)

Stakeholder Opinion 1- **Respondent 4**

Employee (Senior Accountant)

Unit of Analysis (Case 5)

Stakeholder Opinion 2- **Respondent 5**

Service User (Managing Director)

Unit of Analysis (Case 4)

Stakeholder Opinion 3- **Respondent 6**

Finance Director (Services Supplier)

Figure 13 Single Organisation (Case Study) and six (6) Individual Embedded Cases

Yin (2009) and Thomas (2011) provide a framework for designing case studies. These include: questions relating to the study, the development of theories / propositions, identification and definition of the unit of analysis, the logic behind linking the data to the stated propositions and the criteria to be used for interpreting the findings.

The case study design shown in Figure 14 below is used as a basis to design and implement the research process for both the qualitative and quantitative strand (exploratory sequential mixed research methods approach). The Hypotheses 1, 1a, and 1b are used for Stages I and II of the research and for Stage III (Simulation) Hypotheses 2, 2a, 2b, 2c and 3 are used.

The Case Study Research Design-This Research

1. Research Question

How can a DSS tool based upon a System Dynamics(SD) approach be constructed for Shared Service Centres that can complement current approaches in the Shared Service Implementation Process? (i.e Design/Build and Implementation)

Literature Review

1a. Theory Development/Testing

Hypothesis 1:

There is a cause effect relationship between/amongst the various (key/critical success) factors influencing the design/build and implementation of Shared Service Center

Hypothesis 1a:

SSCs are organisations and the reasons for success/failures of organisational change are applicable to SSCs.

Hypothesis 1b:

There are some key (critical success factors) associated with SSCs that influence the design/build and implementation of SSCs.

2b. Theory Development/Testing (also shown via Stock and Flow Diagram-SSC Transition)

Hypothesis 2:

The performance of a newly established SSC is strongly determined by the ability to retain its staff

Hypothesis 2a:

Staff capacity during the establishment of a new SSC is strongly dependent on the ability to manage workloads and keep turnover down to a minimum or low rate

Hypothesis 2b:

The inefficient management of staff turnover can lead to further increases in costs.

3. Theory Development/Testing (also shown via Stock and Flow Diagram-AR Transactional Activities)

Hypothesis 3:

The inefficient management of transactional activities or errors created in the transactional activities can lead to increased costs for the organisation

3. Unit of analysis and Likely cases to be studied

Single Organisation-Financial Organisation (6 embedded cases/units of analysis)

Expert Opinion

3 Experts

1. Business Analyst

2. Project Manager

3. Accounting Manager

Stakeholder Opinion

3 Stakeholders

1. Service User

2. Supplier and

3. Employee

4. Linking Data to propositions and criteria for interpreting the study's findings

1. Logic Models (Use of Causal Loop Diagrams)
2. Cross Case Synthesisis (Analysing the results received for all case studies)
3.Questionnaires
4. Logic Models (Use of Stock and Flow Model)
5. Explanation building and Analysing the results obtained from Questionnaires).

5. Criteria for Judging the quality of the research design

1. Construct Validity

Using multiple sources of evidence. Use of experts and multiple respondents.

2. Internal Validity

Using logic models (Causal Loop diiagram/ Gap analysis /Stock and Flow models and explanation building during the data analysis.

3. External validity

The use of theory(Literature review) in this case study (single organisation and 6 embedded cases/units of analysis).

4. Reliability

Development of case study/protocol/database during the data collection phase.

Figure 14 Case Study Research Design for this research

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Yin (2009) and Farquhar (2012) advocate that the initial basis for a case study design are the development of theory / propositions or the testing of theory; the design of a data collection protocol / questionnaire and selecting candidate cases in this case the unit of analysis. Where there are multiple cases, the research is conducted for each case, individual reports are written, and then cross case conclusion / analysis is made, which then leads to

Case Study Research Design

Define and Design   **Prepare, Collect and Analyse**   **Analyse and Conclude**

- **Develop Theory**
- **Select Cases**
- **Design Data Collection Protocol**
- **Conduct 1st Case** → **Write Individual Report**
- **Conduct 2nd Case** → **Write Individual Report**
- **Conduct remaining Cases** → **Write Individual Report**
- **Draw Cross-Case Conclusions**
- **Modify Theory**
- **Develop Policy Implications**
- **Write-Cross Case Report**

Case Study Method

Figure 15 Case Study Approach

Source: Yin (2009, p.57)

the modification of the theory if appropriate. Collis and Hussey (2009, p. 63) define:

A hypothesis [as] a proposition that can be tested for association or causality against empirical evidence. A theory is a set of interrelated variables, definitions and propositions that specifies relationships among the variables.

In effect, theory building implies using deduction to build theoretical propositions from a set of assumptions. On the other hand, hypotheses are created or emerge through deduction and these are then tested. Hypotheses and propositions may be similar in most cases but usually hypotheses are tested. Finally, a cross case report is then written. Figure 15 illustrates Yin's (2009) approach to the Case Study Research Design. This is used as a template in developing and reporting in the Case Study Research Design in Stages I and II.

3.3.2 Research Methods / Techniques (Overview of 3 Research Stages) Methodological Approach of this research

The research used a three (3) stage research design / approach. This methodological approach is shown in Figure 16 and discussed further below.

The three (3) stages of the research are:

- Stage One: Conducting the pilot survey and selecting expert Opinion

- Stage Two: Conducting Stakeholder Opinion survey and

- Stage Three: Building the Shared Service Transition Model (Stock & Flow Model)

Methodological Approach of this Research

Research Question/Objectives	

Review Literature

Develop Theory

Select Cases (Unit of Analysis is Financial Organisation)

Design Data Collection Protocol and Questionnaire

Conduct Pilot Study (Stage I) and Select Expert Opinion (Candidates) **3 experts** (Business Analyst/Project Manager/Accounting Manager

Analyse Data and Write Individual Report

Analyse Data and Draw Cross-Case Conclusions

Modify Theory (If appropriate)

Develop Policy Implications

Conduct Stage II (Two) Stakeholder Opinion

3 Stakeholders (Service User/Service Supplier and Employee)

Analyse Data and Write Individual

Analyse Data and Draw Cross-Case Conclusions

Modify Theory (If appropriate)

Develop Policy Implications

Cross- Case Analysis

Analysis of all Cases (6 cases) and total

Use Analysis of Data and Individual Report for Stages I & II

Analyse Data and Draw Cross-Case Conclusions

Modify Theory (If appropriate)

Develop Policy Implications

Stage III (Three) Shared Service Transition Model (Stock & Flow Model)

Research Question

Literature Review

Develop Theory

Select Cases (Unit of Analysis is Financial Organisation)

Collect Data for Base Model (Reference Data)

Refine Constructed Causal Loop Diagram

Design & Build Stock & Flow Model (Select Key Variables)

1. Problem Identification
2. Formulation of Dynamic Hypothesis
3. Formulation of a Simulation Model
4. Testing
5. Policy Design and Evaluation

Pre Shared Service Staff (Pre-SSC).

Pre and Post transitioned activities/Transactions

SSC Staff

Temporary Staff

Sales General and Administrative (SGA)

Customer/Service Effect

Workload/ (Work Capacity)

Analyse Data/Conduct Sensitivity Analysis and Write Individual Report

Analyse Data and Draw Cross-Case (Total Model) Conclusions

Modify Theory (If appropriate)

Develop Policy Implications

Write Cross Case Report

Criteria for judging the quality of the research

1. Construct Validity
2. Internal Validity
3. External Validity
4. Reliability

Ethical Considerations

1. Obtain approval from University of Bedfordshire.
2. Ensure that respondents are aware that data and their responses are confidential
3. Keep data in a format that is safe
4. Share data on a need to know basis

Figure16 Methodological Approach of this Research

- **Research Question and Literature review**

For each stage of the research approach, the research begins by reviewing the literature review as espoused in Chapter Two and shown in Figure 16 above. The literature review forms a basis for the posing of the research questions / objectives. The research question and objectives are also interlinked with the literature review as the researcher also has a thought process / mental models of what is to be studied and this also guides the information that is needed for the literature review. In effect, there is a direct and indirect relationship between the literature review and the research question (objectives).

- **Theory Development**

Having identified the literature review there is a development of theory (hypothesis) which then leads to the selection of the unit of analysis. The theory development is influenced by the literature review. Mertens (2015, p.116) argues that:

> The literature review serves as a foundation for forming research questions, operationalising the objectives of the proposed research, focusing the hypothesis and clarifying what information needs to be collected from what sources and under what conditions.

This research work adopts a similar approach. The three research stages are now discussed below.

a) **Stage I (One) Overview of research process and survey participants**

This involved the use of expert opinion (three experts). Each of these experts had / have been involved with managing the transition of Shared Service Centres. A questionnaire (See

Appendix A) was designed by the researcher based upon the literature review, the research objectives / research question and the mental models of the researcher.

The aim of using the three (3) experts was to help operationalise / validate the questions / objectives posed and to adjust them where appropriate. Furthermore, this stage was used as a pilot study. The questionnaire was manually handed over to the three respondents (experts).

Although the three (3) respondents (experts) had been involved in managing or transitioning the activities of a Shared Service Centre, their emphasis were on different aspects of the Shared Service Build / Design / Implementation and Transition process. Therefore, from a research perspective they bring different insights which helps to validate the research process.

The Business Analyst / Manager (Respondent One) had more emphasis and experience in managing the Feasibility and Design Stage of establishing the Shared Service Centre as they provided the necessary data and analysis for the business case, including the design stage. The Accounting Manager (Respondent Two) had more emphasis and experience in managing the testing / deployment and implementation process and finally, the Project Manager (Respondent Three) had more emphasis in managing the overall process (project management), validating the processes and ensuring that the project is managed and completed on time.

- **STAGE I (ONE) RESEARCH PROCESS DESCRIPTION**

The process for this stage involved, starting with the literature review and research questions. This was done by examining and reviewing the current literature regarding the design and building of SSCs and system dynamics. The aim is to help operationalise the objectives. In addition, it will help to select / validate the most important candidates for the Causal Loop Diagram (CLD) and select the correct questions to be asked.

The Theory Development (Hypotheses) were then developed. A questionnaire relating to SSCs and a Causal Loop Diagram (CLD) model was constructed based upon the current literature and the researcher's mental models. The aim is to validate the current existing shared service models and SD techniques as emphasised in the existing literature.

The unit of analysis (financial organisation and three experts) were selected. A pilot study was undertaken by obtaining feedback regarding the questionnaire designed from a number of managers (three experts) at the organisation (institution). This was done via face to face / telephone contact. These managers have been involved in the design and building of SSCs (expert opinion).

The results received from the survey (expert opinion) was then analysed in relationship to the literature review and conclusions were drawn both for the individual respondents (individual reports) and the organisation (cross-case study).

Case Study Research Design for the Pilot Study-Stage 1 (Expert Opinion)

Define and Design	Prepare, Collect and Analyse	Analyse and Conclude

Research Question

Review Literature

Develop /Test Theory

Select Cases (Unit of Analysis is Financial Organisation)

Design Data Collection Protocol and Questionnaire

Construct Causal Loop Diagram as part of Questionnaire Design

Conduct Pilot Study (Stage 1) and Select Expert

Conduct 1st Case Respondent 1 (Business Analyst/ Manager)

Conduct 2ndCase Respondent 2 (Accounting Manager

Conduct 3rd Case Respondent 3 (Project Manager)

Analyse Data and Write Individual Report

Analyse Data and Write Individual Report

Analyse Data and Write Individual Report

Analyse Data and Draw Cross-Case (Total Organisation)

Modify Theory

Develop Policy Implications

Write-Cross Case Report

Figure 17 Case Study Research Design for the Pilot Study-Stage I (Expert Opinion)
Source: Adapted and extended by author from Yin (2009, p.57)

Figure 17 above outlines the Case Study Research process for the Pilot Stage (Stage I) and this is elaborated on further below.

i. Research Question / Literature Review

The literature review, research questions / objectives and the researcher's mental models were used as a basis in the development / testing of theory.

ii. Develop / Test Theory

The below theories (hypothesis) were developed / advanced.

Hypothesis 1:

There is a cause effect relationship between/amongst the various (key / critical success) factors influencing the design/build and implementation of Shared Service Centre.

The aim of this hypothesis was to find out the cause / effect relationship(s) of the key success factors influencing the design / build and implementation of Shared Service Centre and how they interacted and impacted each other.

Hypothesis 1a:

SSCs are organisations and the reasons for success / failures of organisational change are applicable to SSCs.

The aim of this hypothesis was to find out the main reasons for the success / failures of organisational change and how they apply to SSCs.

Hypothesis 1b:

There are some key (critical success factors) associated with SSCs that influence the design / build and implementation of SSCs.

The aim of this hypothesis was to find out the critical success factors relating to the design / build and implementation of Shared Service Centre.

iii. Unit of Analysis

The unit of analysis selected was a single financial institution with three (3) embedded individual cases (expert opinions).

BACKGROUND TO THE ESTABLISHMENT OF THE SSC

To streamline services in their Northern Europe region, the company embarked on a consolidation of activities of its regional offices to the UK. Among the reasons given were to save costs, streamline the management of financial / customer services and be responsive to the needs of the customers served. An SSC project was undertaken to relocate these services. The original implementation occurred from October 2007 to March 2008. Table 18 below shows the SSC design / build approach for this organisation.

Table18 SSC Design / Phases for the organisation

SSC Phase	Description	Duration	Comments
Phase I	Opportunity assessment	Jan-2007 to 10-Apr-2007	The opportunity was identified and submitted to a management review committee for review and approval on the 10 Apr-2007. During this period a business case was also established.
Management Review	Management Review (Business Case)	10-Apr-2007 to 01- June-2007	The business case was made during this period and this was reviewed by management. Approval was granted to commence with the project on the 01-June-2007.
Phase II	Design & Pilot Phase	01-June-2007 to 01- Oct-2007	During this stage, all the activities that were in scope were mapped out, number of headcounts etc., required and the project timeline and implementation was established. Packages were also designed for employees leaving the company. It must be noted that no existing employee remained after the implementation.

SSC Phase	Description	Duration	Comments
Phase III	Implementation and Rollout	01-Oct-2007-31-03-2008	This was the period that the implementation and rollout began and ended. Employees were sent to Scandinavia from the UK for work-shadow activities. They travelled weekly (Monday to Friday). In the first 2-3(two to three) months of the implementation, approximately half of the existing staff left the company which was not anticipated and therefore created a significant challenge for the implementation team. Plans had to be changed at short notice and the project leader was required to perform some of the work shadowing activities. Furthermore, to complicate matters, not all the staff recruitment / training was in place. Areas like banking software for new recruits took time to obtain and thus provided significant challenges.
Phase IV	Optimisation	01-04-2008 to 03-06-2008	This was the stabilisation phase when the activities were finally in the UK.

iv. DATA COLLECTION

A pilot study was undertaken within the financial institution (organisation). Questionnaires / interviews (See Appendix A and Table 32) were sent to the three managers (discussed earlier) who are experts / involved with the design and implementation of SSCs. This was done in February-April 2013. The questionnaires were developed based upon the researcher's mental models and the relevant literature regarding SSCs and SD (Yin 2009). The questionnaire was structured to reflect the objectives / questions of the research that has been espoused.

v. CASE STUDY PROTOCOL

A Case Study Protocol discussed in Appendix B was also developed and used.

i. Data Analysis / Analytic and write up of individual case study report

The SPSS software was used to analyse the responses. The data analysis technique involved using frequency tables in SPSS to analyse each individual response by analysing the descriptive characteristics of the survey / questionnaire response.

A report and discussion regarding each individual response was undertaken by comparing the results received to the relevant literature review, research question / objectives and hypothesis (hypotheses). This confirmed or refuted the hypotheses. Based upon this certain policy implications were proposed.

vi.   Cross Case Analysis (All Three respondents in Stage One)

A cross case analysis was undertaken for all the three results received. This was used for the organisation as a whole. The SPSS software was used which provided a frequency table of all the three (3) responses. A report and discussion regarding the cross-case analysis was undertaken by comparing the results received to the relevant literature review, research question(objectives) and hypothesis(hypotheses). This confirmed or refuted the hypotheses. Based upon this certain policy implications were proposed.

b) Stage II (Two) Overview of Survey Participants

This involved the use of stakeholder opinion (three stakeholders) and a survey using the questionnaire used in Stage I (one) above.

Each of these stakeholders had a different stake in ensuring that the Shared Service Centre worked effectively. The Senior Accountant (Respondent Four) who was an employee was one of the employees directly involved in the learning and transfer of knowledge to the new Shared Service Centre. The insight provided here is the view of the employees who perform the task / work shadow and provide the services delivered by the new Shared Service Centre to the service users.

The Managing Director (Respondent Five) was the ultimate user of the services that were to be provided. The insight to be provided here is from the perspective of the Shared Service Centre customer or its service users.

The Finance Director (Respondent Six) had more emphasis in managing the supply of services delivered by both the previous SSC and the proposed new Shared Service Centre. The Finance Director was also a major stakeholder in the Shared Service Design / Build and transition process.

- **Stage II (Two) RESEARCH PROCESS DESCRIPTION**

The questionnaire designed in Stage I (one) was sent by both email and hand delivered to the three stakeholders. This occurred after feedback from the expert opinion (initial survey) had been received and was done during late 2013 to mid-2016. Following on from the research process in Stage I (one), the technique was to refine / construct if appropriate a new Causal Loop Diagram (CLD) and questionnaire based upon feedback received from the pilot study (Stage I).

In Stage II (Two) based upon the feedback received from the expert opinion, there was no major revision to the questionnaire design. The research technique adopted was similar to the approach adopted in Stage I (one) except for the respondents used.

- **Cross Case Analysis (All Three respondents in Stage two)**

A cross case analysis was undertaken for all the results received in Stage II. The approach adopted was similar to the cross-case analysis used in Stage I.

3.3.3 Cross-Case Analysis -Report Writing for Total Organisation (All Six Respondents)

A cross case analysis was then undertaken for all the six individual cases. This was used to derive the information for the total organisation. The cross-case analysis strategy used in stages one and two is shown in Figure 18 below.
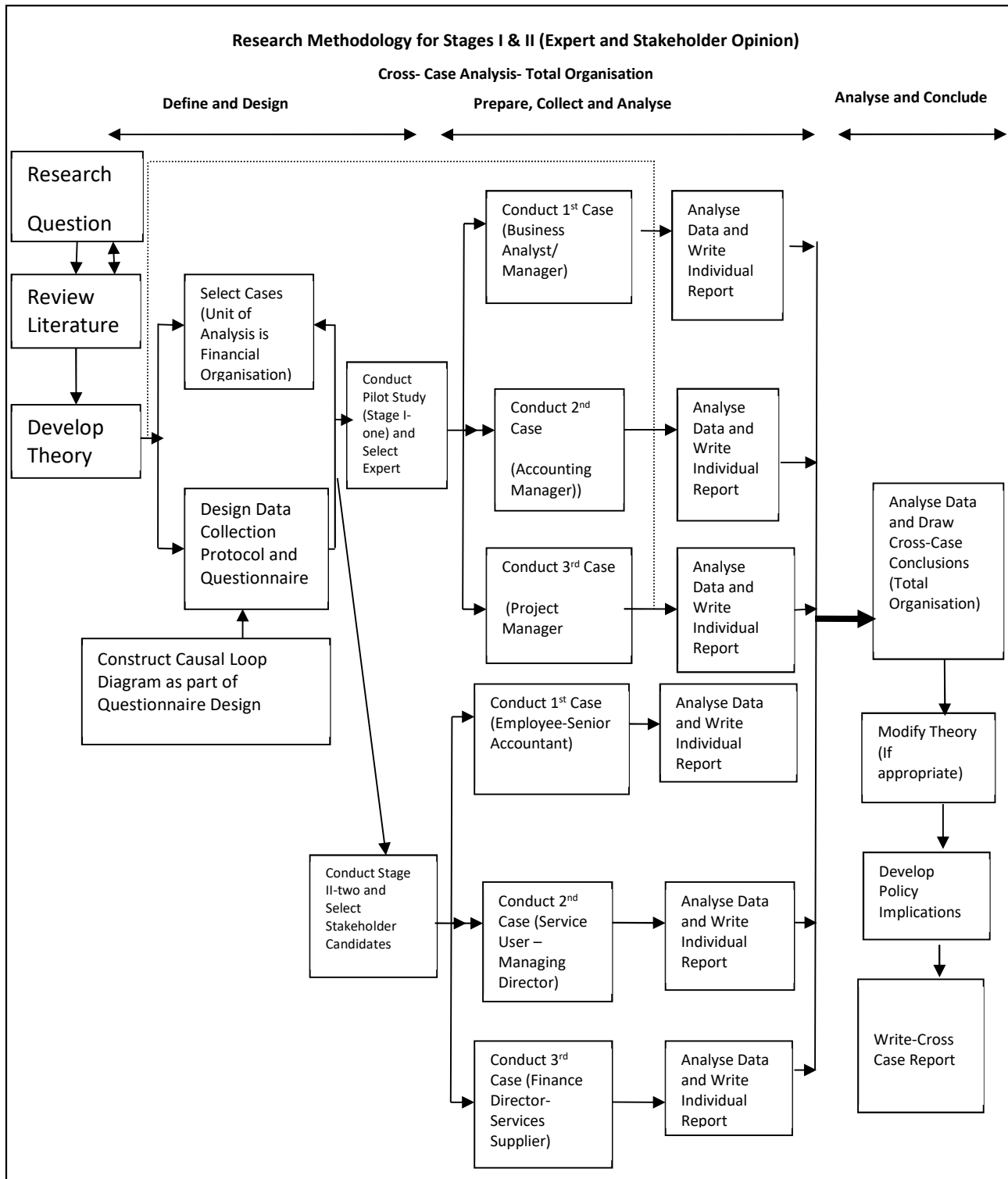
Figure 18 Research Methodology for Stages I & II (Expert and Stakeholder Opinion) – Cross- Case Analysis- Total Organisation

Source: Adapted from Yin (2009, p.57)

The above mainly discussed the research approach adopted for stages one and two. For stage three, the research (methodological) approach adopted is shown in Figure 16 and discussed in Chapter Five (Building the Model).

3.4 Conclusion

This Chapter has reviewed the relevant research methods, discussed the research method chosen and why (choice of research method) it was chosen. In addition, it has addressed the methodology of SD and its justification for this research.

The next Chapter describes and discusses the Conceptual Framework adopted.

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4 Chapter Four: Conceptual Framework

This Chapter lays out the Conceptual Framework for the research based on the previous discussions in Chapters Two and Three. This Chapter spells out the gap in knowledge, the aim and objectives to fill this gap and emphasises the role of SD.

In addition, the Chapter demonstrates what the purpose of the model is, who it is intended for, who will use it, what are its outcomes and how it would benefit the various stakeholders.

This Chapter is organised as follows:

4.1   Theoretical Underpinnings of this research.

4.2   Conceptual Framework of this research.

4.3   Definition of Shared Services, Service Structure and Organisational Form.

4.4   Gap in Knowledge.

4.5   Research Aim(s) / Objectives; System Boundary (time horizon), Research Question and emphasis of the Role of SD.

4.6   Purpose of the Model, who it is intended for, who will use it, outcomes and how it will benefit stakeholders.

4.1   Theoretical Underpinnings of this research

In developing the theoretical framework, three main themes are important. These are:

a.   Organisational Change drivers / philosophy related to systems theory with specific reference to organisations as open systems.

b.   Organisational Change Theory:

- with specific reference to the drivers or reasons of organisational change and their applicability to Shared Service Centres (philosophies of organisational change) and

- with specific reference to the Critical Success Factors of organisational change and their applicability to Shared Service Centres.

c.   To a lesser extent, Stakeholder theory with specific emphasis on Stakeholder analysis.

4.2   Conceptual Framework of this research

The Conceptual Framework encompasses the ideas explored and the way that the research is organised. Mertens (2015, p.115) suggests that 'a researcher's original conceptual framework influences the planning and conducting of the literature review'.

In this research, the conceptual framework is used as a basis to plan and develop the literature review in Chapter Two and vice versa. This then helps to provide a basis for the design and development of the research methodology in Chapter Three, where I review the research methods; advance and describe the methodology of SD and its justification for this research; and finally, discuss and describe the choice of research methods used in this research.

The Conceptual Framework for this research has two strands. The first strand shown in Figure 19 relates to the Design / Build and Implementation of the Shared Service Centre. The argument espoused in this research is that there are cause-effect relationships between

/ among the various factors influencing the design / build and Implementation of the Shared Service Centre. The up-down arrows and the left-right arrows in Figure 19 depict the cause-effect relationships between / among the various factors. The Conceptual Framework in this strand has been designed based upon open systems theory. In Chapter Two, specifically sections 2.3 and 2.4, I discuss systems theory and how organisations are systems. Furthermore, it has been argued out that organisations consists of people working together to achieve a common goal (Smith and Graetz, 2011; Burke, 2014; Encyclopedia of Small Business, 2017). Organisations are formed to achieve either financial, social or other goals. To achieve these goals, they create structures and processes in order to carry out their activities. In doing this, they are influenced by both their internal and external environment, and how they respond to these influences, determines whether they survive, succeed or not.

In Chapter Two, I describe and make the case for organisations as systems. I also address the systems theory and thinking perspective, arguing the case for SSCs as organisations and systems. The objectives of this research are to reflect the cause-effect relationship between / among the SSC transition factors. Open systems theory reflects the internal and external influences that affect the organisation and the interdependencies of these influences. In effect, the issues are systemic. Touching one part will affect the other. In addition, I argue for the use of SD as a decision support system to address this. Thus, the hypotheses shown in Figure19 directs the focus of the Shared Service establishment in this research. These are further discussed later in this chapter.

Another important theoretical foundation is Organisational Change theory as specifically related to the philosophies or drivers of organisational change and its applicability to SSCs.

The aim was to understand the drivers or motives for organisational change and how applicable they are to the motives for SSCs? These are addressed in Chapter Two and this relates to Hypothesis 1a in the Conceptual Framework.

Furthermore, in building the first strand of the Conceptual Framework, another theoretical area was Organisational Change Theory as specifically related to organisational critical success factors and its applicability to SSCs. The aim was to understand the critical success factors of organisational change and their similarities or relevance to the critical success factors of SSCs. These are again addressed in Chapter Two and relates to Hypothesis 1b, shown in Figure 19.

Chapter Three then provides the basis for the choice of research methods, where I use a mixed methods approach (exploratory sequential) by using a qualitative and quantitative approach (Case Study and System Dynamics) based upon the Conceptual Framework and the Literature Review. Furthermore, the Conceptual Framework and the Literature Review drives the choice of Research Paradigm, Research Methodology, Research Methods and Techniques (See also Table 12).

Conceptual Framework Shared Service Centre (SSC) Design/Build and Implementation

Hypotheses

Hypothesis 1

There is a cause effect relationship between/amongst the various (key/critical success) factors influencing the design/build and implementation of Shared Service Centre.

Hypothesis 1a

SSCs are organisations and that the reasons for success/failures of organisational change are applicable to SSCs.

Hypothesis 1b

There are some key (critical success factors) associated with SSCs that influence the design/build and implementation of SSCs.

Shared Service Design/Build and Implementation

SSC Stages Stages

Feasibility Studies

Design/Build

Build/Pilot Stage/Test

Roll out and Implementation

Optimise or continuous improvement)

Critical Success Factors

Vision

Strategy

Effective Communication

Effective Change Management

Senior Management Buy-in

Strong Project Management Skills

Organisation and HR (Human Resources)

Site Location

Figure 19 Conceptual Framework of Shared Service Centre (SSC) Design / Build and Implementation (Strand One)

The second strand, shown in Figure 20 relates to the Shared Service Centre Transition. The argument espoused in this research is that there are two main factors that affect the transition of the Shared Service Centre. The first factor consists of staff / employees (i.e. effective staff management, workload management and staff retention); and the second factor includes the transactional activities (i.e. effective management of work transitioned and minimisation of transactional errors).

The theoretical argument also reflects the cause-effect relationship as argued in strand one of the Conceptual Framework. However, for this aspect, stakeholder analysis theory can to a lesser extent be applied.

i. Stakeholder Analysis (Theory)

Stakeholder theory addresses the ethics and values in managing organisations. This approach originated with Ian Mitroff who attempted to address the issue of what is important and relevant (Grimble and Wellard, 1997). A common version of stakeholder theory is the definition of stakeholders and how they are treated. Freeman is credited as the father or one of the main proponents of stakeholder theory (Grimble and Wellard, 1997; Parmar et al., 2010). In this thesis, the main theoretical influence is on stakeholder analysis.

Grimble and Wellard (1997, p.175) define stakeholder analysis**:**

> As a holistic approach or procedure for gaining an understanding of a system, and assessing the impact of changes to that system, by means of identifying the key actors or stakeholders and assessing their respective interests in the system.

Stakeholders can be referred to as the identification of those that can be affected by a proposed plan of action or can have significant influence in a proposed plan of action (Savage et al., 1991; Mitchell, Agle and Wood, 1997; Fletcher et al., 2003; Benn, Abratt

and O'Leary, 2016). Stakeholders need to be consulted to ensure the success of a project.

Stakeholders can have a significant impact on a project / proposed plan of action and their needs including that of the business need to be considered when developing and implementing the project plan.

Mitchell, Agle and Wood (1997) argue that stakeholders can be identified by either one, two or three attributes or they may possess some or all of these three attributes. These attributes are: their power to influence the activities of the organisation, how urgent is the stakeholders claim on the organisation and finally, how legitimate is the stakeholders' relationship with the organisation. They produce a theoretical typology of different types of stakeholders and who managers should pay attention to. To Mitchell, Agle and Wood (1997, p.855), 'the principle of who or what really counts' is based upon the assumption that in order to achieve a certain goal, managers pay attention to certain classes of stakeholders.

Stakeholders can be of different types (Savage et al.,1991; Mitchell, Agle and Wood, 1997; Fletcher et al., 2003; Benn, Abratt and O'Leary, 2016). These are:

a) Primary, i.e. those that are ultimately affected, and their actions or inactions have a more direct impact on the organisation. These may be customers, suppliers, employees and managers of the organisation.

b) Secondary, i.e., those who are mainly intermediaries and their actions have an indirect impact on the organisation. These may be for example, media, trade associations etc., and community organisations

c) Stakeholders can also be referred to as key stakeholders, i.e. they have more influence and authority within the organisation.

- **Stakeholders Used in This Research**

As stakeholders may have disparate needs and may even have needs at different phases or lifecycle of the project, it is very important to understand and design or mitigate the problems associated with this. With regards to the SSC and especially for this thesis, it is argued that there are three (3) main types of stakeholders. These are Service Users (Customers), Service Suppliers (Service Providers or Service Managers) and employees (Staff who perform the tasks).

Conceptual Framework -Shared Service Centre Transition (Strand Two)

Hypothesis 2b
Inefficient Staff Management
The inefficient management of staff turnover can lead to further increases in costs.

Hypothesis 2a:
Staff Capacity
Staff capacity during the establishment of a new SSC is strongly dependent on the ability to manage workloads and keep turnover down to a minimum or low rate

Shared Service Centre Transition

Hypothesis 3
Transactional Activities
The inefficient management of transactional activities or errors created in the transactional activities can lead to increased costs for the organisation

Hypothesis 2
Staff Retention
The performance of a newly established SSC is strongly determned by the ability to retain its staff

Figure 20 Conceptual Framework -Shared Service Centre Transition (Strand Two)

Finally, in Chapter Three, by using the stakeholders described above based upon feedback from respondents, the literature review and personal experience, I build the SD

model to be able to model the effect on the stakeholders and support the second strand of the conceptual model. In addition, I also provide a justification for using SD below.

4.2.1 Justification for using simulation (System Dynamics) as an alternative to hypothesis testing (application to the thesis)

In section 2.3.3.3, I provide justifications for using simulation (System Dynamics) as an alternative to hypothesis testing and its (SD) application to this thesis.

Furthermore, in order to review the research aims and objectives, it is important first to discuss the concept or definition of Shared Services. This is discussed below.

4.3 Definition of Shared Services; Service Structure and organisational form

Shared Services have been in existence for years. Shared Services came into being in the literature lexicon in the1990's (Fahy, Curry and Cacciaguidi-Fahy, 2002; Deloitte, 2011).

Schulman et al. (1999, p.9); define shared services as the:

> The concentration of company resources performing like activities, typically spread across the organization, in order to service multiple internal partners at lower cost and with higher service levels, with the common goal of delighting external customers and enhancing corporate value.

According to Bergeron (2003, p.3):

> Shared Services is a collaborative strategy in which a subset of existing business functions are concentrated into a new semi-autonomous business unit that has a management structure designed to promote efficiency, value generation, costs savings and improved service for the internal customers of the parent corporation, like a business competing in the open market. The Shared services model is fundamentally about optimizing people, capital, time, and other corporate resources.

Bangemann (2005, p.19) defines a Shared Service Centre (organisation) as:

> a unit with consolidated, dedicated resources; provides process or knowledge-based services to several corporate entities; operates as a business within corporate structure, focuses on (internal) customers; uses contractual arrangements (service level agreements or SLAs) with its customers to define the service level.

In essence, shared services provide back office functions such as finance and accounting / payroll / HR services. Shared Services are consolidated within one area to enhance service delivery (Quinn, Cooke, and Kris, 2000; Ulbrich, 2006; Borman and Janssen, 2013).

4.4 Identifying and Addressing the Gap in Knowledge in This Research

Section 2.5 identified the gap in knowledge. Furthermore, as identified from the Conceptual Framework and the Literature Review, it was determined that the current SSC transformation methodology compartmentalises the SSC implementation process. It was also argued that there are causal factors between / among the critical success factors. These feedback effects need to be understood clearly as demonstrated in the first strand of the Conceptual Framework. Furthermore, to clearly understand these feedbacks, available research suggests that the use of a decision support system that allows for experimentation by SSC implementers has not been comprehensively researched or published. Thus, there is a lack of a DSS tool available to decision makers for experimentation for them to be able to understand these cause and feedback effects. A useful tool to use as a DSS is SD. This is the gap in knowledge as identified earlier, that this research seeks to address and this is also captured in the second strand of the conceptual framework.

The SD methodology seeks to achieve and provide both a qualitative description and analysis of the issues at hand as well as providing a quantitative simulation, design and

analysis of the complex interactions, structure and behaviour in the organisations knowledge and model-based decision approach (Sterman, 2001). Morecroft (1994) argues that SD models, allow for the revision of the results and the adaptation of the decision rules. This enhances the learning effect and future decision-making possibilities. These results from integrating time delays, non-linearity and the concept of feedback (e.g. Sterman, 2000; Wolstenholme, 2003). Furthermore, Morecroft (1994, p.5) opines that models such as DSS have a subtle role in supporting strategic thinking, learning in management teams and group discussions. Morecraft (1994) further asserts that models can be seen as maps that 'activate and capture team knowledge'; they are also to be seen as a framework for filtering and organising knowledge; and lastly can be seen as micro or miniature worlds for experimentation, learning and co-operation. System Dynamics used as a DSS exhibit such characteristics. As a consequence, the System Dynamics approach is applied as a DSS tool to address and investigate this knowledge model-based approach to decision support (DSS).

Having spelt out the gap in knowledge, the aims and objectives are used as a basis to address and fill this gap. This is discussed in the next section.

4.5 Research Aims /Objectives; System Boundary (time horizon) and Research Question

4.5.1 Research Aim

Following on from the discussions in sections 2.5, 4.2 and 4.4 above, it is determined that the main aim of this research project is to develop a research methodology and framework to evaluate the Shared Service Transition / Implementation Process using a System Dynamics (simulation) approach as a decision support system that allows for experimentation by the SSC decision maker. This it is expected will complement current SSC Transformation approaches. As discussed in the preceding sections, the decision to create an SSC is an expensive one and therefore there are benefits in exploring other methodologies as a complement to current approaches. The SD model is additionally an

inexpensive and credible way of analysing the impact of the proposed SSC before the organisation commits its resources using current approaches which can be very expensive. The research's aim is accomplished by analysing the main reasons for setting up the SSC, the SSC critical success factors, and the benefits / disadvantages associated with the SSC establishment. Furthermore, this research will aim to explore and explain the critical success factors and the reasons or motives for establishing SSCs and their applicability to the motives and critical success factors of organisational change. In addition, an analysis of the current SSC Transition approach is undertaken and an SD (Causal Loop Diagram / Stock and Flow) model for SSCs is constructed and analysed.

In this research, the below Hypotheses are espoused under the thematic themes of Cause / Effect Relationship, Critical Success Factors, Staff Management.

a) Hypothesis 1 (Cause / Effect Relationship)

There is a cause effect relationship between / amongst the various (key / critical success) factors influencing the design / build and implementation of the Shared Service Centre.

As discussed in Chapter Two, current approaches for the design and build of SSCs compartmentalises the SSC model into various stages (BearingPoint, 2007; Deloitte, 2011; PWC, 2011). Furthermore, the key critical and success factors as suggested in the current literature appear to be itemised and does not show in a transparent manner the cause / effect relationships between or amongst these factors (Bergeron , 2003; Burns and Yeaton , 2008; Farndale, Paauwe and Hoeksema, 2009; Deloitte, 2011; Ulbrich and Schulz, 2014).

These critical factors do not operate independently of each other but rather interact with each other. In effect, there is a cause / effect relationship among the SSC Critical Success Factors. Current SSC literature is not so explicit in defining these causalities

and interactions (e.g., Miskon et al., 2011; Paagman et al., 2015). It is therefore important to demonstrate that for any SSC Transformation project, these factors need to be understood clearly and the interlinkages between / among them understood. In practice, the proposed SSC changes have wider implications for the organisations.

Furthermore, in the SSC Transition Phase, current approaches do not allow for an interested party to be able to transparently lay out and understand the factors or variables that influence the Shared Service Transition process and how they interact. In effect, current approaches do not conclusively help the user to understand some of the subtle challenging issues impacting the Shared Services Transition such as staff deployment. Therefore, interested users are not able to interrogate / examine the system clearly and develop effective policy intervention tools that can help to mitigate any potential negative consequences. For example, the announcement of a potential SSC, can impact the psychology of how current key staff operate and might lead to key staff fearing for their jobs or resigning their position at the first opportunity. The effect of this is that the transition could suffer, and such key staff arrangements need to be managed carefully (Fahy, Curry and Cacciaguidi-Fahy, 2002; Deloitte, 2011; Miskon et al., 2011). As a consequence, understanding these cause and effect relationships are critical for the proposed SSC and the SSC transition process; and as discussed in Chapter Two and section 4.2.1, SD (simulation) is a credible DSS tool to use. This research depicts the cause-effect relationships relating to the SSC Transition via the use of Causal Loop Diagrams and a modified SD Stock and Flow model.

b) Hypotheses 1a and 1b (Critical Success Factors)

Hypothesis 1a: SSCs are organisations and the reasons for success / failures of organisational change are applicable to SSCs.

Hypothesis 1b: There are some key (critical success factors) associated with SSCs that influence the design / build and implementation of SSCs.

Shared Services arise as a result of responses mainly to the internal and external environment of an organisation. Understanding why the company needs to change (vision and plan), how to do this change and what to accomplish is very important. It is suggested in this research that, SSCs operate similarly to organisations and therefore the key critical success factors including the reasons for successes and failures affecting change in organisations (organisational change) applies to Shared Service Centres. These critical organisational success factors have been depicted by writers such as (Kanter, Stein and Jick, 1992; Pugh,1993; Beer and Nohria, 2000, Hammer and Champy, 2001; Senturia, Flees and Maceda, 2008; Kotter, 2008; 2012; Maurer, 2010; Burnes and Jackson, 2011) as: Effective Change Management; Culture; Understanding the process of change (Having a clear vision and a clear strategy); Effective Communication; Strong Project Management Skills; Buy in of important stakeholders (Senior Managers), Clear Leadership and Using people with the right skills. Most of these factors have been replicated in the SSC literature (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Burns and Yeaton, 2008; Deloitte, 2011; Miskon et al., 2011; PWC, 2011; 2012; Paagman et al., 2015).

c) **Hypotheses 2, 2a and 2b (Staff Management)**

Hypothesis 2: The performance of a newly established SSC is strongly determined by the ability to retain its staff.

Hypothesis 2a: Staff capacity during the establishment of a new SSC is strongly dependent on the ability to manage workloads and keep turnover down to a minimum or low rate) and

Hypothesis 2b: The inefficient management of staff turnover can lead to further increases in costs.

As most of the activities involved in an SSC affects people (Human Resource), staff management in the SSC Transition phase is very key and must be managed carefully (Deloitte, 2011; Miskon et al., 2011). As SSCs involves the layoff of some staff and retrenchment / changes in career of some staff, it is important to manage this properly (Fahy, Curry and Cacciaguidi-Fahy, 2002; Bergeron, 2003; Bangemann, 2005; Miskon et al., 2011; Paagman et al., 2015). This area is very important as this has a big impact on the SSC transformation and affects change management within the SSC Transformation process (Fahy, Curry and Cacciaguidi-Fahy, 2002).

Change management both inside and outside the organisation, such as obtaining the agreement of staff, substantial changes in the roles of staff are seen as some of the inhibitors to the establishments of SSCs and this can affect the motivation of employees (Fahy, Curry and Cacciaguidi-Fahy, 2002; Miskon et al., 2011). Organisations are therefore advised to address these issues satisfactorily as this can contribute to significant resistance (Bergeron, 2003; Bangemann, 2005). Therefore, staff management during the SSC transition or transformation process is key and this can lead to potential dire consequences for the organisation if not effectively addressed (Fahy, Curry and Cacciaguidi-Fahy, 2002; Lacity and Fox, 2008).

d) Hypothesis 3 (Transaction Management)

The inefficient management of transactional activities or errors created in the transactional activities can lead to increased costs for the organisation.

As a significant part of the tasks taken over by SSCs relates to transactional activities, it is imperative that there is a clear understanding of which transactional activities are to be considered. If there is no concept of this, then the SSC will have significant issues. It is vital for SSCs to understand what their capabilities are and what they need to do to ensure that they enhance organisational goals. SSCs should know which activities are to be transitioned and this involves having a systematic process in deciding which activities are to be included in the transition process (Miskon et al., 2011).

Furthermore, SSC designers need to understand the type of service delivery model required (Lacity and Fox, 2008; Deloitte, 2011; PWC, 2011). Given the above discussions, it is suggested in this research that the main tenets (characteristics) of the shared services transition process involves three key criteria. These are (but not limited to):

- The selection of the appropriate service delivery model and understanding the risks and benefits including the value chain of the Organisation

- Understanding the critical success / failure factors for an SSC as espoused above and

- Understanding the phases of the SSC design / build architecture / transition.

Furthermore, as a consequence of the earlier discussions espoused in this report, the specific objectives of this research are:

a) To identify the factors and variables that are critical to the design and implementation of the case study SSC and how the results compares to the current SSC literature.

b) To establish whether SD has been used as a DSS tool in the implementation of the SSC under consideration in this research and, if so, if it was beneficial.

c) To design, build and develop a DSS tool based upon SD to be used in the implementation of the SSC.

d) To identify and determine the reasons for establishing the SSC under consideration in this research (i.e. the case study) and to determine if any benefits were achieved and how those benefits compare with the current SSC literature.

e) To determine whether the benefits envisaged during the SSC life cycle stages (being opportunity identification, management review, design and build, pilot stage, implementation and post implementation) with respect to the SSC under

consideration in this research, have been achieved and how those benefits compare with the current SSC literature and finally

f) To add to the literature regarding the management of SSCs and the use of SD as a DSS.

4.5.2 System Boundary and Time horizon, Research Question and Strategy

ii. System Boundary and time horizon

The system boundaries being studied are SSCs that have been established and transitioned. The time horizon is up to 24 months from the SSC conceptualisation, design and build to implementation (12 months Pre-SSC Transition, 6 months during the SSC Transition and 6 months Post SSC Transition).

iii. Research Question

From the discussions in the preceding sections, it is clear that numerous approaches have been used to enumerate the costs and benefits of Shared Service Centres (Fahy, Curry and Cacciaguidi-Fahy, 2002; BearingPoint, 2007; PWC, 2011; Tammel, 2017). However, there has not been enough research in evaluating Shared Service Centres (SSC) using a Simulation (specifically Systems Dynamics) [SD] Modelling (Janssen and Joha, 2006). This research proposes the use of System Dynamics as a DSS and also as a less expensive but credible way of evaluating the shared service centre transformation process, prior to designing / building them and to enhance the project management methodology for SSCs (Sterman, 1992).

The research question's focus is to find out (explore), whether it is advantageous to use an SD model as a DSS to evaluate an SSC proposal / implementation to complement current approaches. In effect, how can a DSS tool based upon an SD approach be constructed for Shared Service Centres that can complement current approaches (Shared Service Implementation Process)?

iv. Research Strategy

Although the research philosophy of this researcher is pragmatism, this research uses a multiple paradigm approach (mixed methods research approach). The reason being that, the type of research question posed allows for the exploring of a phenomenon (the shared services) via a qualitative study and then using the qualitative study to develop a simulation model (SD) as a complement to understanding the shared services transition process. The paradigms are determined based upon the mixed method design (exploratory sequential). According to Creswell and Clark (2011, p.87), the philosophical assumptions with qualitative research is initially a constructivist view and then when the research moves into the quantitative stage, it becomes a positivist view. 'Thus, multiple worldviews are used in this design, and the worldviews shift from one phase to the other phase'.

This research uses the exploratory sequential mixed methods approach (qualitative and quantitative). There are basically two strands (a qualitative strand followed by a quantitative strand). Exploratory case study research (qualitative strand) is used in this research since there is a scarcity of empirical studies relating to SSCs and SD models; (Janssen and Joha, 2006; Ramphal, 2013; Farndale, Paauwe and Hoeksema, 2009; Knol, Janssen, and Sol, 2014). There is also a need to investigate the nature and background of why companies embark on SSCs, whether they used an SD model in their initial design and whether they are achieving the benefits as initially designed.

Case study research is relevant in this situation as one will be dealing with a complex and broad phenomenon and the current existing knowledge is insufficient and does not allow for the posing of potential unstructured / casual questions (Collis and Hussey, 2009; Yin, 2009, Mertens, 2015). There is also a requirement to have access to in depth potential confidential / sensitive data and organisational personnel.

For the quantitative strand, Simulation (System Dynamics) is used. According to Harrison et al. (2007, p.1233), 'the entire simulation process constitutes a methodology for theory development or theory advancement'. This research is essentially about describing the complex feedback loops that exists within the shared service transformation. This is a representation of reality in a complex world. The model represents a continuous flow and therefore a simulation (system dynamics) approach is important to use. The system under consideration (Shared Service Centres) has complex interactions and requires input from multiple disciplines such as accounting, statistics etc. Therefore, simulation (SD) is the most appropriate tool to use in this research.

4.6 Purpose of the Model, who it is intended for, who will use it, outcomes and how it will benefit stakeholders

In sections 4.2 and 4.4 above, I describe the purpose of the model and who it is intended for.

a. Purpose of the model

In summary the purpose of the model is to develop a DSS tool using System Dynamics as an approach. This is expected to be used as a tool to allow for Shared Service Centres decision makers / implementers to be able to capture, activate knowledge, filter and organise knowledge and to use the developed DSS tool as a miniature or microworld for experimentation, learning and co-operation in the context of the Shared service implementation (Morecroft, 1994).

b. Who it is intended for (the potential beneficiaries) and who will use it

The model as stated above is mainly intended for decision makers / implementers of Shared Service Centres. The other potential beneficiaries of this research work are organisations, their employees and public bodies that embark on an SSC as well as researchers and academics interested in this subject area.

Furthermore, the model can be applied to manage staff transition and Shared Service Staff in the SSC Implementation process. The model can also be used by decision

makers / implementers of Shared Service Centres for the management of transactions to be transferred to the SSC and also to be used to manage the level of workload pressure, and its impact on customers.

The research work will also add to the limited body of research regarding SSCs.

c. **Outcomes**

The outcome expected is that a DSS tool is developed using System Dynamics as an approach. As already indicated earlier in this report, this will allow Shared Service decision makers / implementers to be able to use the developed tool for experimentation, learning and co-operation in the context of the shared service implementation.

In effect, the developed model should be able to aid the SSC implementation process in understanding its environment (decision support), acting as a tool in the successful co-ordination of designs, plans (project management), helping in the effective execution and monitoring of the SSC process (co-ordinating device) and finally, to be forward looking by the use of scenario analysis.

In addition, the model should help decision makers / implementers of Shared Service Centres to balance or understand the competing challenges, resources etc. in the implementation of SSCs. For example, how do you balance and ensure that there is the correct number of staff allocated to training of new SSC staff whilst at the same time ensuring that the existing work is being done to the satisfaction of the customer. Another example of the outcome is ensuring that decision makers / implementers of Shared Service Centres understand the implications including costs of embarking on a particular course of action. For example, should the organisation change the number of transactions or processes before embarking on the SSC implementation or should it move all transactions and make changes later (so called lift and shift approach). In effect, the outcome is expected to be the effective management of staff, workload management,

staff retention as well as the effective management of work transitioned and minimisation of transactional errors.

Finally, another outcome, is to demonstrate that the SSC critical success factors as used in the stock and flow model are interlinked and therefore have feedback effects.

d. How it will benefit stakeholders

This research work departs from the current theoretical / practitioner view by depicting in a holistic way the cause-effect relationships between / among the key SSC variables.

It also outlines the key steps and variables in the SSC Transition model via a Stock and Flow Diagram, thus allowing for the exercise of developing theory as related to the research's hypotheses and objectives (Harrison et al., 2007).

Furthermore, it demonstrates in a practical way by which an interested party can lay out and understand the key factors or variables that influence the Shared Service Transition and how they interact using the constructed System Dynamics (Simulation) model.

The research is expected to help provide a variety of policy intervention tool(s) for supporting decisions regarding the establishments of SSCs. The perspectives of key stakeholders such as staff (staff management); user perspective (Managing Director / users of the service); supplier perspective; customer perspective (SSC impact on customers) and transaction management perspective (impact of SSC transactions), can be explored from both the respective stakeholders and organisational perspectives in the SSC implementation / transition process.

In addition, the perspective of experts (expert opinion) in the SSC design and implementation can also be explored and understood.

The research work will also add to the limited body of research regarding SSCs and in addition, allow for the testing of the SSC phenomenon in a new setting by the use of System Dynamics.

4.7   Conclusion

This Chapter has laid out the basis for the conceptual framework of this research. It has also spelt out the gap in knowledge, the aims and objectives as well as emphasising the role of using SD as a DSS in this research. In addition, the theoretical underpinnings of this research have been made explicit. Finally, the purpose of the model, who it is intended for, the expected outcomes, the beneficiaries (including potential beneficiaries), who will use it and how it would benefit the various stakeholders have been addressed. The next Chapter focuses on how the model was built.

5   Chapter Five Building the Model

Chapter Five describes how the model was built based upon the literature research and personal experience. It also describes how the CLD / Stock and Flow Diagrams were designed. This Chapter also describes how the model was revised, feedback obtained, how agreement was obtained regarding the reasonableness and accuracy of the model. In addition, the Chapter explains the key loops in the CLD / Stock and Flow Diagrams.

The Chapter is organised as follows:

5.1   Identifies the key variables from the literature search and personal experience used in designing and building the initial Causal Loop Diagram.

5.2   Describes how feedback was obtained.

5.3   Describes the revision of the initial Causal Loop Diagram.

5.4   Describes how agreement was obtained that the revised Causal Loop Diagram is reasonable and accurate (verification) and finally,

5.5   Describes how the Stock and Flow Diagram was built based upon the revised Causal Loop Diagram. Furthermore, key loops are explained in both the CLD / Stock and Flow Diagrams.

5.1 Identifying key variables from Literature search and personal experience and Designing the Causal Loop Diagram (Initial Causal Loop Diagram)

The dynamic characteristics of the system are defined through the qualitative modelling process using Causal Loop Diagrams which depict or apply logical descriptions of cause and effect. Based upon the literature review espoused in Chapter Two on SSCs and organisations regarding the critical success factors; the factors influencing the build / design of the SSC and the researchers own mental models (personal experience); the following variables were selected as key in the development of the initial Causal Loop Diagram. Chapter Two, sections 2.1 and 2.2 including Table 5 outlines and discusses the main key variables. These are:

a) **Well defined Organisational Goal and vision**

b) **Effective Strategy / Plan**

c) **Effective Infrastructure**

d) **Effective SSC Design and Build**

e) **Effective HR Execution Plan**

f) **Effective Project Management and Execution**

g) **Costs (Tangible & Intangible)**

h) **Benefits (Tangible & Intangible)**

Furthermore, the researcher based upon personal experience identified the inter-linkages shown and explained in Figure 21 (Causal Loop Diagram) as essential factors to the SSC architecture. I have also used my mental models or personal experience to show that the critical success factors are linked, interdependent and exhibit feedback relationships. This also conforms to the first strand of the Conceptual Framework in this research and discussed in Chapter Four. As stated earlier in Chapter Two, section 2.1, this is because the SSC needs to understand its environment (decision support), the SSC designs, plans etc., should be successfully coordinated (project management) and executed effectively (co-ordinating device). In addition, the needs of the SSC employees and their skills should be effectively managed (Effective HR). Finally, the SSC should be

forward looking and know where it wants to be in the future (Optimisation Phase and Continuous Improvement).

I have then added the designed CLD as part of the questionnaire and distributed it to respondents for verification and comments. There were two lots of respondents. I initially sent it to stage one respondents who were experts in the SSC field, and after receipt of the questionnaire, I reviewed it but made no major modifications. This was then sent to stage two respondents who were mainly stakeholders in this research. Figure 21 below shows the Causal Loop Diagram.
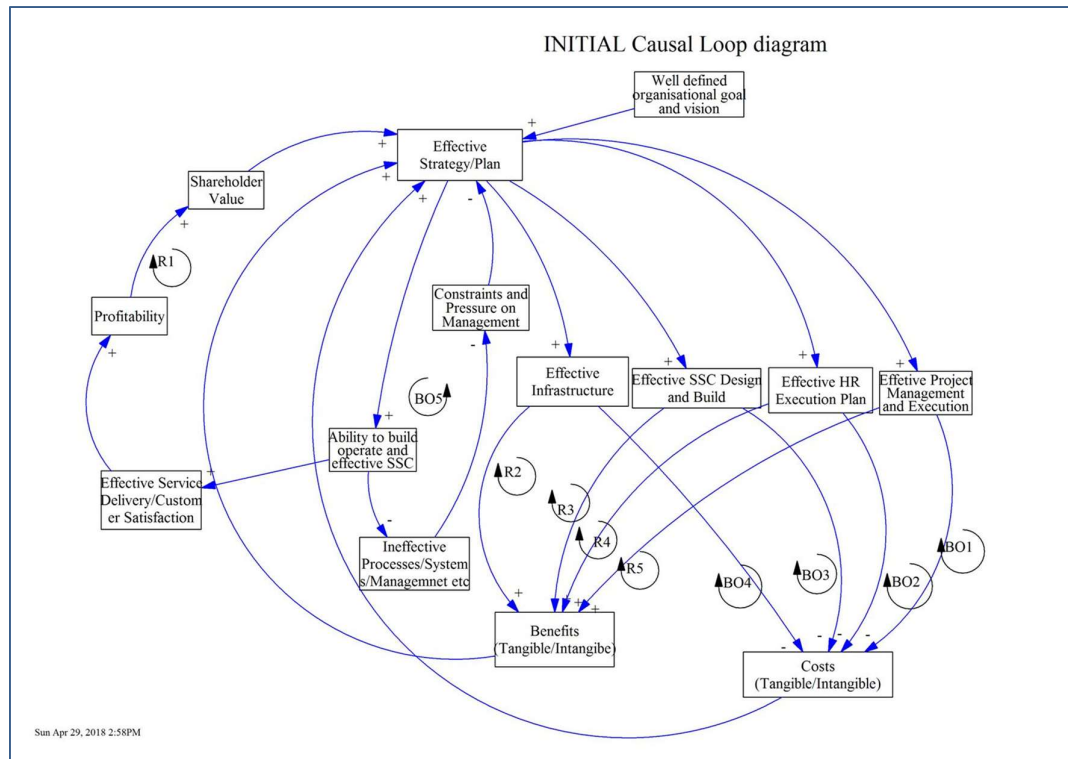
Figure 21 SSC Causal Loop Diagram

The inter-linkages among the selected variables are explained below.

1. EXPLANATION OF REINFORCING LOOPS
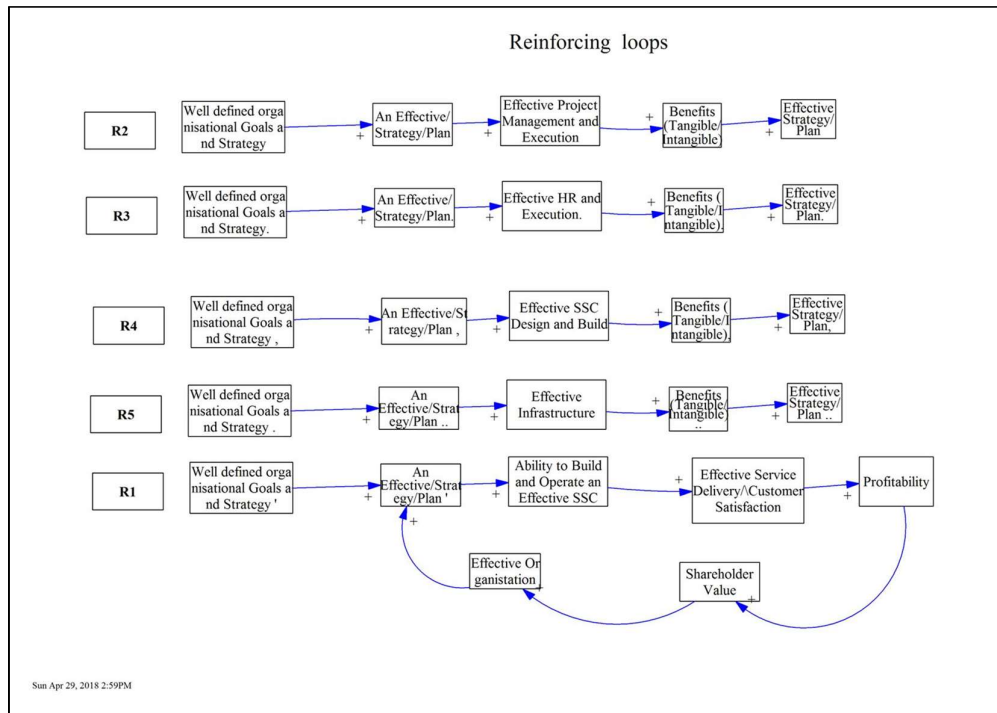
Figure 22 Diagrammatic Representation of Reinforcing Loops

Figure 22 above depicts the reinforcing loops (R1 to R5). These reinforcing loops are explained further below.

a. Reinforcing Loop One (R1)
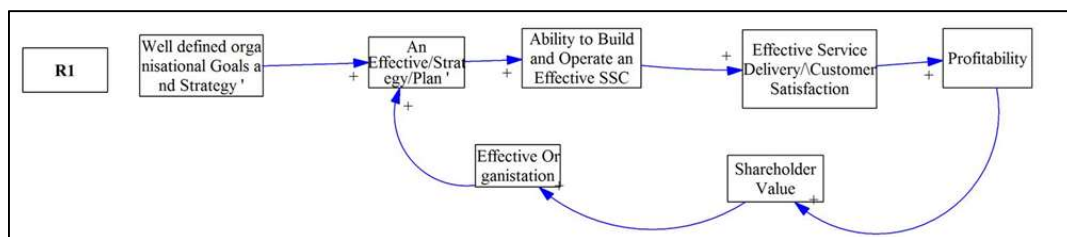
Figure 23 Reinforcing Loop One (R1)

Figure 23 above depicts the reinforcing loop one. This is explained below.

    i.   Well Defined Organisational Goals and Strategy (Clear Vision)

Organisations must have a clear vision and strategy in order to be successful. The vision of the company should be very clear and this will help drive the focus and the activities of the company (Beer and Nohria, 2000).

    ii.   An Effective Strategy/ Plan

This is the beginning of the reinforcing loop. The vision helps drive and guide the company on what to do (planning and strategy). As noted in Chapter Two, an effective plan and strategy is key to achieving the SSCs goals. The strategy sets out the direction of what the organisation needs to do. This helps the SSC to differentiate and also to be able to identify the needed resources etc., (Koch, 2006). Strategy defines how the organisation will achieve its goals (Grant, 2005). In applying Grant's (2005) arguments, this implies that the SSCs goals should be specific to make the strategy clear. Effective Plan / Strategy fulfils three roles, i.e. acting as a device for control (co-ordination), decision making or decision support and as a forward-looking document (i.e. acting as a target). As already argued out in Chapter Two, section 2.1, the SSC needs to understand its environment (decision support), the SSC designs, plans etc., should be successfully coordinated (project management) and executed effectively (co-ordinating device). Finally, the SSC must be forward looking and know where it wants to be in the future (Optimisation phase and continuous improvement).

    iii.   Ability to build and Operate and SSC

The ability to build and operate an SSC will depend on how best the main SSC critical success factors: Having a clear vision and a clear strategy, (What is the vision and Strategy of the organisation?); Buy in from senior management (This is needed to drive the process forward); Effective Communication (Effective communication of change and issues are required); Effective Change Management(Change in the organisation must be managed effectively); Robust IT Architecture (The IT infrastructure is a key

component); Strong Project Management Skills(As SSCs are projects it is important to have people with the right skills to manage the process); Organisation and HR, (As most of the activities involved in an SSC affects people, the Human Resource function (HR) is very key and must be managed carefully); Site Location, (It is important a convenient site is selected, which allows for the right level of skilled employees and facilities/infrastructure to be available); and adequate Investments (This needs to be provided for an SSC to be successful) are managed. If they are managed well, then the SSC Transformation process stands to reap benefits.

iv.   Benefits/Tangible/Intangible

If the above processes are managed carefully, then the SSC Transformation will reap benefits, such as a motivated labour force, higher trained and competent workforce, which will in turn lead to higher productivity and also to higher customer satisfaction. According to Miskon et al. (2011), failing to understand the realisation of the benefits and costs can be seen as a failure.

v.   Effective Service Delivery

If the above are managed well or are at their optimum, then customers / stakeholders stand to reap better service from the SSC.

vi.   Profitability

The argument advanced here is that if customers reap better service, then they are likely to be happy and this can result in positive outcomes which will provide the business with increased profitability.

vii.   Shareholder value

Profitability will then increase the shareholder value, as shareholders will get a better return based upon a higher profitability.

  viii. Effective Organisation

This then makes the organisation effective, as it is achieving or delivering good results. The organisation becomes effective as a result of a good SSC delivery, which supports the corporate goals and thus helps to motivate staff and customers alike.

  v. Effective Strategy/Plan

The benefits achieved will then provide guidance for reviewing and updating the plan / strategy. This process will continue to repeat itself (reinforce itself) and the organisation should see improvements in the business.

  b. Reinforcing Loop Two (R2)
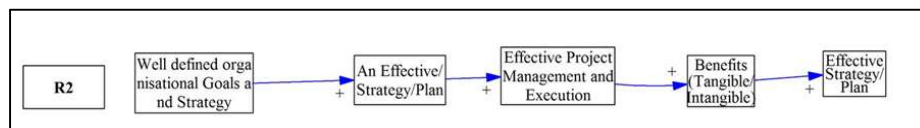
Figure 24 Reinforcing Loop Two (R2)

Figure 24 above depicts the reinforcing loop 2 (two). This is explained below.

  i. Well Defined Organisational Goals and Strategy (Clear Vision)

See (i) above under Reinforcing Loop One (1).

  ii. An Effective Strategy / Plan

 See (ii) above under Reinforcing Loop One (1).

  iii. Effective Project /Management Execution

As SSCs are large scale projects, are complex dynamic systems, they have multiple interdependencies, involving multiple feedback loops, non-linear data, and consist of both soft and hard data, System Dynamics as a DSS can be used as a tool to manage these projects (Sterman,1992). A key critical factor for SSCs involves having strong project management skills and practices. In effect, it is important to understand and

address how the projects will be managed (Burns and Yeaton, 2008; Deloitte, 2011; Miskon et al., 2011). This results from understanding and having an effective plan / strategy. As the creation of an SSC is a project, it requires project management techniques to ensure that the project is done on time and all variables that impact or are key to the project are acquired, understood and implemented.

iv.   Benefits /Tangible / Intangible

See (iv) above under Reinforcing Loop One (1).

v.   Effective Strategy/Plan

The benefits achieved will then provide guidance for reviewing and updating the plan / strategy. This process will continue to repeat itself (reinforce itself) and the organisation should see improvements in the business.

c. Reinforcing Loop Three (R3)
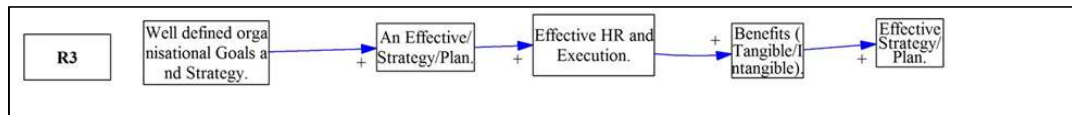
Figure 25 Reinforcing Loop three (R3)

Figure 25 above depicts the reinforcing loop three. This is explained below.

i.   Well Defined Organisational Goals and Strategy (Clear Vision)

See (i) above under Reinforcing Loop One (1).

ii.   An Effective Strategy/ Plan

See (ii) above under Reinforcing Loop One (1).

iii.   Effective HR and Execution

Undertaking and managing the projects involves having people with the right skills and understanding (Hammer and Champy, 2001). This implies that, Organisation and Human Resources (HR) is key. As stated in Chapter Two, the activities of SSCs affect a lot of people and the HR function should be able to manage this carefully (Deloitte, 2011; Miskon et al.,2011).

iv.   Benefits/Tangible/Intangible

See (iv) above under Reinforcing Loop One (1).

v.   Effective Strategy/Plan

See (v) above under Reinforcing Loop Two (2).

d. Reinforcing Loop Four (R4)
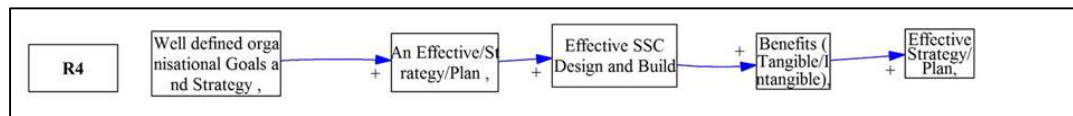
Figure 26 Reinforcing Loop four (R4)

Figure 26 above depicts the reinforcing loop four. This is explained below.

i.   Well Defined Organisational Goals and Strategy (Clear Vision)

See (i) above under Reinforcing Loop One (1).

ii.   An Effective Strategy / Plan

See (ii) above under Reinforcing Loop One (1).

iii.   Effective SSC Build and Design

Having an effective plan / strategy will allow for better planning and managing of the SSC

Build and Design. This will ensure that the required resources, time plan etc., are put into

place and also will facilitate a better understanding of the SSC requirements.

iv.   Benefits/Tangible/Intangible

See (iv) above under Reinforcing Loop One (1).

v.   Effective Strategy/Plan

See (v) above under Reinforcing Loop Two (2).

e. Reinforcing Loop Five (R5)
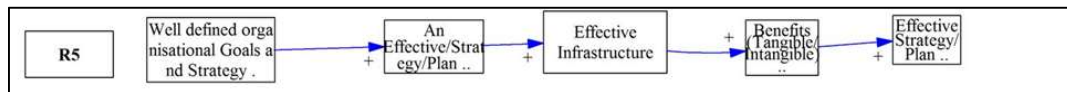
Figure 27 Reinforcing Loop five (R5)

Figure 27 above depicts the reinforcing loop five. This is explained below.

i.   Well Defined Organisational Goals and Strategy (Clear Vision)

See (i) above under Reinforcing Loop One (1).

ii.   An Effective Strategy/ Plan

See (ii) above under Reinforcing Loop One (1).

iii.   Effective Infrastructure

According to Hammer and Champy (2001), the provision of adequate resources

including adequate infrastructure is key to successful change management. Kanter,

Stein and Jick (1992) argue for the provision of an enabling structure. As SSCs require

substantial initial investments, failure to provide this can also hurt the performance of the

SSC (Miskon et al., 2011). Infrastructure, is not limited only to IT, but resources such as

personnel etc., can be affected. Deloitte (2011) and PWC (2011) argue for the right level

of investments. Thus, it is critical that the optimum level of investments and infrastructure are provided. This will require the support of Senior Management to get this done.

iv.   Benefits /Tangible / Intangible

See (iv) above under Reinforcing Loop One (1).

v.   Effective Strategy/Plan

See (v) above under Reinforcing Loop Two (2).

2. BALANCING LOOPS

Figure 28 below depicts the balancing loops (B01 to B05). These balancing loops are explained further below.
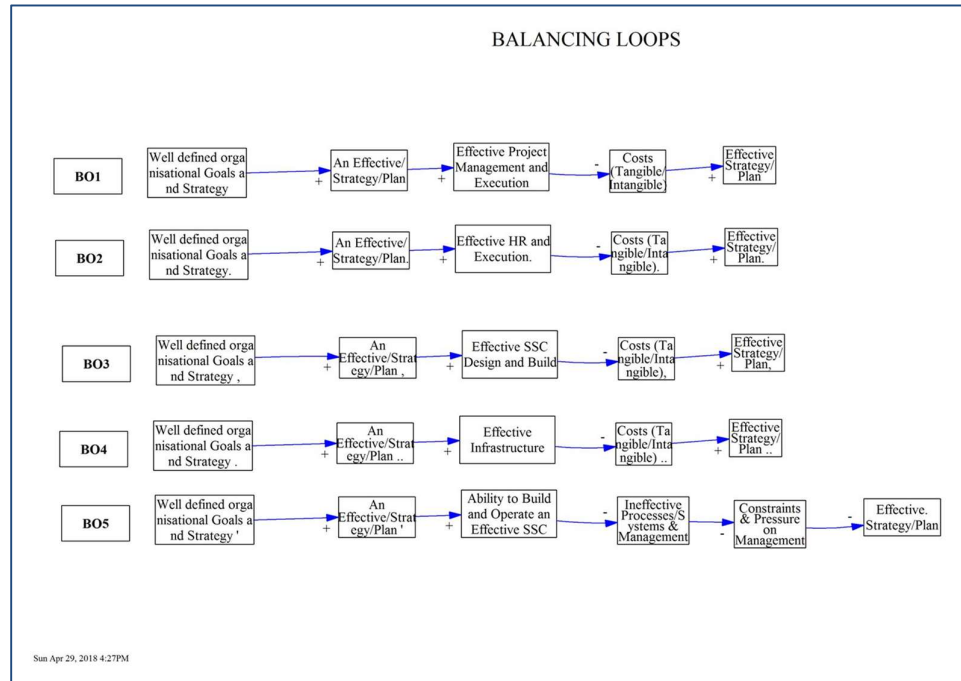
Figure 28 BALANCING LOOPS

a. **Balancing Loop One (BO1)**
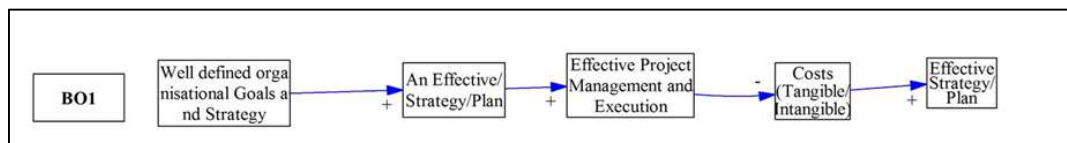
Figure 29 Balancing Loop one (BO1)

Figure 29 above depicts the balancing loop one. This is explained below.

    i.   Well Defined Organisational Goals and Strategy (Clear Vision)

See (i) above under Reinforcing Loop One (1).

    ii.   An Effective Strategy/ Plan

See (ii) above under Reinforcing Loop One (1).

    iii.   Effective Project /Management Execution

See (iii) above under Reinforcing Loop Two (2).

    iv.   Costs/Tangible/Intangible

If the above processes are not managed carefully, then the SSC Transformation will incur extra costs, such as an unmotivated staff, less trained and less competent workforce, which will in turn lead to lower productivity and also to lower customer satisfaction. According to Miskon et al. (2011), failing to understand the realisation of the benefits and costs can be seen as a failure.

    v.   Effective Strategy/Plan

The costs achieved will then provide guidance for reviewing and updating the plan / strategy. This process will continue to repeat itself (reinforce itself) and the organisation should see improvements in the business.

b. Balancing Loop Two (BO2)
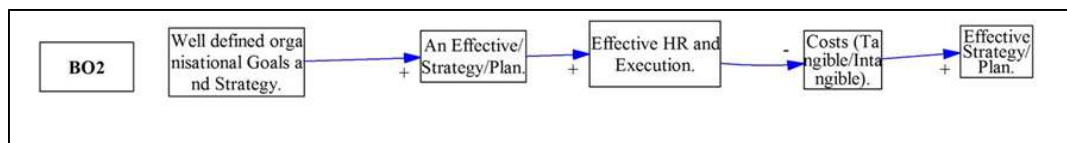
Figure 30 Balancing Loop Two (BO2)

Figure 30 above depicts the balancing loop two. This is explained below

    i.   Well Defined Organisational Goals and Strategy (Clear Vision)

See (i) above under Reinforcing Loop One (1).

    ii.   An Effective Strategy/ Plan

See (ii) above under Reinforcing Loop One (1).

    iii.   Effective HR and Execution

See (iii) above under Reinforcing Loop Three (3).

    iv.   Costs/Tangible/Intangible

See (iv) above under Balancing Loop One (1).

    v.   Effective Strategy/Plan

See (v) above under Balancing Loop One (1).

    c. Balancing Loop Three (BO3)
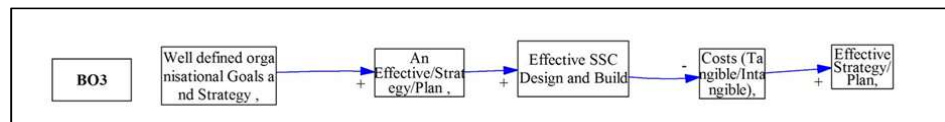
Figure 31 Balancing Loop Three (BO3)

Figure 31 above depicts the balancing loop three. This is explained below.

    i.   Well Defined Organisational Goals and Strategy (Clear Vision)

See (i) above under Reinforcing Loop One (1).

    ii.   An Effective Strategy/ Plan

See (ii) above under Reinforcing Loop One (1).

    iii.   Effective SSC Design and Build

See (iii) above under Reinforcing Loop Four (4).

    iv.   Costs/Tangible/Intangible

See (iv) above under Balancing Loop One (1).

v.   Effective Strategy/Plan

See (v) above under Balancing Loop One (1).

d. Balancing Loop Four (BO4)
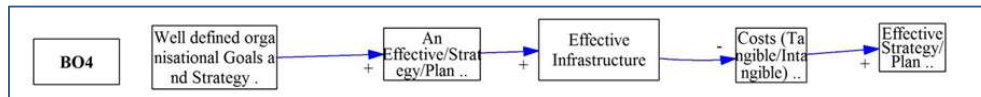
Figure 32 Balancing Loop Four (BO4)

Figure 32 above depicts the balancing loop four. This is explained below.

i.   Well Defined Organisational Goals and Strategy (Clear Vision)

See (i) above under Reinforcing Loop One (1).

ii.   An Effective Strategy/ Plan

See (ii) above under Reinforcing Loop One (1).

iii.   Effective Infrastructure

See (iii) above under Reinforcing Loop Five (5).

iv.   Costs/Tangible/Intangible

See (iv) above under Balancing Loop One (1).

v.   Effective Strategy/Plan

See (v) above under Balancing Loop One (1).

e. Balancing Loop Five (BO5)
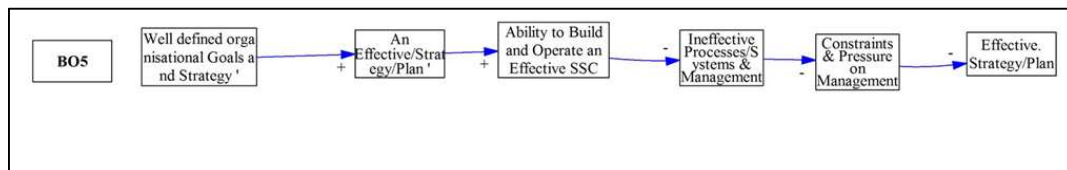
Figure 33 Balancing Loop Five (BO5)

Figure 33 above depicts the balancing loop five. This is explained below.

    i.   Well Defined Organisational Goals and Strategy (Clear Vision)

See (i) above under Reinforcing Loop One (1).

    ii.   An Effective Strategy / Plan

See (ii) above under Reinforcing Loop One (1).

    iii.   Ability to build and Operate and SSC

See (iii) above under Reinforcing Loop One (1).

Furthermore, as stated under Reinforcing Loop One (1) section (iii) above, the ability to build and operate an efficient SSC is a function of how the critical SSC success factors are managed. If they are not managed well, then there will be negative implications such as increased costs for the organisation.

    iv.   Ineffective Processes, Systems and Management

As a consequence, from (iii) above, this will result in ineffective processes, systems and management as for example work errors, dissatisfied employees etc., contribute to the ineffectiveness of the organisation.

    v.   Constraints Pressure on Management

This will then lead to constraints, pressures on management. Management will then have to spend time to reallocate scarce resources and make corrective actions.

    vi.   Effective Strategy / Plan

This will have the effect of negatively feeding into the organisational plan / strategy and if this continues, this will reinforce the negative feedback / behaviour which will finally affect the organisation.

5.2   **Obtain feedback**

As indicated in section 5.1 above, the CLD was distributed as part of the questionnaire to respondents in stages one and two of the research process for feedback, verification and comments. Where relevant the Causal Loop Diagram (CLD) was expanded / refined and developed based upon responses received from respondents from Stages I (One) and II (Two) of the research. Based upon the feedback received from the respondents in Stages I and II, a new Causal Loop Diagram (CLD) was reconstructed mainly based upon staff, transactions and costs as reflected in the Conceptual Framework (second strand). In addition, the System Dynamics (SD) model (Stocks and Flows) was then designed to reflect this (the SSC transition process).

5.3   **REFINED CAUSAL LOOP DIAGRAM**

The refined Causal Loop Diagram (CLD) is shown in Figure 34 below and the main variables are discussed further below.

REFINED CAUSAL LOOP

Figure 34 Refined Causal Loop Diagram (CLD)

Main Variables of the Refined Causal Loop Diagram (CLD)

The below are the main variables:

a)   Pre Shared Service Staff (Pre-SSC)

These are the staff (Old Dept. Staff) existing before the establishment of the Shared Service Centre.

It is a function of the:

- Initial Old Staff less the layoff of old staff (due to the SSC redundancy) less
- Old Staff Leave (due to staff leaving for personal or other reasons)

Figure 35 below depicts this.
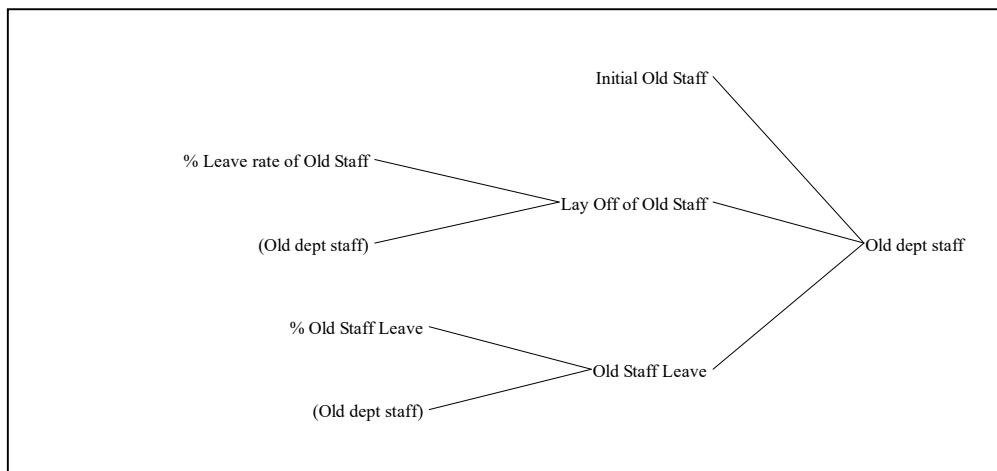
Figure 35 Pre-Shared Service Staff (Pre-SSC)

- **REFINED CAUSAL LOOP DIAGRAM FOR OLD-STAFF AND EXPLANATION OF FEEDBACK AND KEY LOOPS**

Figures 36 and 37 below show the CLD. In terms of the balancing loop one (B1); the higher the number of Pre-SSC Staff or Old Departmental Staff required, the higher the number of staff available for lay-off. This has a positive or reinforcing effect on the Lay-Off of Old Staff. This implies that potential redundancy costs etc., will increase. In addition, as staff are laid off, if they are not replaced with the correct level of staff and staff with the requisite skills this
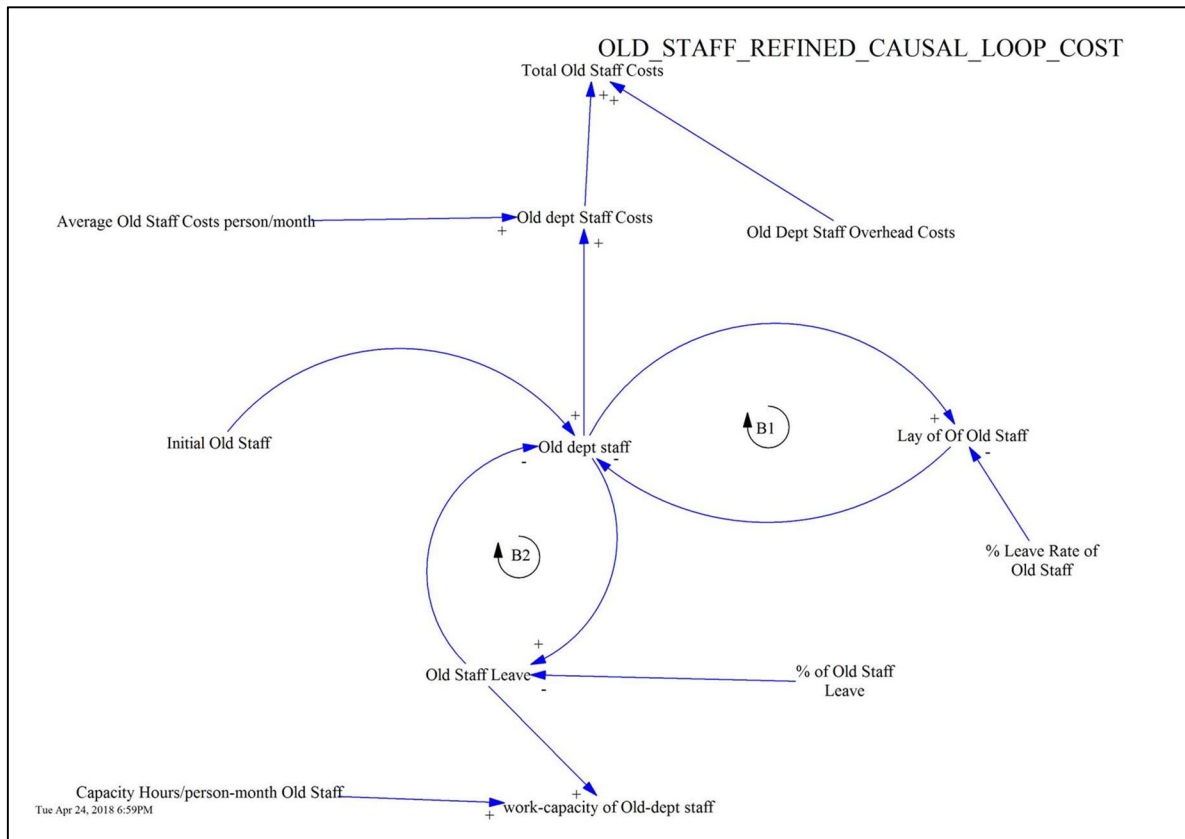
Figure 36 Refined Causal Loop Diagram Old-Staff
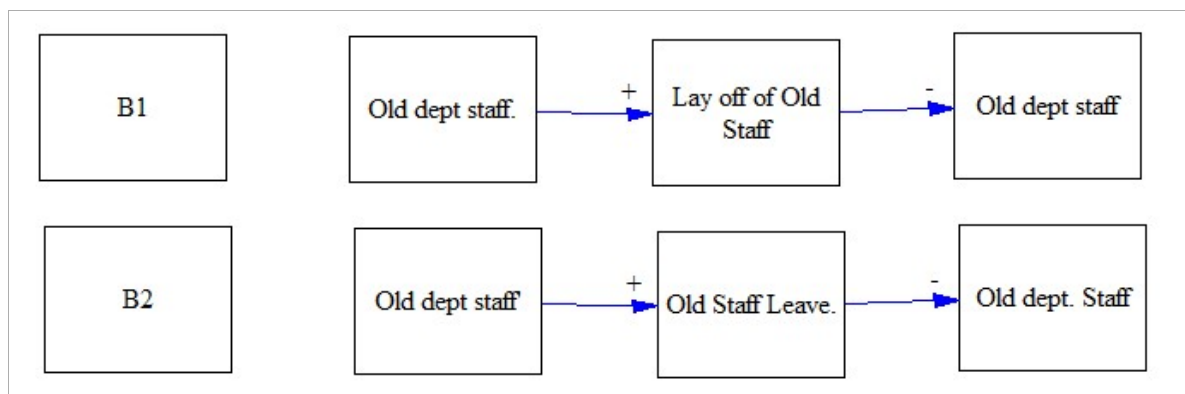
Figure 37 Explanation of Old Dept. Staff Key Loops

could have an adverse impact on the remaining staff morale etc., and therefore productivity could suffer. Conversely, when staff are laid off, this decreases the number of Pre-SSC Staff

available. This has a negative effect on the available number of Pre-SSC Staff available (Old dept. Staff).

Similarly, for balancing loop two (B2); the higher the number of Pre-SSC Staff or Old Departmental Staff required, the higher the number of Staff available who may leave due to other reasons, such as lack of morale, pressure or other reasons. This has a positive or reinforcing effect on Old Staff Leaving (old staff leave). In effect, the behaviour and consequences will be similar to B1 above. As this is unplanned, a failure to anticipate this can have a negative impact on the business as this was the case with the SSC under discussion. Conversely, when staff leave due to other reasons than being laid off, this decreases the number of Pre-SSC Staff available. This has a negative effect on the available number of Pre-SSC Staff (Old dept. Staff) and can lead to issues such as work errors and reduction in staff morale.

b)   Pre-and Post transitioned activities / Transactions

These are the transactional activities transferred to the Shared Service Centre.

It is a function of the:

- Total initial transactions plus

- New Transactions (Pre & SSC) added less

- Transactions leaving (Pre and post SSC).

Figure 38 below depicts the Pre-and Post transitioned activities / Transactions model.

Total % of New Transactions Added

(Total Pre- SSC & SSC Transactions)

New Transactions (Pre & SSC) added

Initial Transactions Pre-SSC

Initial Transactions SSC

Total Initial Transactions

Total Pre- SSC & SSC Transactions

% of Transactions Leaving

(Total Pre- SSC & SSC Transactions)

Transactions leaving (Pre &SSC)
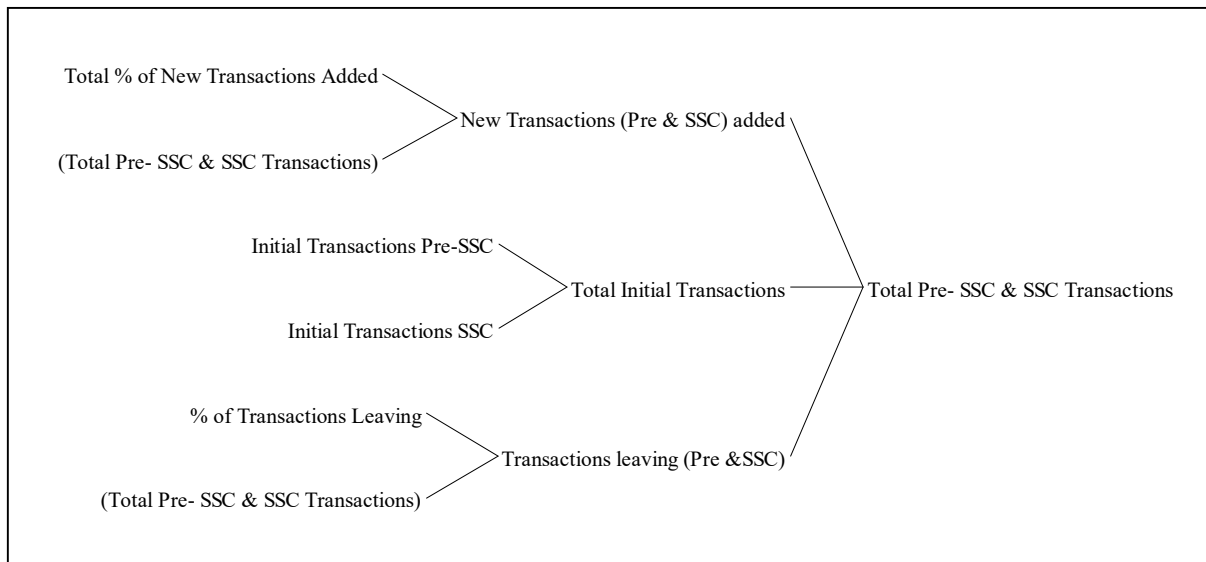
Figure 38 Pre and Post transitioned activities/Transactions

- **REFINED CAUSAL LOOP DIAGRAM FOR SSC TRANSACTIONS AND EXPLANATION OF KEY LOOPS AND FEEDBACK**

Figures 39 and 40 show the refined SSC Transactions causal loop diagram. In terms of the

balancing loop three (B3); the higher the number of Pre-SSC & SSC Transactions required,

the higher the number of transactions available for reduction. This has a positive or

reinforcing effect on the Transactions Leaving (Pre & SSC). In effect, there is a need to

ensure that the right level of transactions are being taken over. Therefore, correct resources

in terms of staff etc., need to be allocated. On the other hand, when the Total Pre SSC &

SSC Transactions are reduced as a consequence of having a larger transactions pool available, this has the effect of decreasing the number of total transactions available.
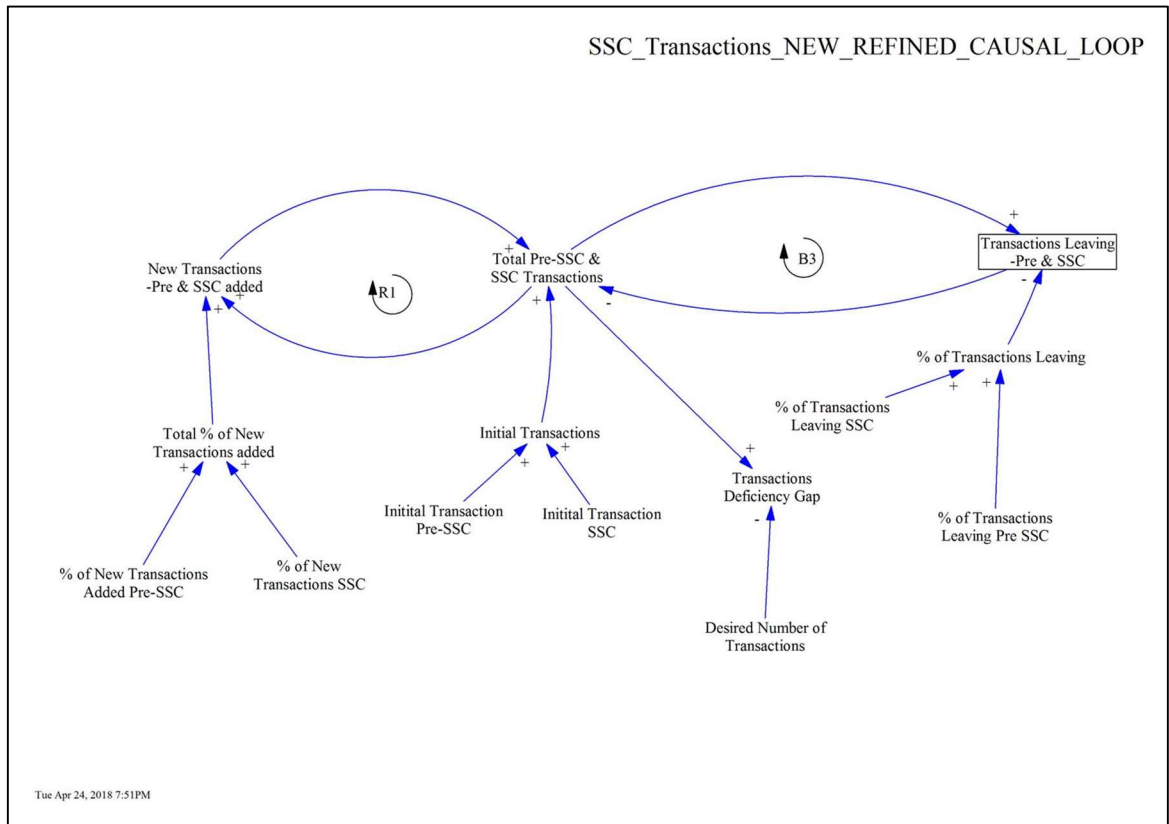
Figure 39 Refined Causal Loop Diagram SSC Transactions
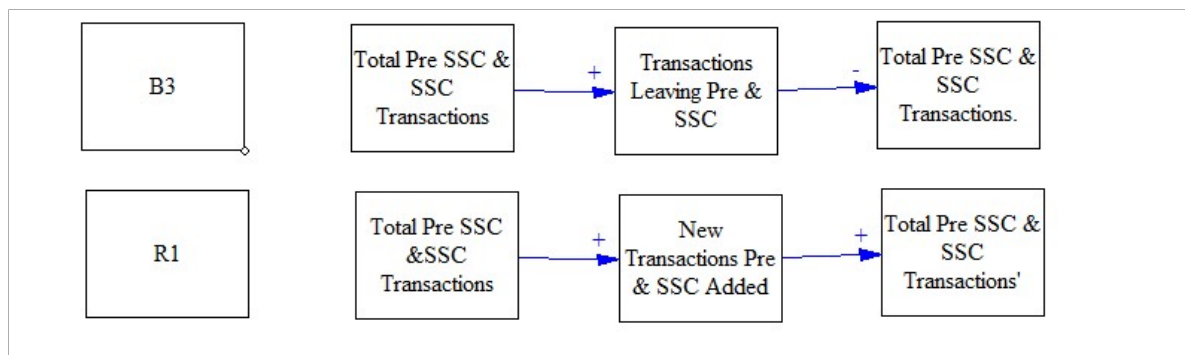
Figure 40 Explanation of Key Loops SSC Transactions

This has a negative effect on the total number of Pre-SSC & SSC Transactions available. In practice, there is the possibility that as the number of transactions are decreased there is a possibility for over-capacity in terms of excess personnel and Sales, General and Administrative (SGA[19]) costs. This again is important to manage efficiently.

However, for the reinforcing loop one (R1); the higher the number of Pre-SSC & SSC Transactions required, the higher the number of new transactions that are required to be added. This has a positive or reinforcing effect on the New Transactions Pre & SSC Added (as there is a requirement to add more transactions). By adding more transactions this will increase the number of total transactions available. Adding more transactions, implies that the resources available to manage these transactions will increase and this will have the effect of increasing costs such as new staff, training etc. This has a positive effect on the total number of Pre-SSC & SSC Transactions available. In effect, the aim is to have an optimal balance between existing transactions, proposed new transactions to be added and proposed transactions to be reduced or fine-tuned.

c)   SSC Staff

These are the required Shared Service Staff employees (New Staff).

It is derived from the:

- Initial SSC Staff plus

- Trained SSC Trainees less

- SSC Staff Leaving

The SSC Staff model is illustrated in Figure 41 below.

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[19] Sales, General and Administrative and SGA is used interchangeably in this report
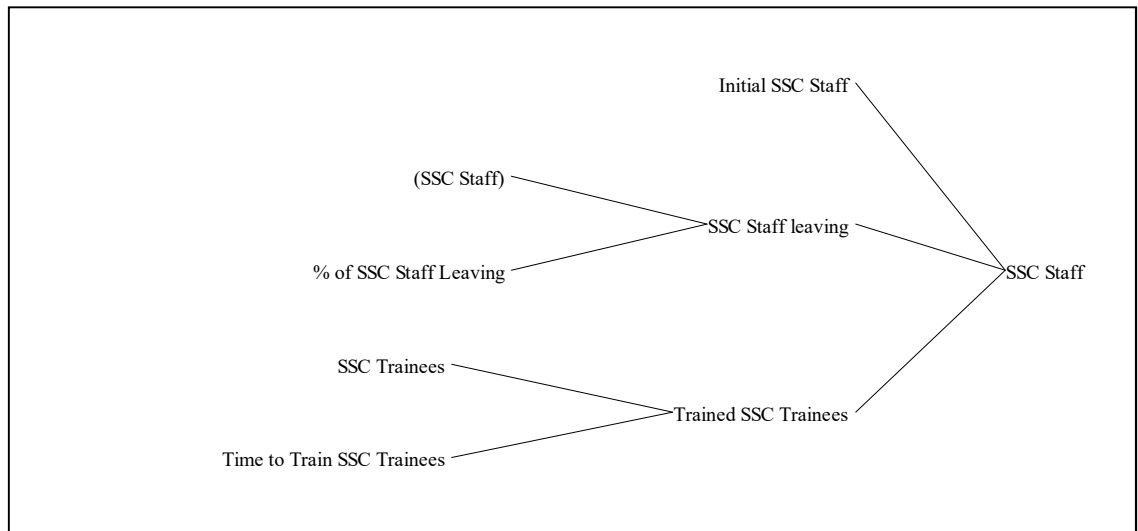
Figure 41 SSC Staff

- **REFINED CAUSAL LOOP DIAGRAM FOR SSC STAFF AND EXPLANATION OF KEY LOOPS AND FEEDBACK**

Figures 42 and 43 below show the refined SSC Staff causal loop diagram.
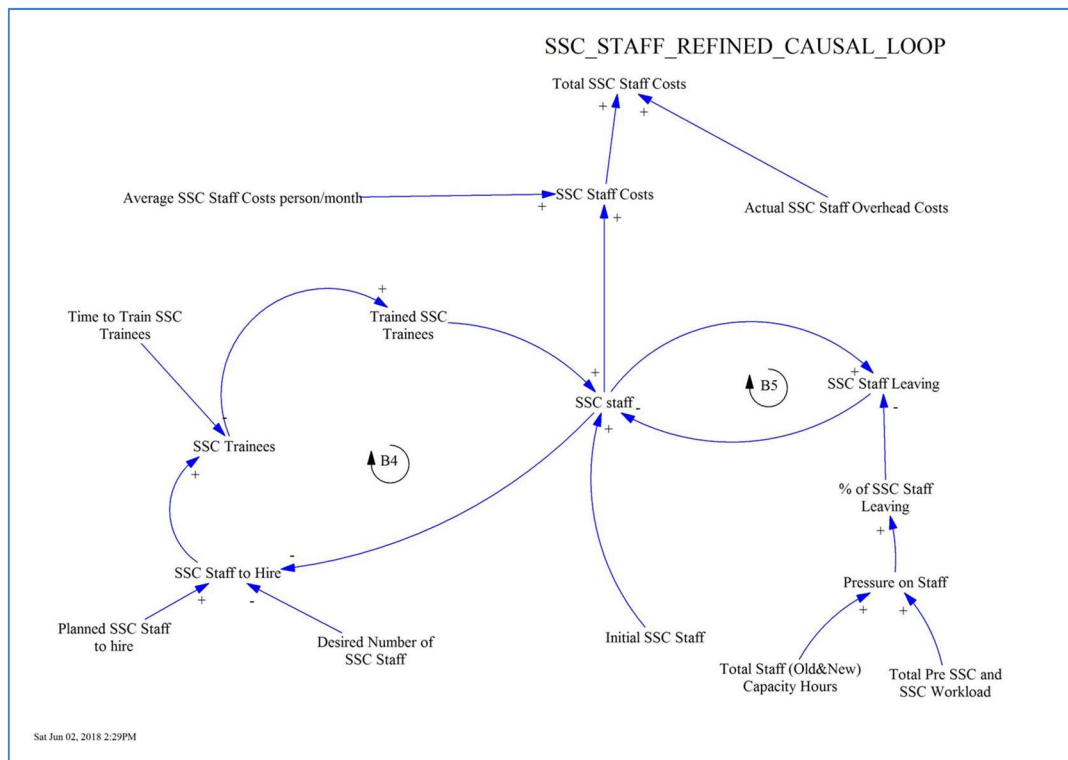
Figure 42 Refined Causal Loop SSC Staff
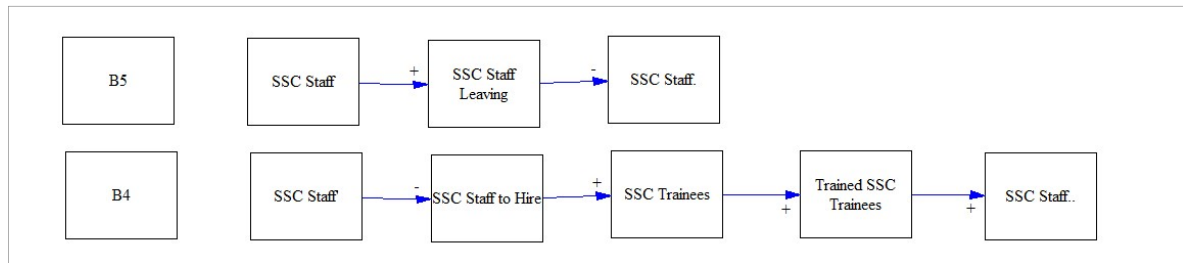
Figure 43 Explanation of Key Loops SSC Staff

In terms of the balancing loop four (B4); the higher the number of SSC Staff, the lower the number of Staff that are required to be added or recruited. In effect, if there is a higher level of SSC Staff, then you would expect the SSC Staff to Hire to be reduced, thus, this will result in a balancing loop. This then implies that, the need to recruit and train more people (SSC Trainees) who will then add to the pool of the SSC Staff will be less. On the converse, having a higher level of planned staff to hire will affect the number of trainees to be hired and this will have a positive effect on the number of trainees recruited. Having more SSC Staff, implies that the resources available to manage SSC transactions will increase and this will have the effect of increasing costs. However, the requirement to have a reduced level of Staff to Hire will conversely reduce the costs unless there is an effort to increase the level of planned staff which will increase costs and also the number of Trained and SSC Staff available. Policy makers need to ensure that there is an optimal balance between existing SSC Staff, proposed new SSC Trainees to be added and proposed SSC Staff to be reduced or leaving.

Regarding the balancing loop five (B5); the higher the number of SSC Staff required, the higher the number of potential SSC Staff available to leave (SSC Staff leaving). This has a positive or reinforcing effect on the SSC Staff Leaving. This implies that there could be potential redundancy costs etc., or other sudden costs in terms of work effort and work load management as pressure increases. In addition, as staff leave, if they are not replaced with the correct level of staff and staff with the requisite skills this could have an adverse impact

on the remaining staff morale etc., thus productivity could suffer. Conversely, when staff leave, this decreases the number of SSC Staff available. This has a negative effect on the available number of SSC Staff. Ensuring that staff levels are at an optimum becomes the challenge for policy makers. On the other hand, when the total SSC Staff are reduced as a consequence of having a larger SSC Staff available, the effect is the decrease in the number of SSC Staff. Decreasing the number of SSC Staff available, could imply for example, that there is under capacity in terms of staff hours etc., and this could affect the quality of work etc. Furthermore, there is the possibility that as the number of SSC Staff are decreased there is a possibility of requiring the use of for example, temporary employees which will increase personnel and SGA costs. As emphasised earlier, this is important to manage efficiently.

d)   Temporary Staff

These are the required temporary staff. This is a function of the:

- Initial Temporary Staff plus the
- Trained Temporary Staff less the
- Temporary Staff Leaving

The Temporary Staff model is illustrated in figure 44 below.
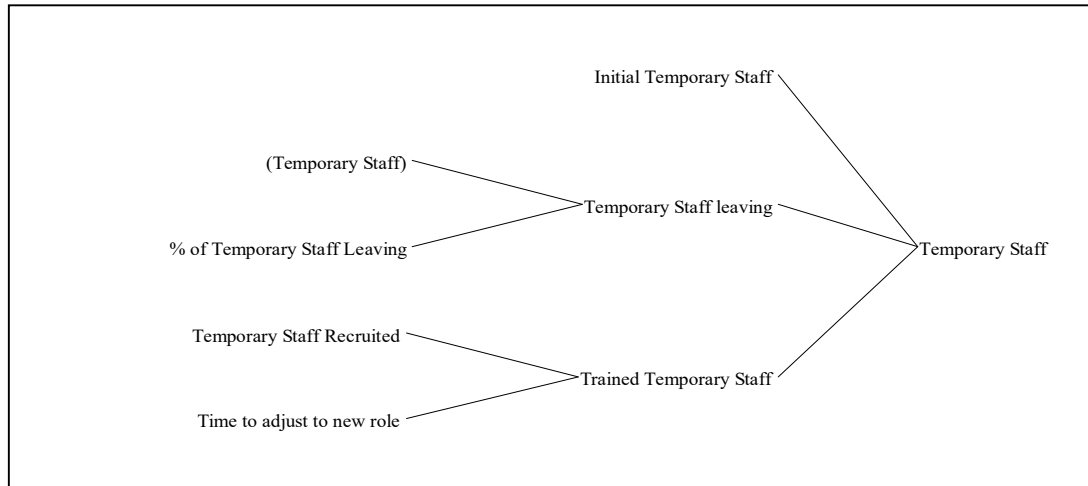
Figure 44 Temporary Staff

- **REFINED CAUSAL LOOP DIAGRAM FOR TEMPORARY STAFF AND EXPLANATION OF KEY LOOPS AND FEEDBACK**

Figures 45 and 46 below show the refined Temporary Staff causal loop diagram. Temporary Staff in this model make up the shortfall in terms of SSC employees that the business is not able to meet.
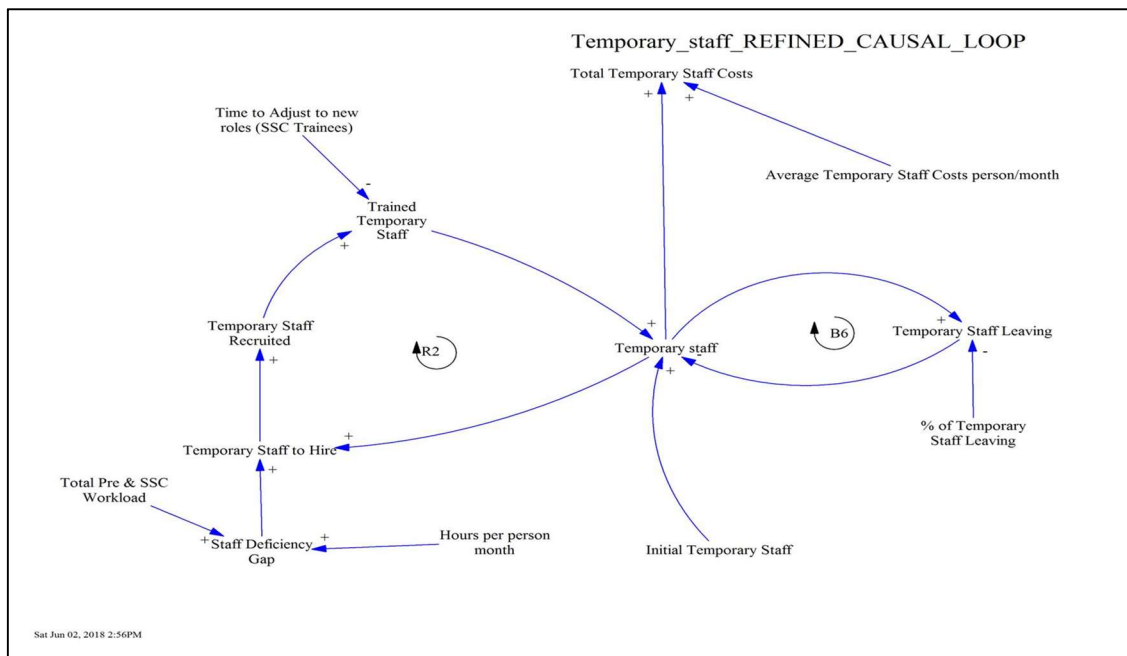
Figure 45 Refined Causal Loop Temporary Staff
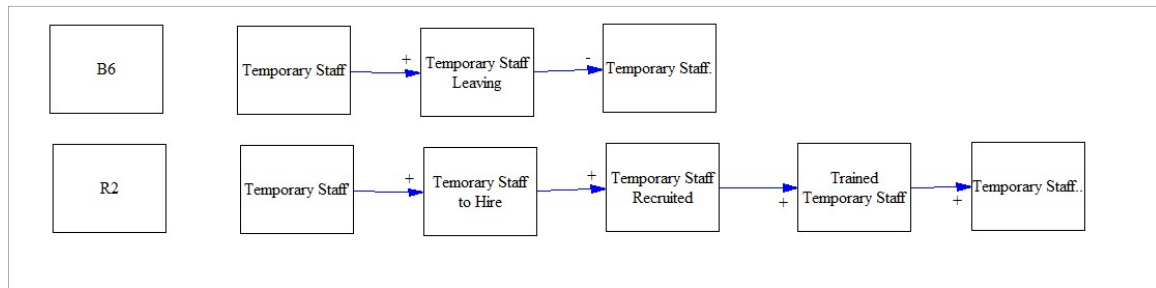
Figure 46 Explanation of Key Loops/ Feedback

In terms of the balancing loop six (B6); the higher the number of Temporary Staff required, the higher the number of potential Temporary Staff available to leave (Temporary Staff Leaving). This has a positive or reinforcing effect on the Temporary Staff Leaving. This implies that there could be potential for losing temporary staff at short notice. Although most temporary staff may not be paid redundancy costs etc., their sudden loss can create problems for the transition, especially if they are in key positions and have to be replaced. This will affect the implementation of the project and could also result in extra costs such as the length of time to find a suitable replacement. Furthermore, there could be loss of productivity as work is left undone and customer satisfaction may suffer. As a consequence, it is important to ensure that temporary staff are also managed carefully, either for example, by offering long term contracts for the duration of the project etc. Similarly, as with the SSC Staff, as Temporary Staff leave, if they are not replaced with the correct level of staff and staff with the requisite skills this could have an adverse impact on the remaining staff morale etc., and therefore productivity could suffer. Conversely, when temporary staff leave, this decreases the number of Temporary Staff available. This has a negative effect on the available number of Temporary Staff. The key for policy makers is to ensure that both SSC and Temporary Staff levels are at an optimum. On the other hand, when the total Temporary Staff are reduced as a consequence of having a larger Temporary Staff available, the effect is the decrease in the number of Temporary Staff. As seen with the SSC Staff, decreasing

the number of Temporary Staff available could imply for example, that there is under capacity in terms of staff hours etc., and this could affect the quality of work.

Conversely for the reinforcing loop two (R2); the higher the number of Temporary Staff required, the higher the number of Temporary Staff that are required to be added or recruited. This then implies that, there is a need to train more people (Trained Temporary Staff) who will then add to the pool of Temporary Staff and thus the total number of Temporary Staff will thus increase. The implication is that costs such as training, employee expenses etc., will rise. This has a positive reinforcing effect on Temporary Staff (as there is a requirement to add more Staff).

e)   Clients/ Other Staff (Customer Service Effect)

Clients / Other Staff is a function of:

- Clients / Other Staff less the product of
- % of Clients/Other Staff Leaving and Clients / other staff

Figure 47 below shows the Clients/ Other Staff model.
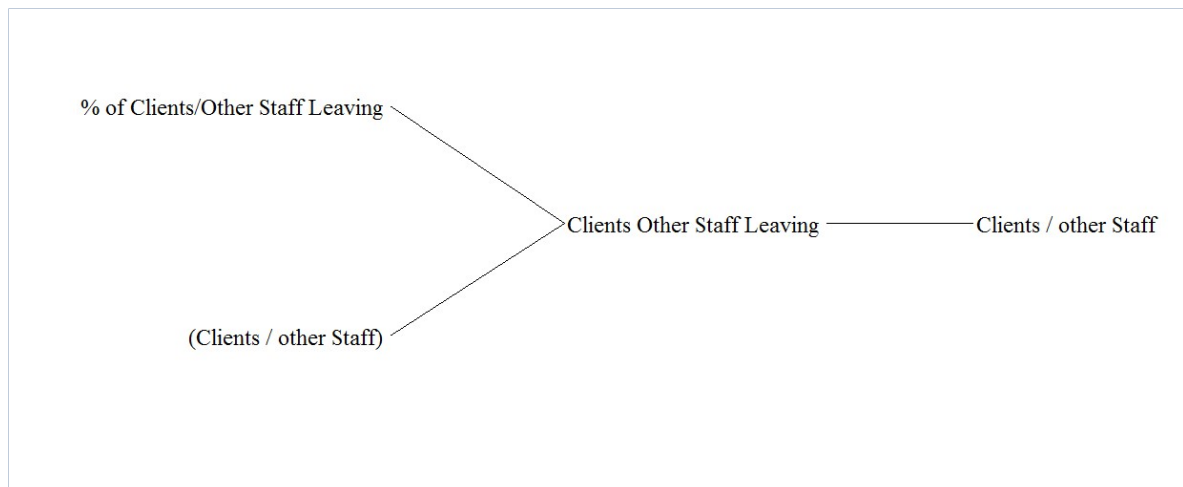
Figure 47 Clients / Other Staff

- **REFINED CAUSAL LOOP DIAGRAM FOR CLIENTS/OTHER STAFF AND EXPLANATION OF KEY LOOPS AND FEEDBACK**

Figures 48 and 49 below show the CLD. In terms of the balancing loop seven (B7); the higher the number of Clients / Other Staff required, the higher the potential number of Clients / Other Staff that the company could lose (Clients Other Staff Leaving). This has a positive reinforcing effect on the Clients Other Staff Leaving. This implies that there is a potential of losing other staff or customers. These stakeholders need to be managed well as inferior
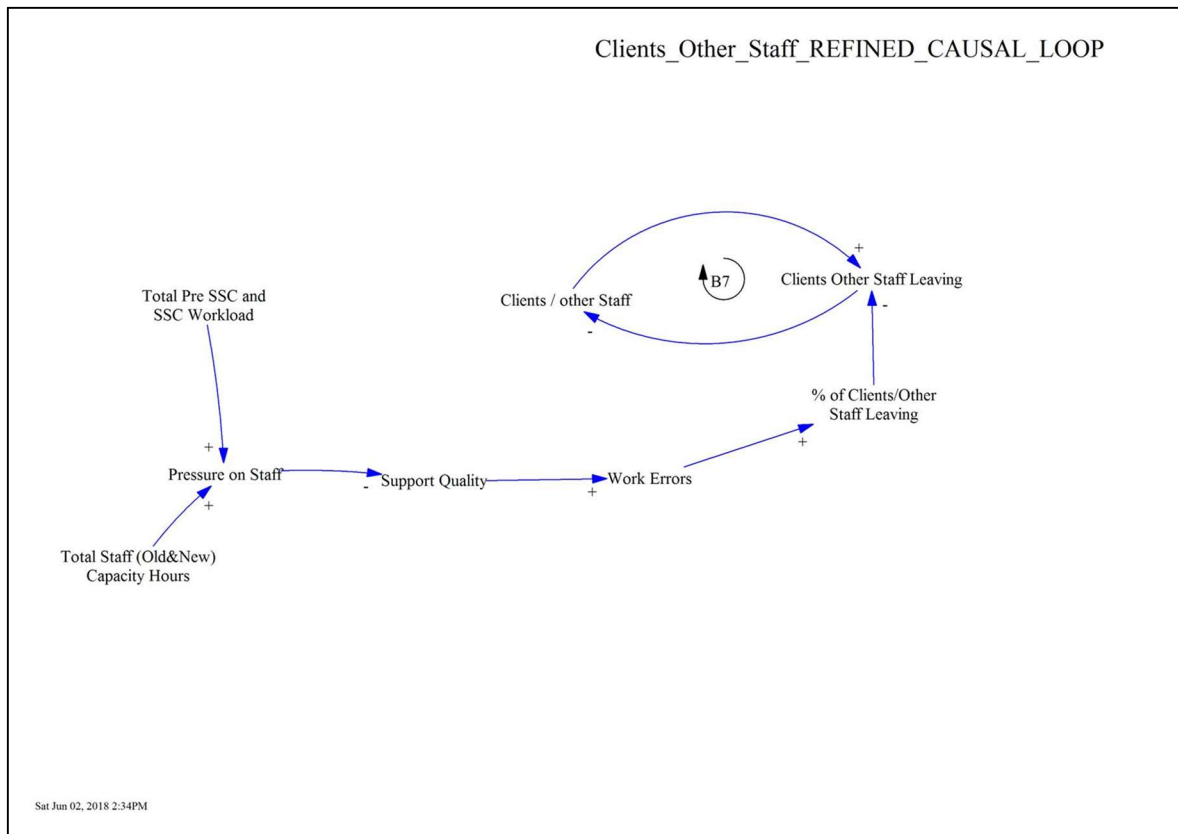
Figure 48 Clients/ Other Staff (Customer Service Effect)
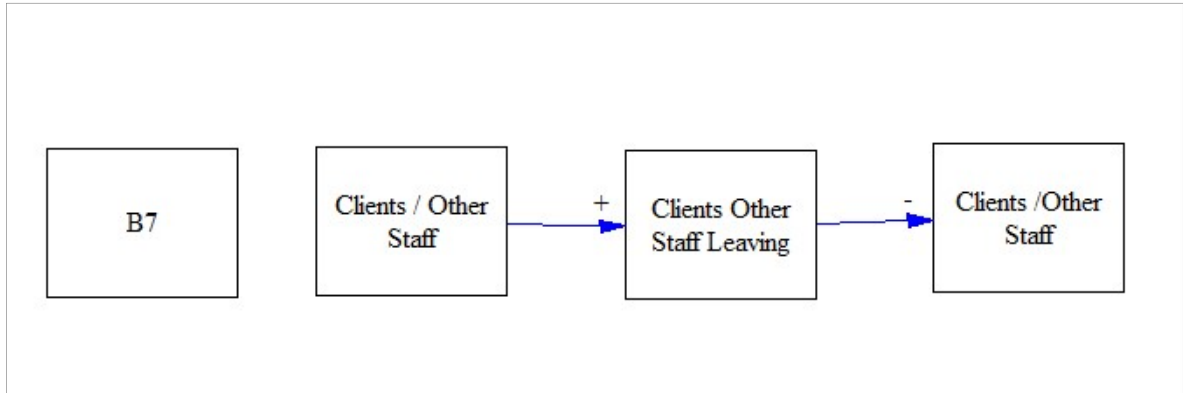
Figure 49 Explanation of Key Loops Clients/Other Staff

service levels could affect them. For example, losing these staff are dependent on the work pressures, work errors, support quality that is delivered or will be delivered by the SSC Staff as shown in Figure 48. In addition, as Clients / Other Staff (Clients Other Staff Leaving) leave, the business will lose out financially and also will lose the skills set in other business areas or departments. If these employees or customers are not satisfactorily replaced, this could have an adverse impact on the remaining staff morale etc., and therefore productivity could suffer. In addition, this affects the current pool of Clients / Other Staff.

f)   Sales General and Administrative Expenses (SGA costs)

This measures the total cost of all the relevant activities.

It is a function of the:

- Total Temporary Staff Costs plus the

- Total SSC Staff Costs plus the

- Total Old Staff Costs (Old dept. Staff).

Figure 50 below illustrates Sales General and Administrative Expenses model.
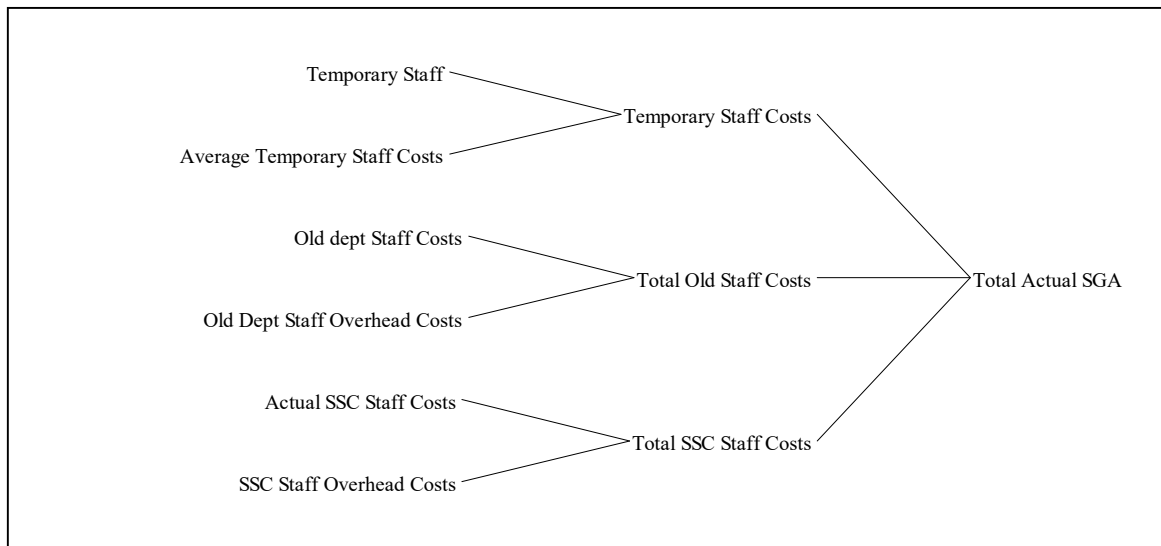
Figure 50 Sales General and Administrative Expenses (SGA costs)

REFINED CAUSAL LOOP DIAGRAM

SGA is the sum of the SSC Staff, Old Staff and Temporary Staff Costs as shown above. How it relates to the key loops are discussed under SSC Staff, Old Staff and Temporary Staff above.

5.4   Obtain agreement that this is reasonable and accurate (verification)

The revised Causal Loop Diagram was reviewed initially with the Business Analyst and later the Accounting Manager, to ensure that the model was reasonable and accurate. This was done after the receipt of feedback from stage II (two) respondents. It must be noted that the feedback from stage I (one) respondents was also considered. The review process itself involved a few 'face to face' meetings / telephone conference discussions of about one-hour duration each on a number of occasions (approximately three to five meetings). The review involved the researcher explaining and going through the revised model with each person and identifying the reasons and what the feedback / causalities entailed. The Business Analyst and Accounting Manager mainly discussed this with respect to the SSC transition undertaken and made enquiries as to the basis of for example, the loops and feedback. In general, both participants mainly agreed with the reasoning behind the revised Causal Loop Diagram. Once this was agreed, I proceeded to build the Stock and Flow Model, which is described in the next section.

5.5   Modelling the Stock and Flow

Following on from the feedback received from respondents in stages one and two regarding the CLD, the Stock and Flow Model was then designed to reflect this (the SSC Transition process). The basic tenets underlying the Stock and Flow Model, follows from the refined Causal Loop Diagram, my mental models and the literature review as stated earlier. The main feedback from respondents related to 'costs' (mainly employee and overhead costs), transactional activities and headcount. Therefore, in this research the Stock and Flow Model was developed to look at the interaction of these three main variables and how they impact on the SSC transformation process including the current SSC used in this research.

The Stock and Flow Diagram was modelled based upon the recommendations of Sterman (2000) as described in the Literature Review. Initially, the model was designed based upon the literature review / research question / objectives and the mental models of this researcher.

A generic model (Total model) was built, but sub components of the model consisting of seven (7) key variables were also identified and developed, using Sterman's (2000) model building approach. Where relevant the model assumptions are described under the relevant sub-headings such as the key variables in the model. The developed SD model is shown in Figures 51 and 52 below. A systematic discussion of the main components of the model is undertaken in this section which explains the whole model.

Furthermore, this model was reviewed and verified with the Business Analyst and the Accounting Manager to ensure that it reflected the actual situation on the ground.
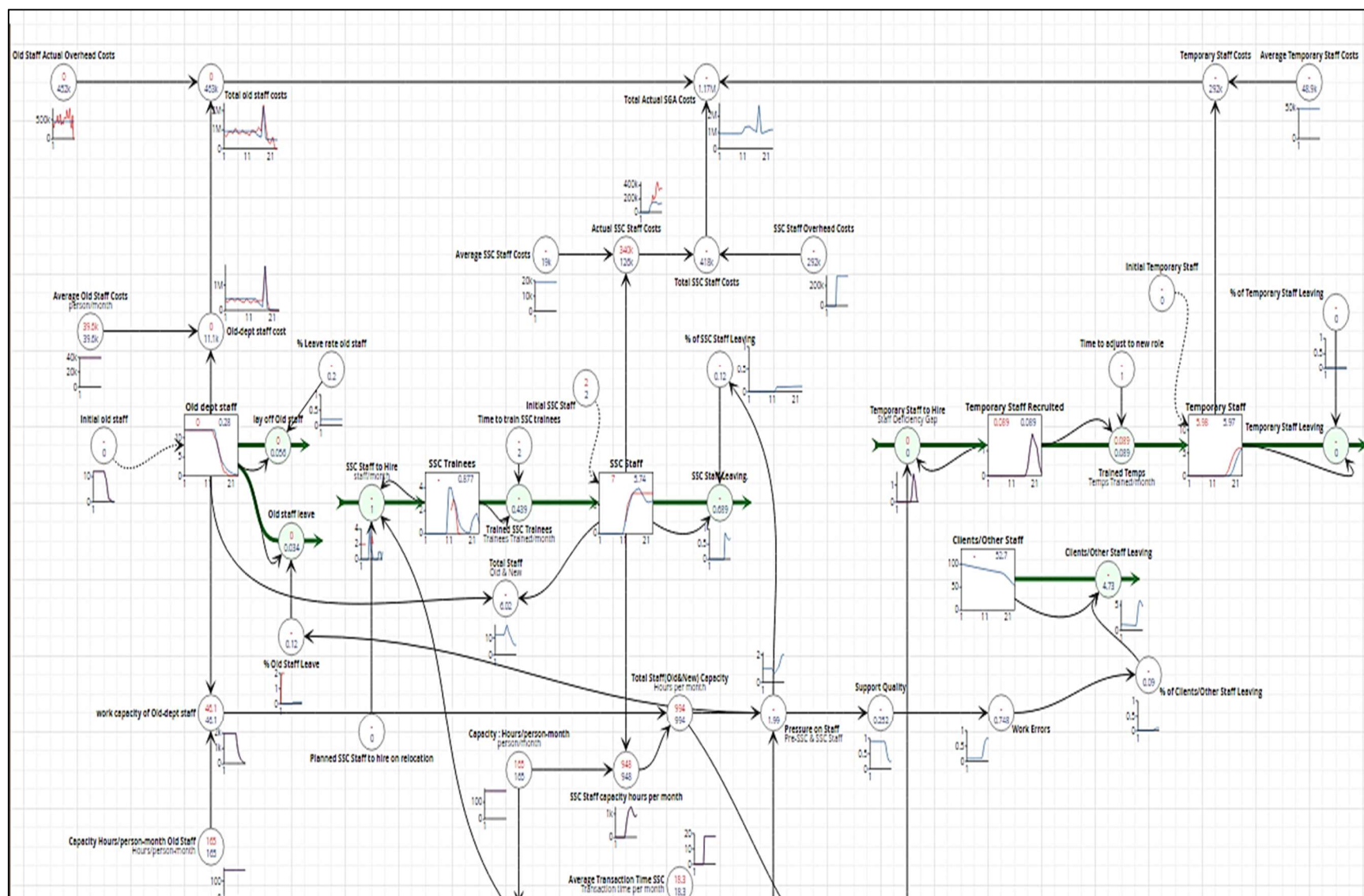
Figure 51 SSC Transition Model (1)
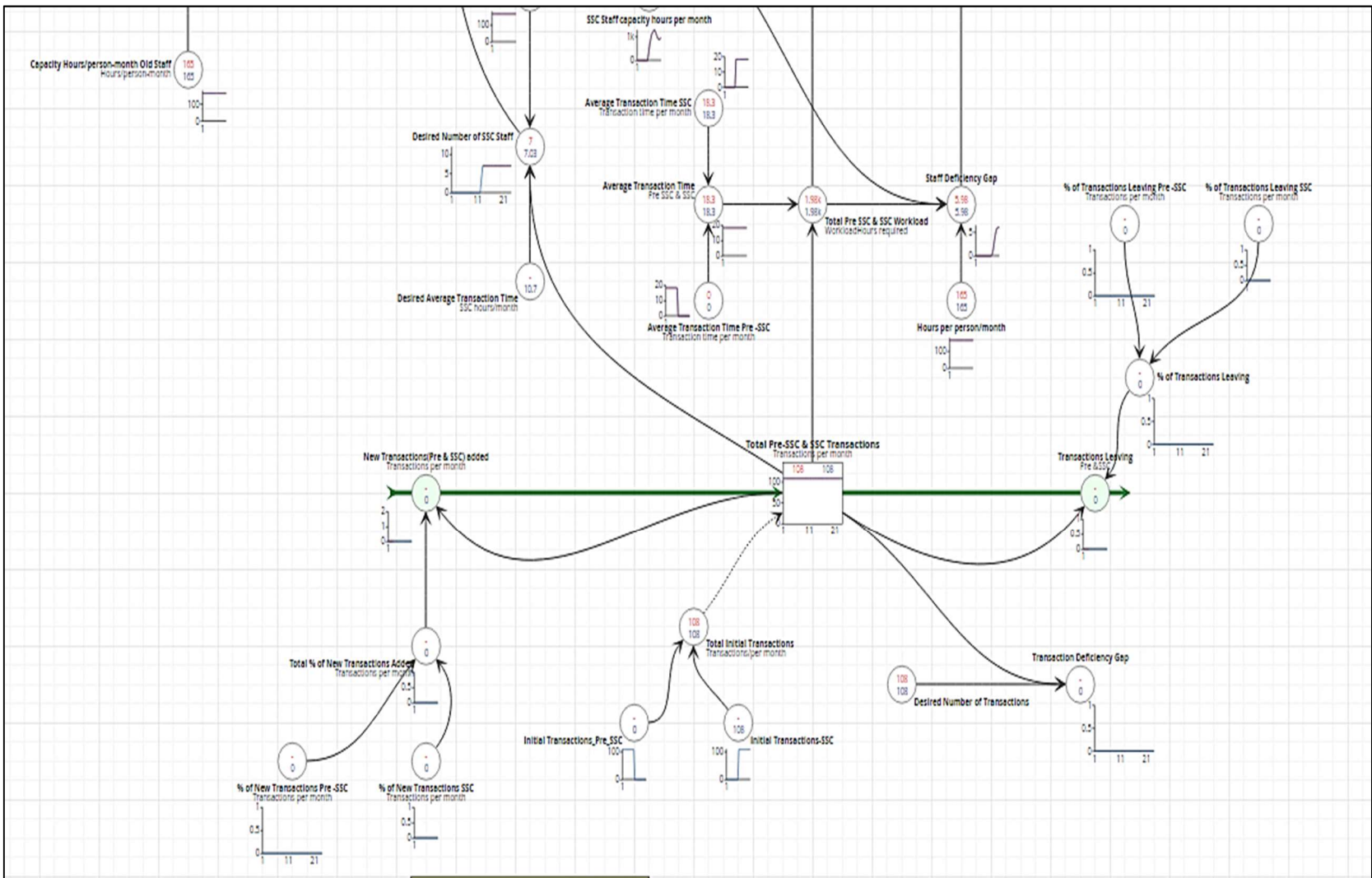
Figure 52 SSC Transition Model (2 contd.)

5.5.1 Justification for the variables selected in the Stock and Flow model[20]

At a transactional level and in the modelling of the Stock and Flow Model, a recalibrated Causal Loop Diagram consisting of 'costs' (mainly employee and overhead costs), transactional activities and headcount were selected as the main variables. As argued earlier (specifically in Chapter Two), SSC transformation involves mainly the reduction of costs and these are linked to headcount reduction. It also involves transactional activities, and these are activities that are pooled together to bring about the formation of the SSC.

Therefore, in this research the Stock and Flow Model looks at the interaction of these three main variables and how they impact on the SSC transformation / implementation process. The aim then is to provide a model that addresses the main or key variables (headcount reduction, costs and transactional activities) in the SSC transformation process (build / design and implementation).

5.5.2 Stock and Flow Model

The Stock and Flow Model design is discussed under the themes: problem identification, formulation of the dynamic model, formulation of the simulation model, testing, policy and evaluation (Sterman, 2000). The Stock and Flow modelling approach is illustrated in Figure 53 below.

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[20] See also sections 5.1, 5.3 and 5.5

Sterman, (2000) SD Modelling Approach for Stock & Flow Model

Problem Identification	Formulation of Dynamic Hypothesis	Formulation of a Simulation Model	Testing	Policy Design & Evaluation

Research Question	1. Problem Identification (Boundary Selection)	2.Formulation of Dynamic Hypothesis	3. Formulation of a Simulation Model	4. Testing	5. Policy Design & Evaluation
Review Literature	Theme Selection	Initial Hypothesis generation	Specification of structure, decision rules	Comparison to reference modes:	Scenario Specification
Develop Theory					Policy design
Refine Causal Loop Diagram in Stages I & II	**Key Variables**	Endogenous Focus	Estimation of parameters, behavioural relationships and initial conditions	Robustness under extreme conditions	What if analysis
	Time Horizon	Mapping (Modes)			Sensitivity analysis
Select Cases (Unit of Analysis is Financial Organisation)	Dynamic Problem Definition (Reference Modes)		Tests for consistency with the purpose and boundary	Sensitivity analysis	Interaction of policies
Collect Data for Base Case (Reference Model)					

Figure 53 Sterman (2000) SD Modelling Approach for Stock & Flow Model

Source: Adapted from Sterman (2000, p.86)

The next section discusses the approach adopted for the generic (Total Model) and the approach adopted for the sub components (key variables) using Sterman's (2000) SD framework model shown in Figure 53, the literature review and the researcher's mental models as a basis. A generic model (Total Model) was initially constructed and seven (7) key variables were identified as sub components of the model, based upon the literature review and the mental models of the researcher.

5.5.3 Approach Adopted for The Generic (Total Model)

a) Problem Identification (Boundary Selection)

The theme selection is that, current approaches for the design and build of SSCs compartmentalises the SSC model into various stages (e.g., BearingPoint, 2007; PWC, 2011). The seven (7) key variables identified were Pre-Shared Service Staff (Pre-SSC); Workload / (Work Capacity); Customer / Service Effect; Pre and Post transitioned activities / Transactions; SSC Staff; Temporary Staff and Sales General and Administrative Expenses (SGA costs).

The time horizon of the case study is up to twenty-four (24) months, starting from twelve (12) months before the SSC was established, six (6) months during the SSC transition phase and six (6) months after the SSC Transition phase (post implementation). The system boundary being studied is the Single SSC Financial Organisation.

The Definition of the Dynamic Problem (Reference modes or the historical behaviour of the system) is that, SSC Transitions are dependent on maintaining and keeping both current and new staff to function effectively. This also affects the implementation costs of the SSC Transition. The Problem Identification phase of the model is illustrated in Figure 54 below.
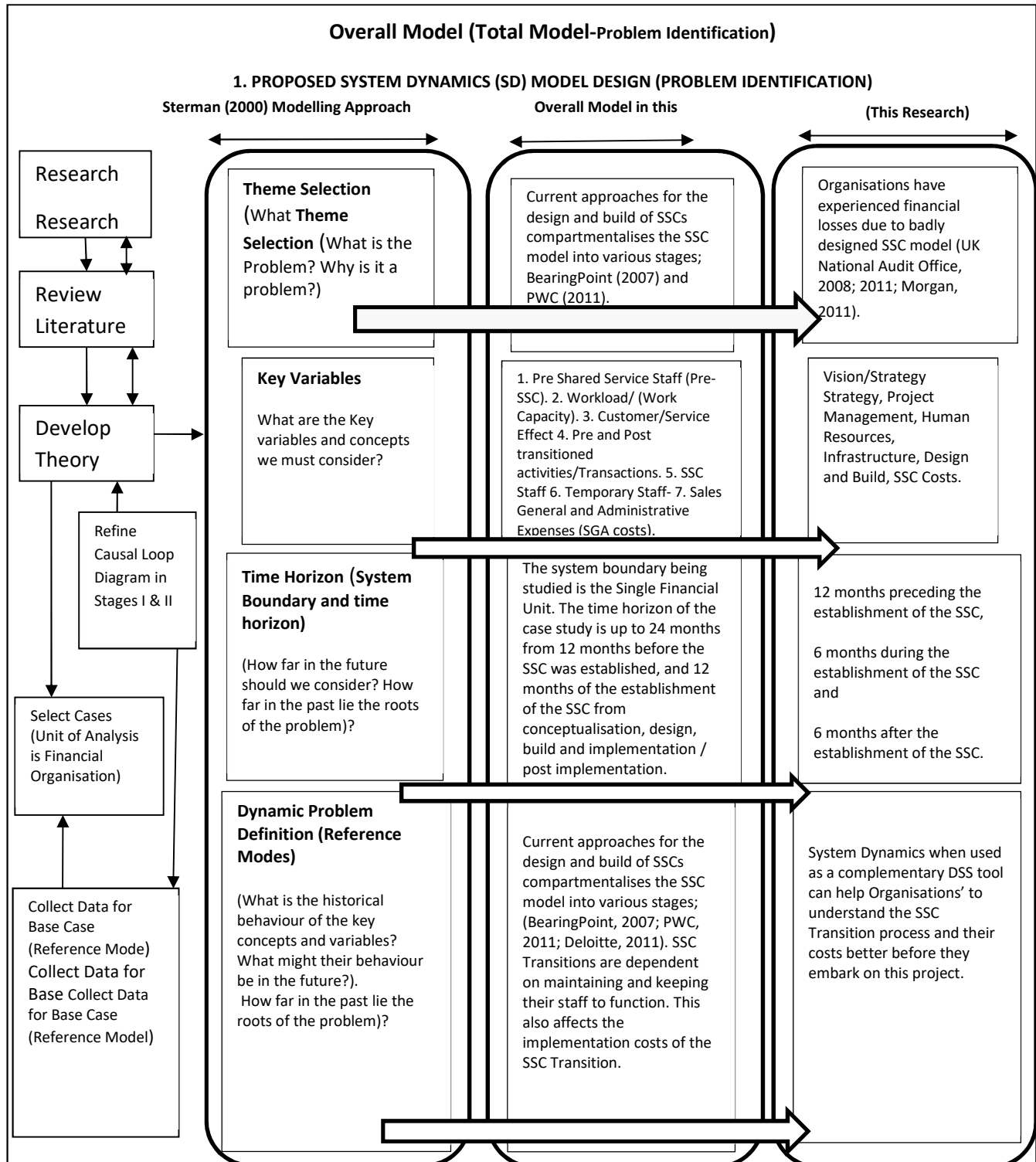
Figure 54 Overall Model (Total Model-Problem Identification)

Source: Adapted from Sterman (2000)

b)   Formulation of the Dynamic Hypothesis

This involves the initial hypothesis generation, endogenous focus (feedback structure) and

mapping (modes). These were developed based upon the literature review, mental models

of the researcher, the initial and refined Causal Loop Diagrams as well as the Stock and

Flow Diagram developed in Stages I & II & III (One, Two and Three). The Formulation of the

Dynamic Hypothesis phase of the model is illustrated in Figure 55 below.
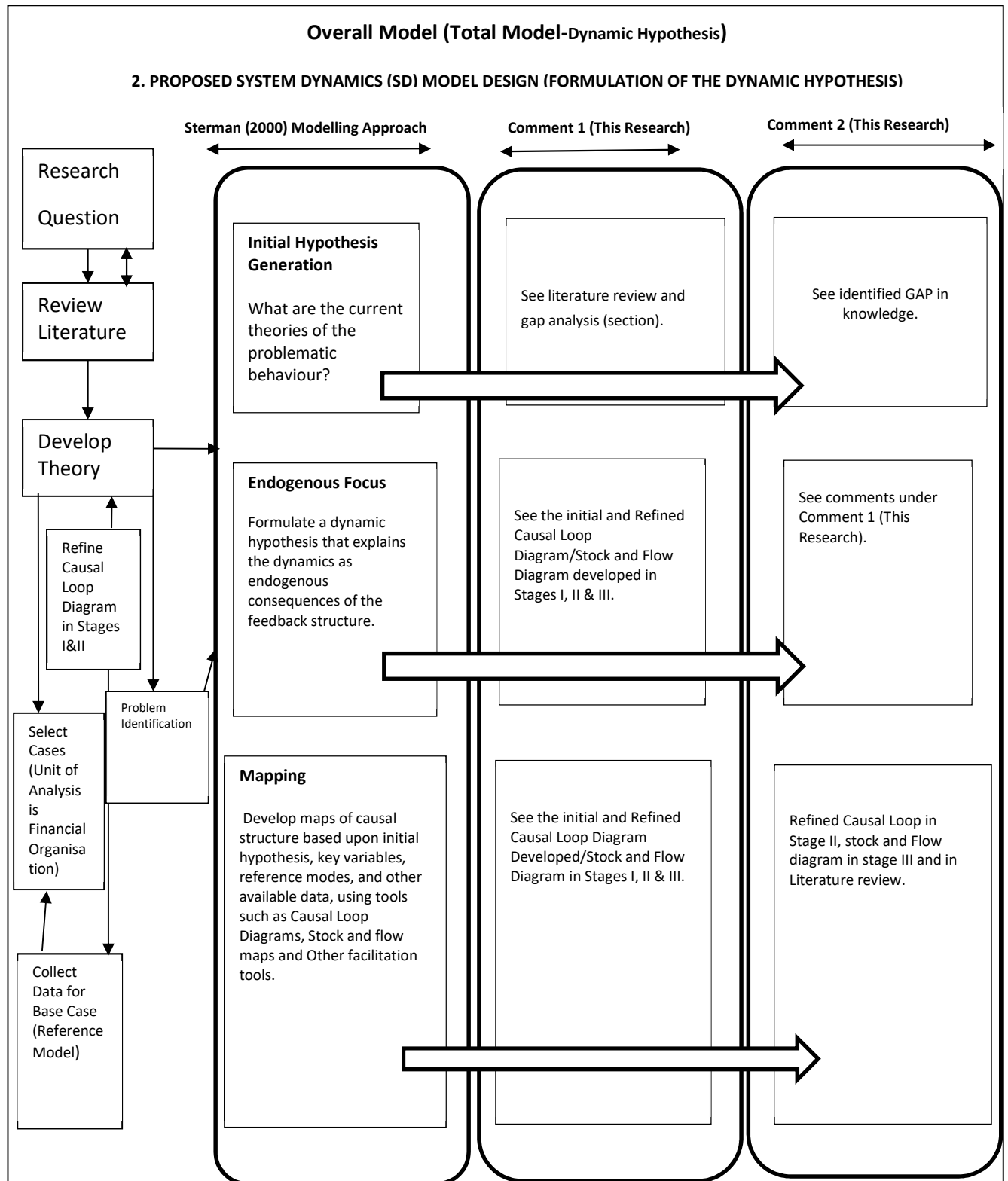
Figure 55 Overall Model (Total Model-Formulation of the Dynamic Hypothesis)
Source: Adapted from Sterman (2000)

c)   Formulation of a Simulation Model

This involves the specification of structure, decision rules, and the estimation of parameters, behavioural relationships and initial conditions. Decision rules are specified by using the actual or estimated reference data from the most important variables where available and comparing it to the simulated outcome. For example, the actual or estimated data for the initial staff, SGA costs, and workload capacity is compared against the simulated data. Equations are also made based upon the literature review and the mental models of the researcher. Parameters can then be estimated or identified from this. Figure 56 below illustrates the Formulation of a Simulation Model phase.

Overall Model (Total Model-Formulation of A Simulation Model)

3. PROPOSED SYSTEM DYNAMICS (SD) MODEL DESIGN (FORMULATION OF A SIMULATION MODEL)

Sterman (2000) Modelling Approach **Comment 1 (This Research)** **Comment 2 (This Research)**

Research Question

Review Literature

Develop Theory

Refine Causal Loop Diagram in Stages I&II

Problem Identification

Select Cases (Unit of Analysis is Financial Organisa

Formulation of the Dynamic Hypothesis

Collect Data for Base Case (Reference Model)

Specification of structure, decision rules

Decision rules are specified by using the actual reference data from the most important variables where available and comparing it to the simulated outcome. For example, the actual or estimated data for the initial staff, SGA costs, and workload capacity is compared against the simulated data. Equations are also made based upon the literature review and the mental models of the researcher. Parameters can then be estimated or identified from this.

See comments under Comment 1 (This Research).

Estimation of parameters, behavioural relationships and initial conditions

See Comments above.

See comments under Comment 1 (This Research).

Tests for consistency with the purpose and boundary

See Comments above.

See comments under Comment 1 (This Research).

Figure 56 Overall Model (Total Model-Formulation of a Simulation Model)

Source: Adapted from Sterman (2000)

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d)   Testing

This involves the comparison to reference modes, testing the robustness under extreme conditions and the conducting of sensitivity analysis. Tests were done to ensure that the model replicates the reference years before / during and after the building of the Shared Service Centre. Various parameters (variables) identified in the model were used to test this. The Testing phase of the model is illustrated in Figure 57 below.

Overall Model (Total Model-Testing)

4. PROPOSED SYSTEM DYNAMICS (SD) MODEL DESIGN (TESTING)

	Sterman (2000) Modelling Approach	Comment 1 (This Research)	Comment 2 (This Research)

Research Question

Review Literature

Develop Theory

Refine Causal Loop Diagram in Stages I&II

Problem Identification

Select Cases (Unit of Analysis is Financial Organisation)

Formulation of the Dynamic Hypothesis

Formulation of the Simulation Model

Collect Data for Base Case (Reference Model)

Comparison to reference modes

Does the model reproduce the problem behaviour adequately for your purpose?

Test to ensure that model replicates the reference years before/during and after the building of the Shared Service Center.

See comments under Comment 1 (This Research).

Robustness under extreme conditions

Does the model behave realistically when stressed by extreme conditions?

Use various identified parameters (variables) in the model to test this.

See comments under Comment 1 (This Research).

Sensitivity

How does the model behave given uncertainty in parameters, initial conditions, model boundary, and aggregation?

See Comments above.

See comments under Comment 1 (This Research).

Figure 57 Overall Model (Total Model-Testing)

Source: Adapted from Sterman (2000)

e) **Policy Design and Evaluation**

With regards to Scenario Specification this could involve the situation where parameters could change as for example, the recruitment of new staff.

With regards to Policy Design; for example, are the number of staff (pre-SSC and post SSC staff), temporary staff, SGA costs, the optimum number of transactional activities transferred, workload and work capacity and customer service effect realistic? How do we design a policy that is efficient? In terms of what if analysis, or sensitivity analysis; what are the effects of various scenarios, such as, training of new staff; number of SSC activities taken etc., on the SSC? With regards to the interaction of policies; there is a need to check whether each policy identified can operate under its own or need interaction with other identified policies. The Policy Design and Evaluation phase of the model is illustrated in Figure 58 below.
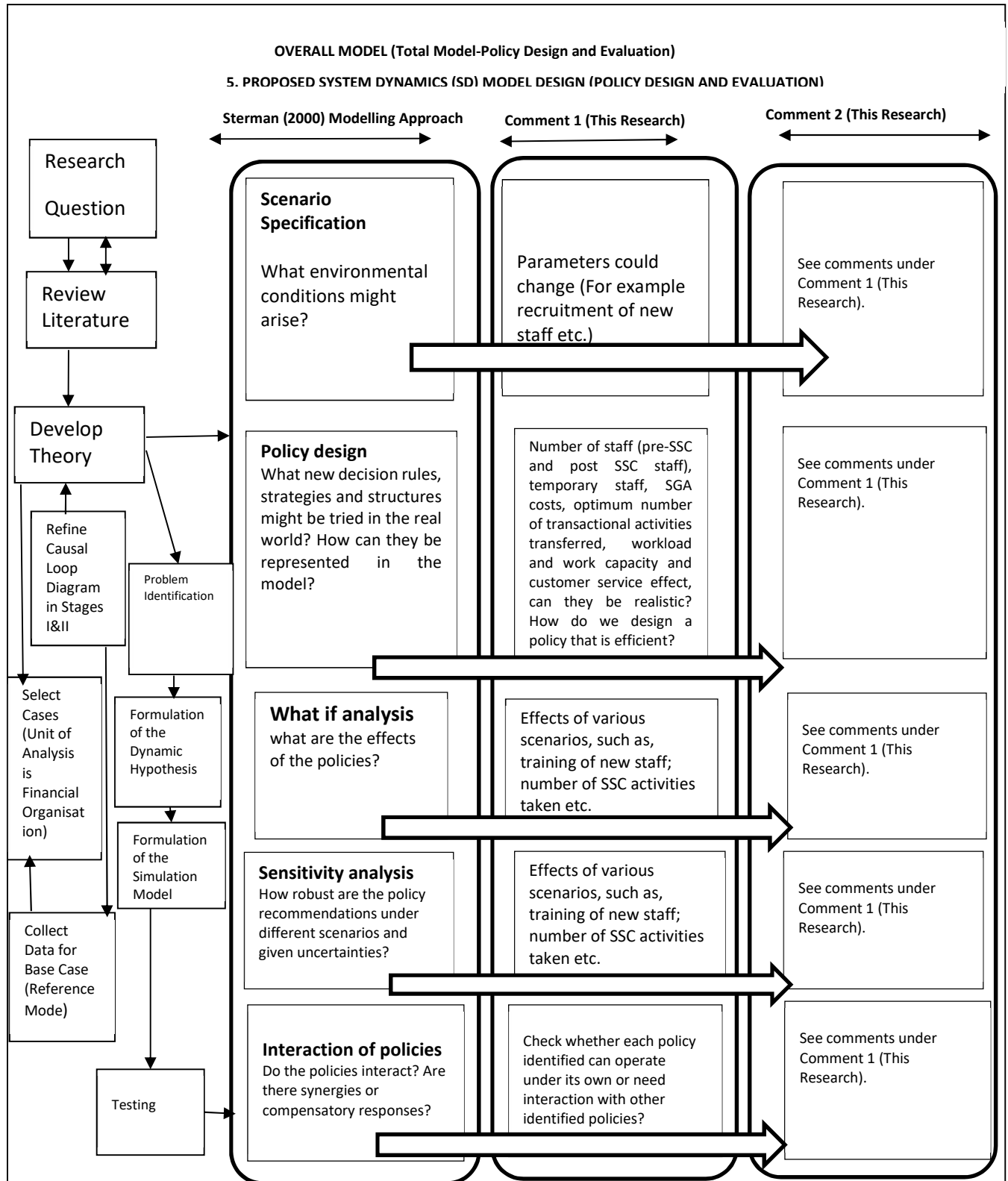
Figure 58 OVERALL MODEL (Total Model-Policy Design and Evaluation)

Source: Adapted from Sterman (2000)

5.5.4 **Key Variables Analysis of the Model**

The model itself consists of seven (7) major or key variables. These were selected based upon the literature review, the research question / objectives and the mental models of the researcher as discussed earlier. The below were the seven (7) key variables selected:

1. Pre-Shared Service Staff (Pre-SSC). These are the staff (Old Dept. Staff) existing before the establishment of the Shared Service Centre.

2. Pre-and Post transitioned activities/Transactions. These are the transactional activities- transferred to the Shared Service Centre.

3. SSC Staff. These are the required Shared Service Staff employees (New Staff).

4. Temporary Staff required. These are the required temporary staff.

5. Customer/Service Effect, which measures the staff pressure, effect on work and the effect on customers.

6. Workload / (Work Capacity). Pre & Post SSC. This shows the workload that is required or available (See also Appendix H).

7. Sales General and Administrative Expenses, (SGA costs). This measures the total 'costs' of all the relevant activities.

The above seven (7) key variables are now discussed in detail below.

1. Pre-Shared Service Staff (Pre-SSC).

The sub component model was built based upon the methods described in Figure 59 below.
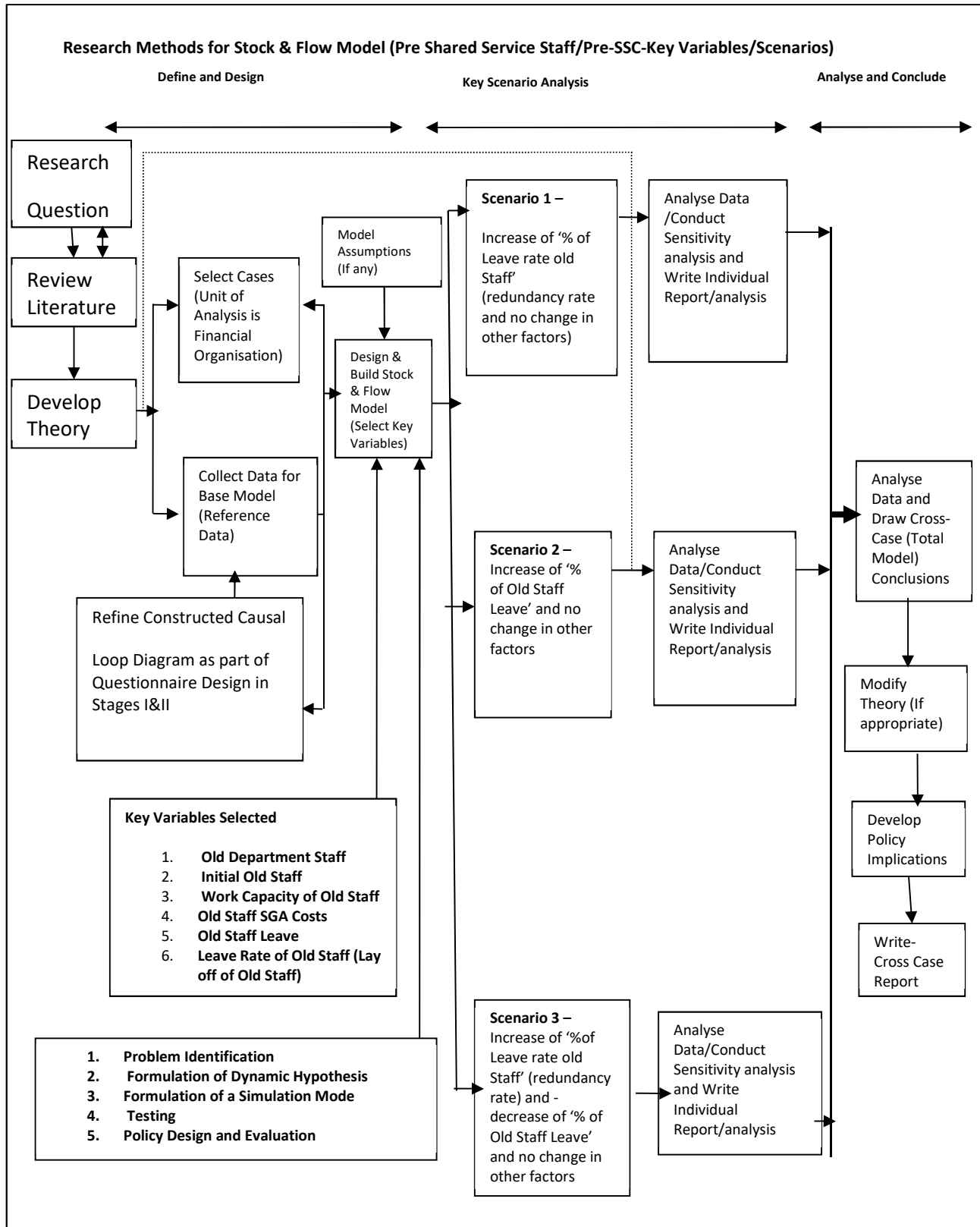
Figure 59 Research Methods for Stock & Flow Model (Pre-Shared Service Staff /Pre-SSC-Key Variables/Scenarios)

This is now described in detail below.

- **EXPLANATION OF KEY LOOPS IN THE OLD DEPT-STAFF (PRE-SHARED SERVICE STAFF) MODEL**

This is discussed in section 5.3 above under sub section (a) Pre-Shared Service Staff (Pre-SSC). Figure 60 depicts the key loops (B1 and B2) in the OLD DEPT- STAFF model. This is also shown in Appendix G.

Key Variables Selected

Under this scenario there were six key variables that were relevant for this aspect of the model as shown in Figure 59. These were:

Old Dept Staff

There is a stock of Pre-SSC Staff (Old –Dept. Staff) that existed. This stock consists of the initial Staff (pre-existing Staff). There are two outflows of pre-existing Staff. There is a natural attrition rate for the old staff (Old staff leave either voluntarily or otherwise) and a forced attrition rate (lay off of Old Staff) primarily due to forced redundancy. Figure 60 depicts the OLD DEPT STAFF.

Initial Old Staff

These were the staff existing before the SSC was transitioned and is shown in Figure 60.

Lay off of Old Staff (% Leave rate of Old Staff)

The 'lay off of old staff' is the Old Department staff leaving due to redundancy. This is influenced by the '% Leave rate of Old Staff '. In effect, the 'Lay off of Old Staff' will be impacted depending on the percentage movement of the '% Leave rate of Old Staff '. Figure 60 depicts the 'Lay off of Old Staff'.

Old Staff Leave

This is the leave rate of the Old Department Staff. The reason for leaving is due to other reasons (voluntary or otherwise) other than redundancy. Depending on the circumstances, the leave rate contributed to the reduction of the old staff. Figure 60 below depicts The Old Staff Leave.
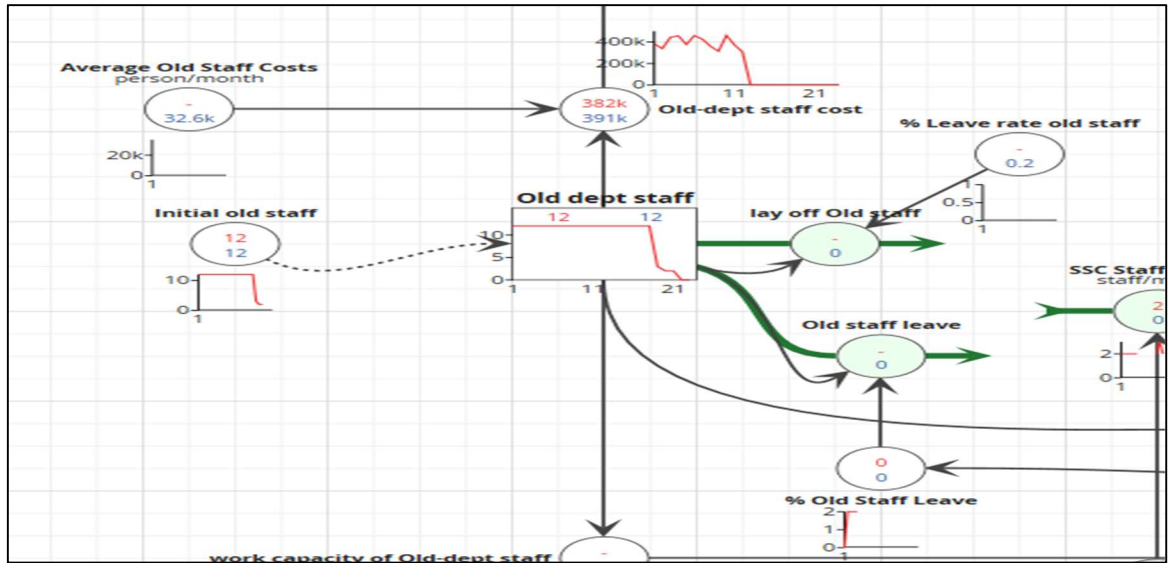
Figure 60 Pre-SSC (Old Dept. Staff Model) And Identification of Key Feedback Loops

Work Capacity of Old- Dept Staff

This is the capacity of hours that the old staff must work. This is determined by the Old Department Staff and the Capacity / Hours per person available per month. Figure 61 below depicts the Work Capacity of Old- Dept Staff.
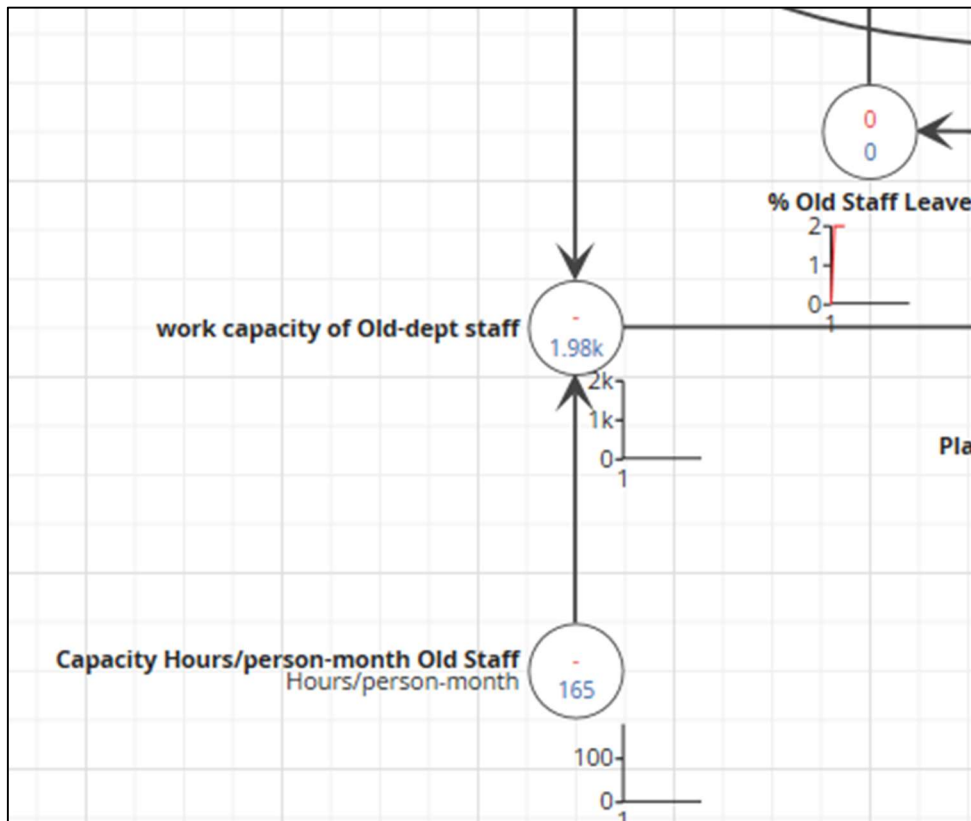
Figure 61 Work Capacity of Old-Dept. Staff

Old Staff SGA Costs

This shows the staff costs related to the old staff. Figure 62 below depicts the Old Staff SGA Costs.
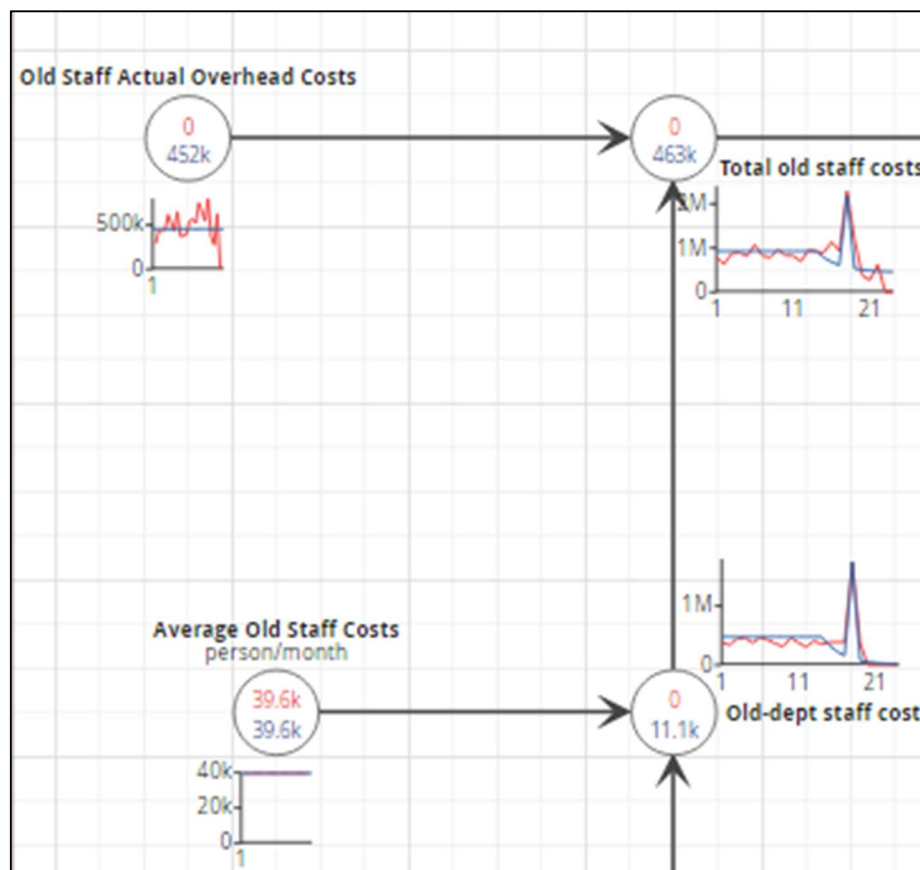
Figure 62 Old Staff SGA Costs

DATA COLLECTION (Reference model/Data)

The reference model / data is obtained from actual or estimated information from the company being analysed. Table 19 below shows the actual headcount of employees before the SSC transition.

Table19 Actual Head Count of Pre-SSC Employees (Old Staff)

ACTUAL HEAD COUNT OF PRE-SSC EMPLOYEES (OLD STAFF)		
Functional Area	**Transactional Activities**	**Head Count**
Accounting	Accounts Payable Total	1.04
	Budgets Total	0.53
	Cash Application Total	3.33
	Cash Management Total	0.26
	Corporate Reporting Total	0.39
	Dealer Funding Total	0.42
	General Ledger Total	2.07
	Payroll Total	0.03
	Regulatory Total	0.30
Accounting Total		**8.38**
Customer Services	Archiving Total	0.05
	Collections Total	1.01
	Contract Booking Total	0.05
	Customer Management Total	0.38
	Invoicing Total	1.60
	Post Total	0.53
Customer Services Total		**3.62**
Grand Total		**12.00**

Source: Compilation by author from various internal sources

MODEL BEHAVIOUR (REFERENCE MODEL)

Pre Shared Service Staff (Pre-SSC) / (Old Dept. Staff)

Initial Pre-SSC Staff were 12 in the Pre-SSC period (initial 12 months). Over the next periods

the number of personnel reduced and was zero by the end of month 24.

SCENARIO SPECIFICATION

A sensitivity analysis is undertaken based upon the three (3) scenarios discussed in Figure 59. The aim of this was to use sensitivity analysis to investigate how the three (3) scenarios impacted on Work Capacity, Old staff (current staff and initial old staff) and Old staff costs (Sales General and Administrative expenses).

EQUATIONS OF THE MODEL

The below equations were used in the base/reference model:

Equation 1 Initial old staff

Initial old staff= 'sketch'

Equation 2 Old dept staff

Old dept staff = 'Initial old staff' less lay off of old staff less old staff leave

lay off Old staff=if 'time' >13 then 'Old dept staff '*'% Leave rate old staff' else 0

Old staff leave=if 'time' > 13 then 'Old dept staff '*'% Old Staff Leave' else 0

Equation 3 Work capacity of Old-dept. staff

'Old dept staff '*'Capacity Hours/person-month Old Staff'

Equation 4 Old Staff SGA costs

Total Old Staff Costs= 'Old-dept staff cost' +' Old Staff Actual Overhead Costs'

Old-dept staff cost= if 'time' = 18 then 1742770else ('Average Old Staff Costs'*'Old dept staff')

Old Staff Actual Overhead Costs= constant (452250)

Data Analysis and Policy Formulation

The scenario specification and the main base models are analysed against the literature review, the reference / base data, the hypotheses and policy intervention tools are then developed.

.

2. Pre and Post transitioned activities/Transactions.

These are the transactional activities transferred to the Shared Service Centre. The model was built based upon the methods described in Figure 63 below. The contents of the model are further described in detail in this section.

Research Methods for Stock & Flow Model (Pre and Post transitioned activities/Transactions-Key Variables/Scenarios)

Define and Design

Key Scenario Analysis

Analyse and Conclude

Research Question

Review Literature

Develop Theory

Select Cases (Unit of Analysis is Financial Organisation)

Model Assumptions (If any)

Design & Build Stock & Flow Model (Select Key Variables)

Collect Data for Base Model (Reference Data)

Refine Constructed Causal Loop Diagram as part of Questionnaire Design in Stages I & II

Scenario 1

Increase the 'Total % of New Transactions Added')

Analyse Data/Conduct Sensitivity analysis and Write Individual Report/analysis

Scenario 2

Increase the '% Total transactions leaving'

Analyse Data/Conduct Sensitivity analysis and Write Individual Report/analysis

Analyse Data and Draw Cross-Case (Total Model) Conclusions

Modify Theory (If appropriate)

Develop Policy Implications

Write-Cross Case Report

Key Variables Selected

1. Total Pre-SSC & SSC Transactions

2. New Transactions (Pre & SSC) added

3. Transactions Leaving

4. Transaction Deficiency Gap

1. **Problem Identification**
2. **Formulation of Dynamic Hypothesis**
3. **Formulation of a Simulation Model**
4. **Testing**
5. **Policy Design and Evaluation**

Scenario 3
Increase the '% Total transactions leaving' and Decrease the 'Total % of New Transactions Added'

Analyse Data/Conduct Sensitivity analysis and Write Individual Report/analysis

Figure 63 Research Methods for Stock & Flow Model (Pre and Post transitioned activities/Transactions-Key Variables/Scenarios)

- **EXPLANATION OF KEY LOOPS IN THE PRE-SSC & SSC TRANSACTIONS MODEL**

This is discussed in section 5.3 above under sub section (b), i.e. Pre-and Post transitioned activities / Transactions. Figure 64 below depicts the key loops (R1 and B3). The model is also shown in Appendix G.

Key Variables

Total Pre-SSC & SSC Transactions

As shown in Figure 64 below, this is made up of the total transactions prior to and after the SSC transition. It is the:

'Total Initial Transactions' plus the 'New Transactions (Pre & SSC) added' less 'Transactions Leaving' the system.
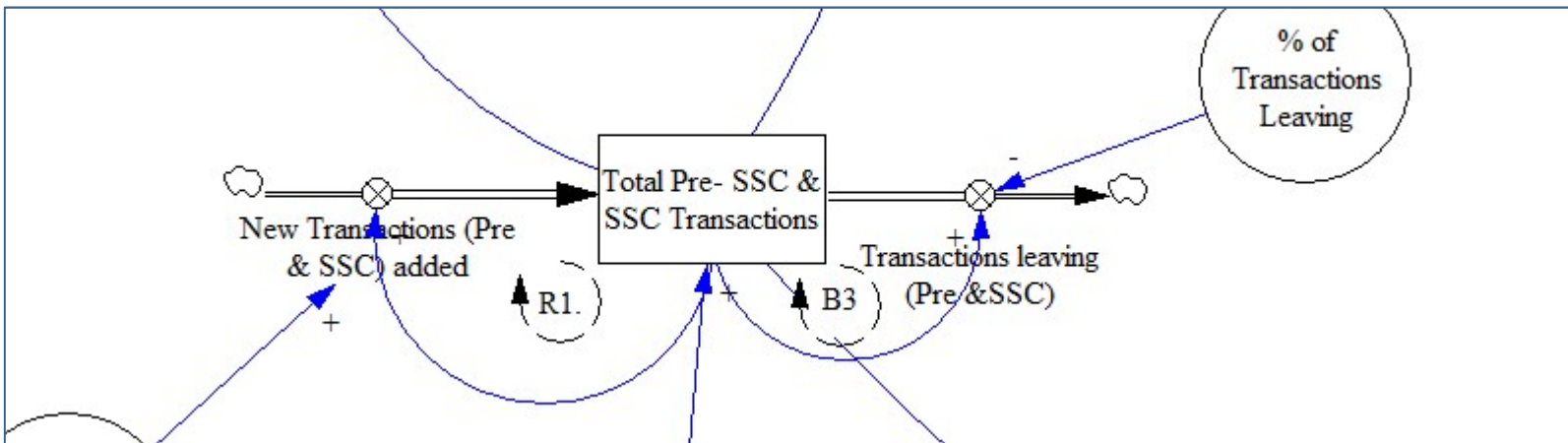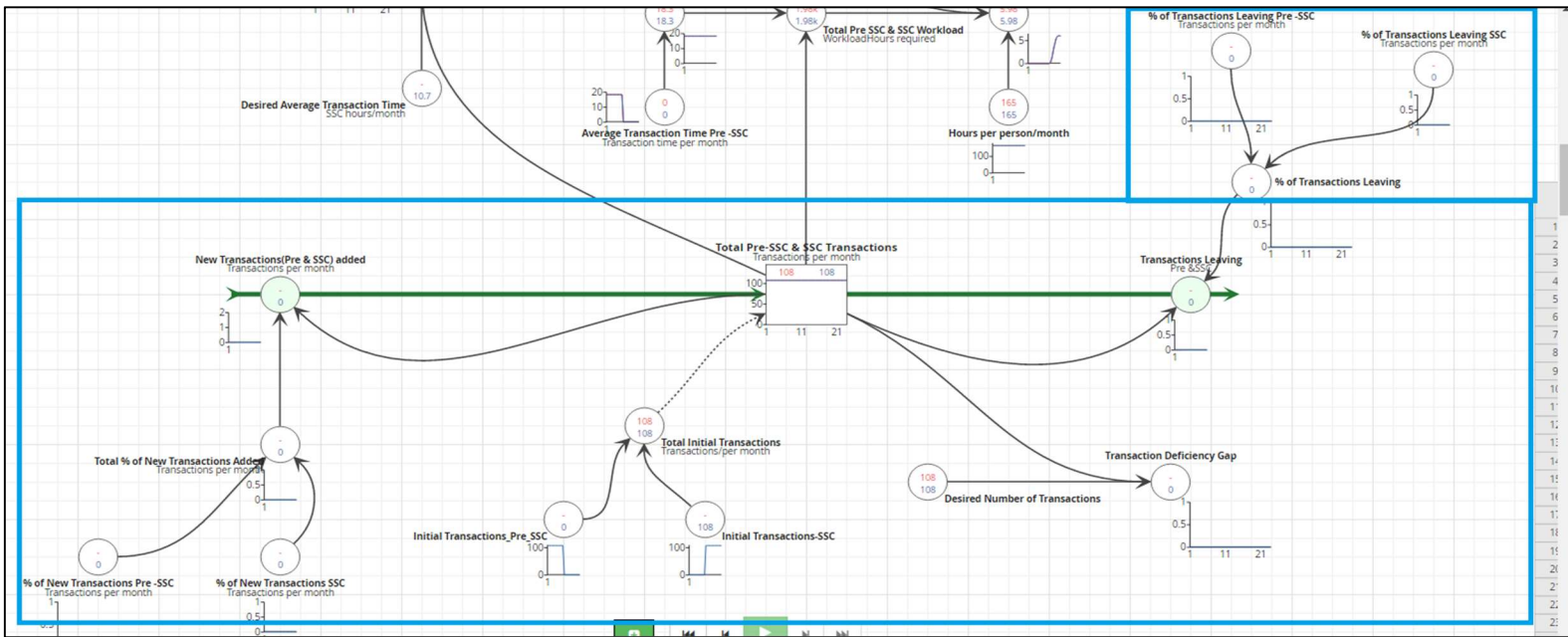
Figure 64 Total Pre-SSC & SSC Transactions and Identification of Key Feedback Loops

New Transactions (Pre & SSC) added

These are the transactions / activities that are taken over by the SSC both pre and post SSC establishment. This is influenced by the:

'Total Pre-SSC & SSC Transactions '* 'Total % of New Transactions Added'.

Total % of New Transactions Added

As shown in Figure 64, the Total % of New Transactions Added is made up of the 'Initial Transactions Pre_SSC' and the 'Initial Transactions-SSC' (which are the transactions / activities undertaken after the establishment of the SSC).

Transactions Leaving

As illustrated in Figure 65 below, these are the transactions / activities that leave the system. It is made up of the:

Total Pre-SSC & SSC Transactions *'% of Transactions Leaving'.

The '% of Transactions Leaving' the system is made up of '% of Transactions Leaving Pre – SSC' and % of Transactions Leaving SSC.
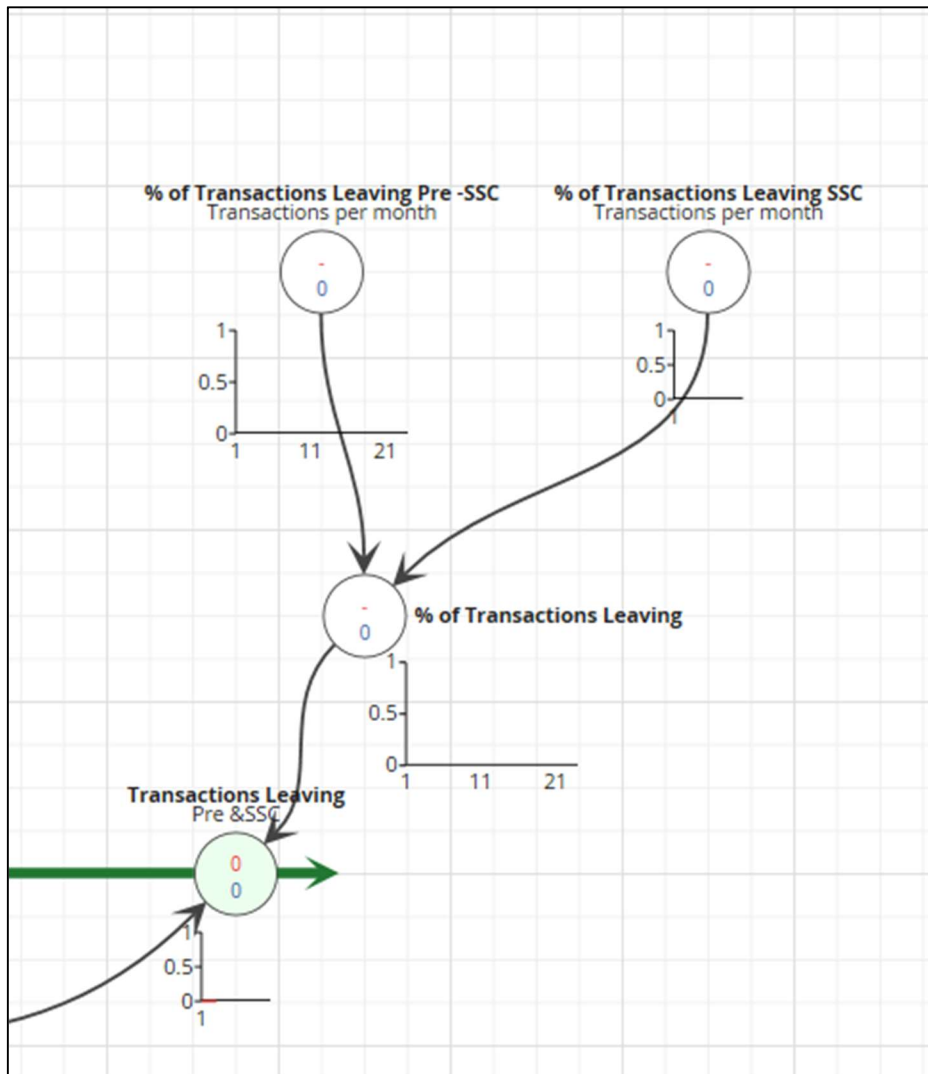
Figure 65 Transactions Leaving

Transaction Deficiency Gap

As shown in Figure 64, this is the Desired Number of Transactions **minus the** 'Total Pre-SSC & SSC Transactions'.

DATA COLLECTION (Reference model/Data)

The reference model / data is obtained from actual or estimated results of the company being analysed. Table 20 below shows the actual number of pre-transitioning activities / transactions taken over.

Table 20 Transactions/Activities Taken over

Department	Category	Total
Accounting	Accounts Payable	6
	Budgets	2
	Cash Application	6
	Cash Management	3
	Collections	3
	Corporate Reporting	10
	Dealer Funding	4
	General Ledger	19
	Payroll	6
	Regulatory	21
Accounting Total		**80**
Customer Services	Archiving	2
	Collections	1
	Contract Booking	4
	Customer Management	16
	Invoicing	3
	Post	2
Customer Services Total		**28**
Grand Total		**108**

Source: Compilation by author from various internal sources

MODEL BEHAVIOUR AND REFERENCE DATA

The model attempts to replicate the actual behaviour of the system.

SCENARIO SPECIFICATION

A sensitivity analysis is undertaken based upon the three (3) scenarios discussed in Figure 63. The aim of this was to use sensitivity analysis to investigate how these three scenarios impacted the 'Transactions Leaving', 'New Transactions added (Pre & SSC)', 'Total Pre-SSC & SSC Transactions' and the 'Transaction Deficiency Gap'.

EQUATIONS OF THE MODEL

The below equations were used in the base / reference model.

Equation 5 Total Pre-SSC & SSC Transactions

'Total Initial Transactions' plus 'Total Pre-SSC & SSC Transactions '*' Total % of New Transactions Added' (New Transactions added) less 'Total Pre-SSC & SSC Transactions '*'% of Transactions Leaving' (Transactions Leaving)

Equation 6 New Transactions (Pre & SSC) added

if 'Total % of New Transactions Added'<0 then (0*'Total Pre-SSC & SSC Transactions '*'Total % of New Transactions Added') else 'Total Pre-SSC & SSC Transactions '*'Total % of New Transactions Added'

Equation 7 Total % of New Transactions Added

if 'time'>=1 and 'time' <=12 then '% of New Transactions Pre -SSC' else'% of New Transactions SSC'

Equation 8 Transaction Deficiency Gap

'Desired Number of Transactions'-'Total Pre-SSC & SSC Transactions'

Equation 9 Transactions Leaving (Pre- and Post SSC)

'if '% of Transactions Leaving '<0 then (0*'Total Pre-SSC & SSC Transactions '*'% of Transactions Leaving ') else 'Total Pre-SSC & SSC Transactions '*'% of Transactions Leaving '

Data Analysis and Policy Formulation

The scenario specification and the main base models are analysed against the literature review, the reference / base data, the hypotheses and policy intervention tools are then developed.

3. **SSC Staff**

These are the required Shared Service Staff (SSC employees).

Figure 66 below shows the approach used in developing this and it is discussed in detail further below.
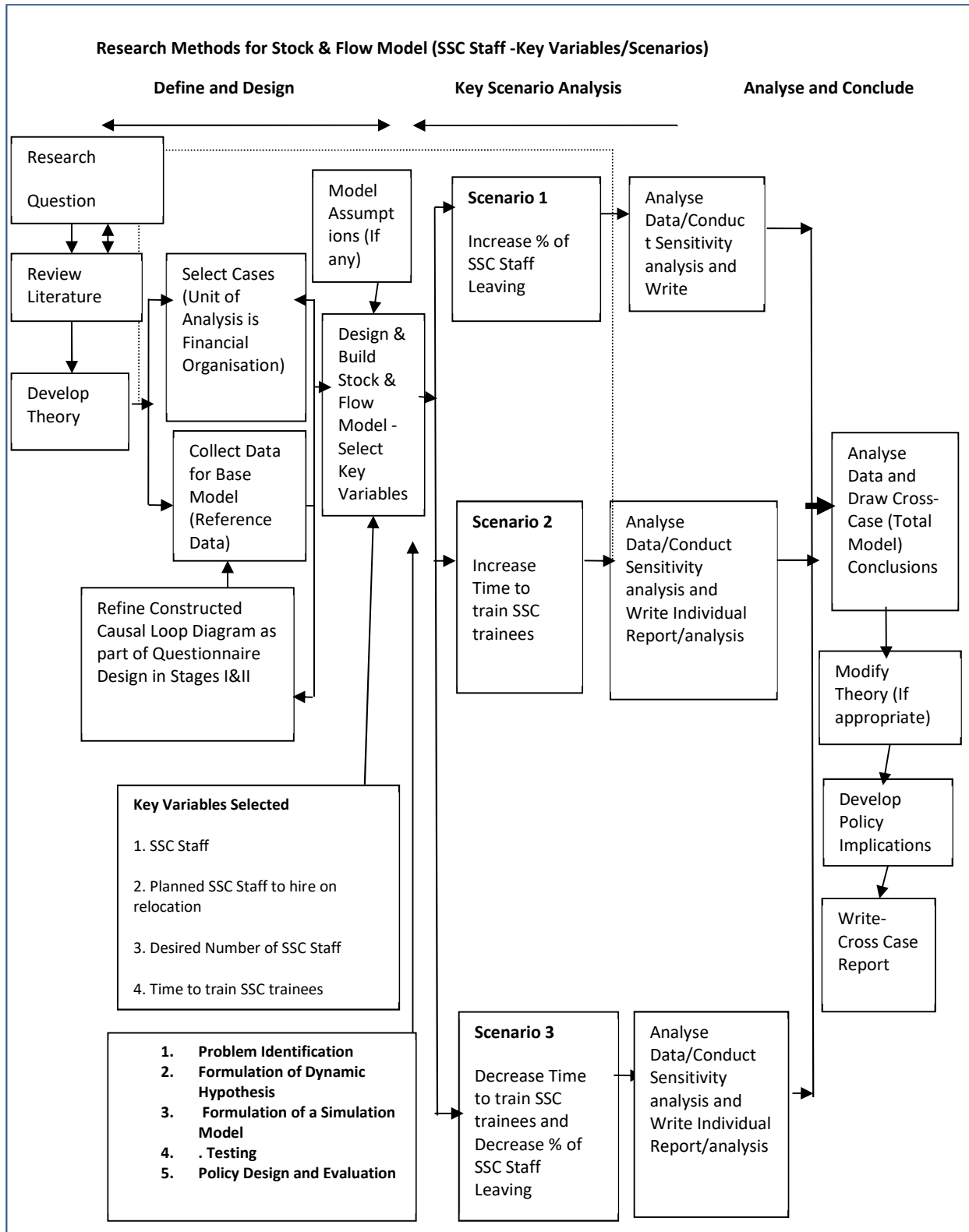
Figure 66 Research Methods for Stock & Flow Model (SSC Staff -Key Variables/Scenarios)

The SSC Staff is the optimum required staff that is required post SSC transitioning. These are the Staff that have been recruited or transitioned to the SSC. They consist of initial staff, trainees less those who have left for varying reasons such as work pressures etc. This is shown in Figure 67 (highlighted in blue).

SSC staff are recruited at the required planned stage and are expected to take over the activities of the SSC.

- **EXPLANATION OF KEY LOOPS IN THE SSC STAFF MODEL**

This is discussed in section 5.3 above under sub section (c), SSC Staff. The key loops (B4 and B5) in the SSC STAFF MODEL are shown in Figure 67 below. These are also shown in Appendix G.
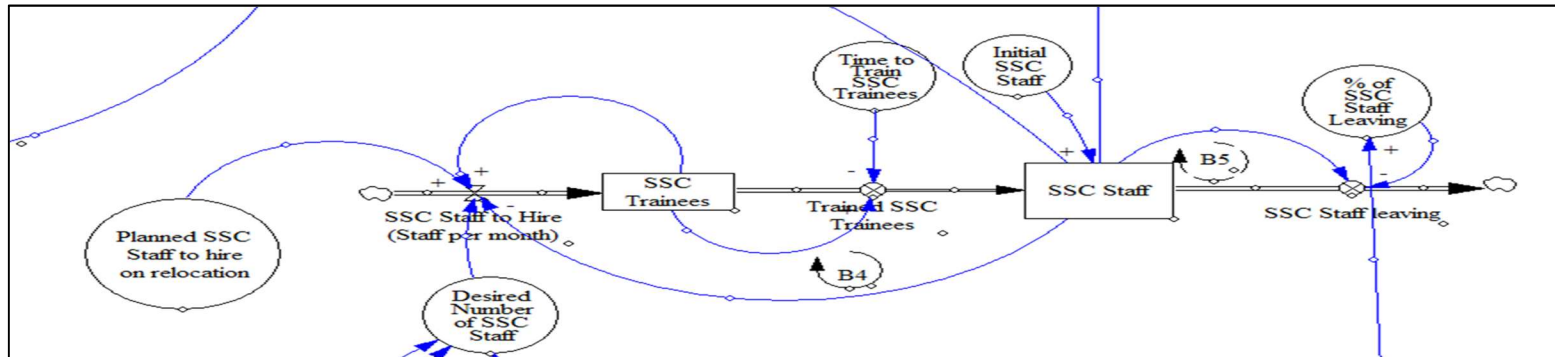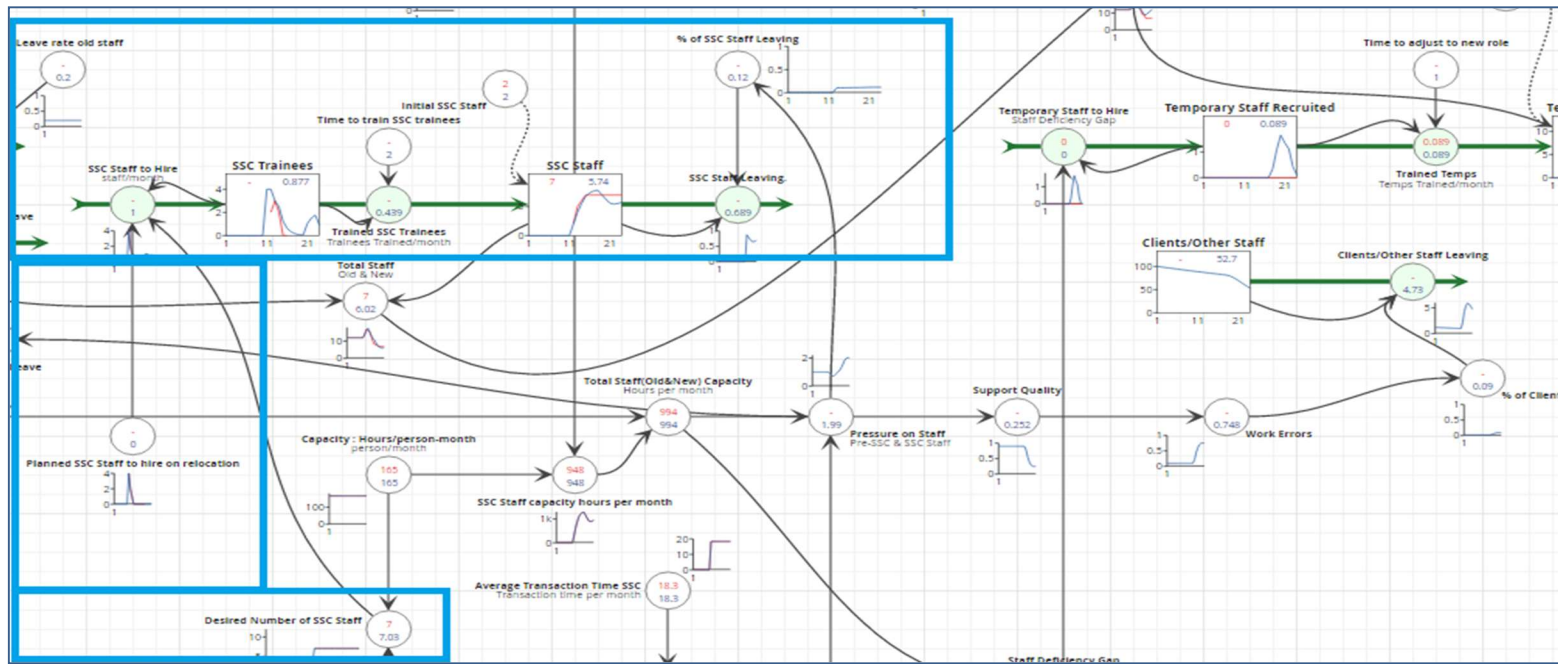
Figure 67 SSC Staff and Identification of Key Feedback Loops

Key (Main) variables

The key variables of this sub component are:

SSC Staff

This is the total number of trained SSC Staff at any time. This is made up of the initial SSC Staff (who may come from the pre-transition period) and the SSC Staff that have been trained and can perform the assigned tasks. It is a function of the initial SSC staff plus newly trained SSC staff less any SSC staff leaving the system.

Planned SSC Staff to hire on relocation

This is the number of planned staff to hire on relocation. This is different to the desired number of SSC Staff as during this stage the staffs are hired over a period of time. This will normally be done according to a staff hiring plan.

Desired Number of SSC Staff

This is the absolute number of staff required for the whole SSC project. It is made up of the 'Total Pre-SSC & SSC Transactions '* 'Desired Average Transaction Time') / 'Capacity: Hours/person-month '. In effect, the Total number of transactions times the Desired Average Transaction time which is then divided by the assumed capacity hours of the person per month.

Time to train SSC trainees

This is the time it takes to train the SSC staff. When SSC staff are recruited, as they are new, they need time to be trained and assimilated into the organisation. Their productivity is not at its optimum and therefore they need some training to reach this. Therefore, the time to train the SSC Staff is very critical in the design of the SSC.

SSC Staff Leaving

This is the SSC Staff that leaves the system. Unfortunately, as the company recruits new employees (SSC Staff), some current and old staff may decide to leave for various reasons. This has an impact on the total SSC Staff and affects the work productivity.

Total SSC Staff Costs (SGA costs)

The costs of the SSC also have an impact on the SSC productivity. Consequently, it is important to control the SSC costs. This is made up of the SSC Staff costs and the SSC overhead costs.

Assumptions of the model

The main assumptions of the model relate to the time to train new SSC staff (SSC trainees).

DATA COLLECTION (Reference model/Data)

The reference model / data is obtained from actual or estimated results of the company being analysed. The actual number of pre / post transitioning SSC staff during the period under discussion is shown in Table 21 below.

Table 21 SSC Staff

PERIOD	MONTH	Number of Staff
1	Oct-06	0
2	Nov-06	0
3	Dec-06	0
4	Jan-07	0
5	Feb-07	0
6	Mar-07	0
7	Apr-07	0
8	May-07	0
9	Jun-07	0
10	Jul-07	0
11	Aug-07	0
12	Sep-07	2
13	Oct-07	5
14	Nov-07	6
15	Dec-07	7
16	Jan-08	7
17	Feb-08	7
18	Mar-08	7
19	Apr-08	7
20	May-08	7
21	Jun-08	7
22	Jul-08	7
23	Aug-08	7
24	Sep-08	7

Source: Compilation by author from various internal sources

MODEL BEHAVIOUR AND REFERENCE DATA

The model attempts to replicate the actual behaviour of the system.

SCENARIO SPECIFICATION

A sensitivity analysis is undertaken based upon the three (3) scenarios outlined in Figure 66. The aim was to use sensitivity analysis to investigate how the three (3) scenarios impacted the SSC Staff, the Planned SSC Staff to hire on relocation, the Desired Number of SSC Staff, the SSC Staff Leaving, the Time to train SSC trainees and the Total SSC Staff Costs (SGA Costs).

EQUATIONS OF THE MODEL

The below equations were used in the base / reference model.

Equation 10 SSC Staff

This is the initial SSC Staff plus Trained SSC Trainees less the SSC Staff Leaving.

Equation 11 Planned SSC Staff to hire on relocation

This is based upon the hiring plan which is represented in the sketched model.

Planned SSC Staff to hire on relocation= 'sketch'

Equation 12 Desired Number of SSC Staff

The desired number of SSC Staff is the optimum number of staff that is required. Desired Number of SSC Staff = if 'time' >12 then ('Total Pre-SSC & SSC Transactions '*'Desired Average Transaction Time')/'Capacity: Hours/person-month 'else 0

Equation 13 Time to train SSC trainees

Time duration are in months. Time to train SSC trainees= 2

Equation 14 SSC Staff Leaving

The leave rate of SSC Staff is

SSC Staff Leaving= (if 'time' < 18 then 0 else max (0,'SSC Staff '*'% of SSC Staff Leaving'))

Equation 15 Total SSC Staff Costs

This is the total SSC Staff Costs.

Total SSC Staff Costs = 'SSC Staff Overhead Costs '+'Actual SSC Staff Costs'

Data Analysis and Policy Formulation

The scenario specification and the main base models are analysed against the literature review, the reference / base data, the hypotheses and policy intervention tools are then developed.

4. Temporary Staff

These are staff that are employed temporarily when there is a shortage of permanent staff or there is extra pressure on staff. Figure 68 below shows the approach used in developing this and is discussed in detail below.

Research Methodology for Stock & Flow Model (Temporary Staff)

Define and Design   Key Scenario Analysis   Analyse and Conclude

Research Question				

Select Cases (Unit of Analysis is Financial Organisation)

Model Assumptions (If any)

Review Literature

Develop Theory

Design & Build Stock & Flow Model (Select Key Variables)

Collect Data for Base Model (Reference Data)

Refine Constructed Causal Loop Diagram as part of Questionnaire Design in Stages I&II

Scenario 1

Increase % of Temporary Staff Leaving

Analyse Data/Conduct Sensitivity analysis and Write Individual Report/analysis

Scenario 2

Increase Time to adjust to new role

Analyse Data/Conduct Sensitivity analysis and Write Individual Report/analysis

Analyse Data and Draw Cross-Case (Total Model) Conclusions

Modify Theory (If appropriate)

Develop Policy Implications

Write-Cross Case Report

Key Variables Selected

1. **Temporary Staff**
2. **Time to adjust to new role**
3. **Temporary Staff Leaving**
4. **Staff Deficiency Gap**
5. **Temporary Staff Costs (SGA)**

1. **Problem Identification**
2. **Formulation of Dynamic Hypothesis**
3. **Formulation of a Simulation Model**
4. **Testing**
5. **Policy Design and Evaluation**

Scenario 3

Decrease Time to adjust to new role and Decrease % of Temporary Staff Leaving

Analyse Data/Conduct Sensitivity analysis and Write Individual Report/analysis

Figure 68 Research Methodology for Stock & Flow Model (Temporary Staff)

Figure 69 below shows the temporary staff model (highlighted in blue below).

- **EXPLANATION OF KEY LOOPS IN THE SSC TEMPORARY STAFF MODEL**

This is discussed in section 5.3 above under sub section (d), Temporary Staff. Figure 69 below depicts the SSC Temporary Staff Model and the key loops (R2 and B6). The model is also shown in Appendix G.
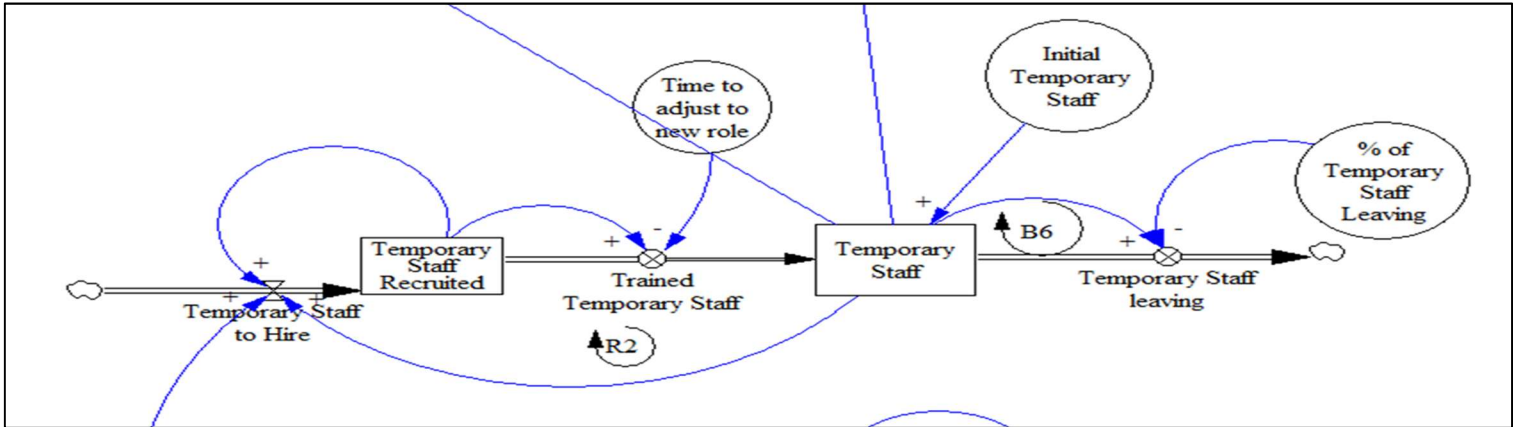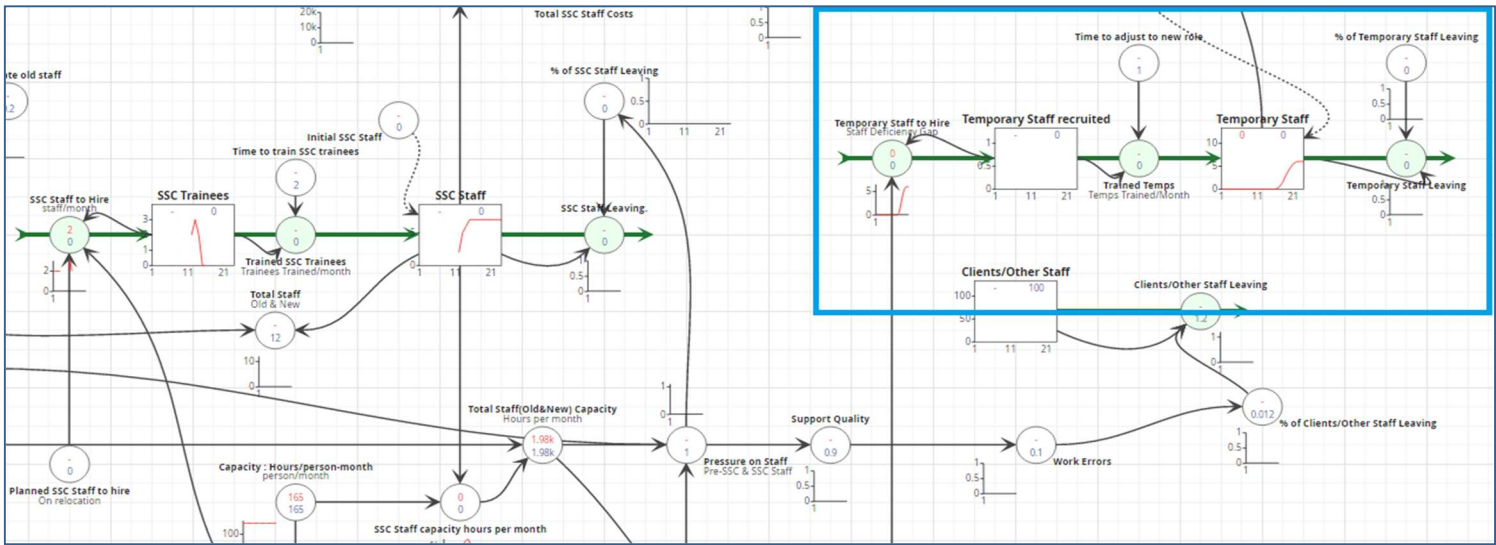
Figure 69Temporary Staff and Identification of Key Feedback Loops

Main Variables

The key variables are:

Temporary Staff

Temporary Staff is the total number of temporary staff that have been employed mainly as a result of the shortage of staff.

Time to adjust to new role

This is the time that is needed to train Temporary Staff or for Temporary Staff to be able to adjust to the new role. It is expected that Temporary Staff will need a shorter training period to adjust to the role.

Temporary Staff Leaving

This shows the leave rate of the Temporary Staff. If more temporary staff are leaving or entering the system, this influences the SSC Staff rate and also the total SGA costs.

Staff Deficiency Gap

This shows the difference between total workload and the total capacity of SSC and Old Staff which gives the workload deficiency. The result of this is divided by hours/person to work out the number of temporary staff needed.

Temporary Staff Costs (SGA)

This is the total monetary costs of hiring the Temporary Staff.

Assumptions of the model

See assumptions under main model discussed earlier in this chapter.

DATA COLLECTION (Reference model / Data)

The reference model / data is obtained from actual / estimated results of the company being analysed in question. Table 22 below shows the actual headcount of temporary staff during the transitioning phase of the SSC.

Table 22 Number of Temporary Staff

Period	Number of Temporary Staff
Oct-06	0
Nov-06	0
Dec-06	0
Jan-07	0
Feb-07	0
Mar-07	0
Apr-07	0
May-07	0
Jun-07	0
Jul-07	0
Aug-07	3
Sep-07	3
Oct-07	3
Nov-07	3
Dec-07	3
Jan-08	3
Feb-08	2
Mar-08	1
Apr-08	1
May-08	0
Jun-08	0
Jul-08	0
Aug-08	0
Sep-08	0

Source: Compilation by author from various internal sources

MODEL BEHAVIOUR AND REFERENCE DATA

The model attempts to replicate the actual behaviour of the system.

SCENARIO SPECIFICATION

A sensitivity analysis is undertaken based upon the three (3) scenarios outlined in Figure 68. The aim of this was to use sensitivity analysis to investigate how the three scenarios impacted on Temporary Staff, Time to adjust to new role, the % of Temporary Staff Leaving, Staff Deficiency Gap, and the Temporary Staff Costs (SGA).

EQUATIONS OF THE MODEL

The below equations were used in the base / reference model.

Equation 16 Temporary Staff

Temporary Staff = 'Initial Temporary Staff '+ Trained Temps less Temporary Staff Leaving

Temporary Staff to hire= if ('Staff Deficiency Gap'-('Temporary Staff '+'Temporary Staff recruited')) <0 then 0 else ('Staff Deficiency Gap'- ('Temporary Staff '+'Temporary Staff recruited'))

Equation 17 Trained Temps

Time to adjust to new role = 1 month

Trained Temps= 'Temporary Staff recruited'/'Time to adjust to new role'

Equation 18 Temporary Staff Leaving

Temporary Staff Leaving= 'Temporary Staff '*'% of Temporary Staff Leaving'

Equation 19 Staff Deficiency Gap

Staff Deficiency Gap= if ((('Total Pre SSC & SSC Workload'-('Total Staff (Old&New) Capacity'))/'Hours per person/month') <0 then 0 else (('Total Pre SSC & SSC Workload'-'Total Staff (Old&New) Capacity'))/'Hours per person/month'

Equation 20 Temporary Staff Costs

Temporary Staff Costs= 'Average Temporary Staff Costs'*'Temporary Staff'

Data Analysis and Policy Formulation

The scenario specification and the main base models are analysed against the literature review, the reference / base data, the hypotheses and policy intervention tools are then developed.

5. Customer / Service Effect

This measures the staff pressure, effect on work and the effect on customers.

The Customer / Service Effect consists of the following variables: Pressure on SSC Staff, Support Quality, Work errors, Clients/Other Staff.

Figure 70 below shows the approach used in developing this. This is also discussed in detail below.

Research Method for Stock & Flow Model (Customer/Service Effect)

Define and Design   Key Scenario Analysis   Analyse and Conclude

Research Question

Review Literature

Develop Theory

Select Cases (Unit of Analysis is Financial Organisation)

Collect Data for Base Model (Reference Data)

Refine Constructed Causal Loop Diagram as part of Questionnaire Design in Stages I&II

Model Assumptions (If any)

Design & Build Stock & Flow Model (Select Key Variables)

Key Variables Selected

1. Pressure on SSC Staff (Pre SSC & Post SSC)
2. Support Quality
3. Work Errors
4. Clients/Other Staff

1. Problem Identification
2. Formulation of Dynamic Hypothesis
3. Formulation of a Simulation Model
4. Testing
5. Policy Design and Evaluation

Scenario 1

Increase % of Clients/Other Staff Leavin

Analyse Data/Conduct Sensitivity analysis and Write Individual Report/analysis

Scenario 2

Increase Pressure on Staff

Analyse Data/Conduct Sensitivity analysis and Write Individual Report/analysis

Scenario 3

Decrease % of Clients/Other Staff Leavin and Decrease Pressure on Staff

Analyse Data/Conduct Sensitivity analysis and Write Individual Report/analysis

Analyse Data and Draw Cross-Case (Total Model) Conclusions

Modify Theory (If appropriate)

Develop Policy Implications

Write- Cross Case Report

Figure 70 Research Method for Stock & Flow Model (Customer/Service Effect)

- **EXPLANATION OF KEY LOOPS IN THE CUSTOMER/SERVICE EFFECT MODEL**

This is discussed in section 5.3 above under sub section (e), Clients /Other Staff (Customer Service Effect). Figure 71 depicts the key loop (B7). This is also shown in Appendix G.

Key Variables

The below are the main variables used in this part of the model.

Pressure on SSC Staff (Pre SSC & SSC)

This is the pressure that the SSC Staff (both old and new) face as compared to the available workload. It is the Total SSC workload divided by the Total Staff (Old & New Capacity. A higher workload will imply a number greater than one and will increase pressure on the available staff.

Support Quality

This is created because of the pressure on staff. The higher the pressure on staff, the lower support quality that it becomes.

Work Errors

These are the errors created as a result of the pressure on staff and support quality. The lower the support quality, the higher the errors created.

Clients / Other Staff

The error rate affects the level of support staff or clients remaining.

The model is shown in Figure 71 below.
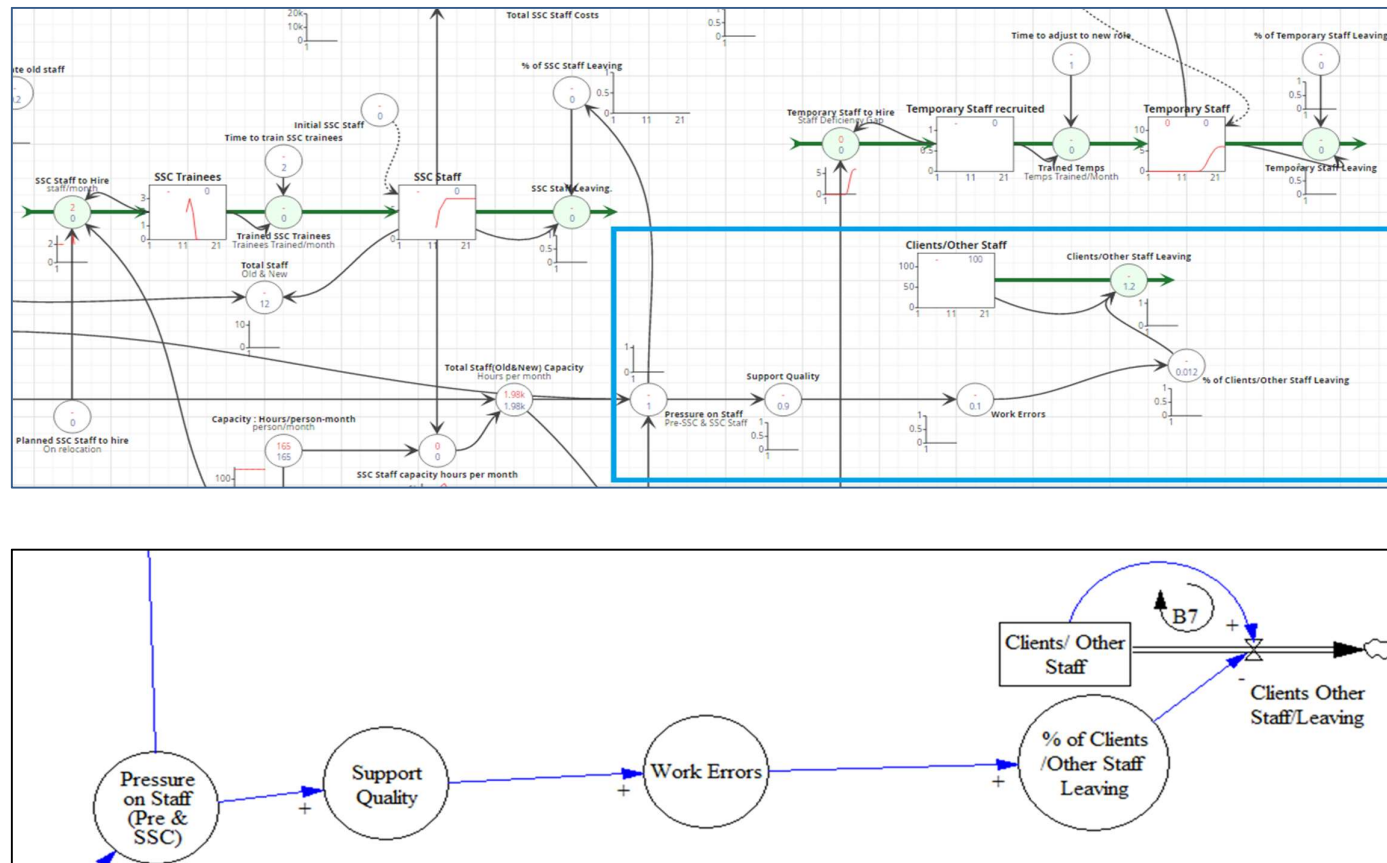
Figure 71 Customer/Service Effect and Identification of Key Feedback Loops

Model Assumptions

Pressure on SSC Staff (Pre SSC & SSC). The optimum level for this is one (1). If the value is above one (1), then it means that the pressure on staff has increased and if below one (1), there is less pressure on staff.

Support Quality

Support Quality is set at the minimum of (0.9, 1/'Pressure on Staff'^2). The higher the pressure on staff the lower the support quality and vice versa.

Work Errors

Work Errors is set to (1-'Support Quality'). The higher the support quality, the lower the work errors and vice versa.

SCENARIO SPECIFICATION

A sensitivity analysis is undertaken based upon the three (3) scenarios outlined in Figure 70. The aim of this was to use sensitivity analysis to investigate how the three scenarios impacted on Pressure on Staff, Work Errors, Support Quality and Clients/Other Staff.

EQUATIONS OF THE MODEL

Equation 21 PRESSURE ON SSC STAFF

PRESSURE ON SSC STAFF (PRE SSC & SSC) = 'Total Pre SSC & SSC Workload'/'Total Staff(Old&New) Capacity 'Support Quality

Equation 22 Work Errors

Work Errors = (1-'Support Quality')

Equation 23 Support Quality

Support Quality= min (0.9, 1/'Pressure on Staff'^2)

Equation 24 Clients/Other Staff

Clients/Other Staff =0.12*'Work Errors'

Data Analysis and Policy Formulation

The scenario specification and the main base models are analysed against the literature review, the reference / base data, the hypotheses and policy intervention tools are then developed.

6. **Workload / (Work Capacity) Pre & Post SSC**

This shows the workload that is required or available.

It is a function of the:

- Total Pre-SSC & SSC Transactions multiplied by the
- Average Transaction Time

This is explained further in Appendix H.

7. **Sales General and Administrative Expenses (SGA costs)**

This represents the sum of all 'costs' of the SSC (i.e. old and new staff, overhead costs and temporary staff costs). Figure 72 below shows the approach used in developing this. It is further discussed in more detail below.

Research Method for Stock & Flow Model (Sales General and Administrative

Define and Design   Key Scenario Analysis   Analyse and Conclude

Research Question

Review Literature

Develop Theory

Select Cases (Unit of Analysis is Financial Organisation)

Collect Data for Base Model (Reference Data)

Refine Constructed Causal Loop Diagram as part of Questionnaire Design in Stages I&II

Model Assumptions (If any)

Design & Build Stock & Flow Model (Select Key Variables)

Scenario 1

Increase Desired Number of Staff

Analyse Data/Conduct Sensitivity analysis and Write Individual Report/analysis

Scenario 2

Increase Time to train SSC Trainees

Analyse Data/Conduct Sensitivity analysis and Write Individual Report/analysis

Analyse Data and Draw Cross-Case (Total Model) Conclusions

Modify Theory (If appropriate)

Develop Policy Implications

Write-Cross Case Report

Scenario 3

Decrease Time to train SSC Trainees and Decrease Desired Number of SSC Staff

Analyse Data/Conduct Sensitivity analysis and Write Individual Report/analysis

Key Variables Selected

1. Total Actual SGA Costs (All SSC plus Old and Temporary Staff Costs)
2. Total SSC Staff Costs (All SSC Staff costs)
3. Temporary Staff Costs (All Temporary Staff Costs)
4. Total Old Staff Costs (All Old Staff Costs)

1. Problem Identification
2. Formulation of Dynamic Hypothesis
3. Formulation of a Simulation Model
4. Testing
5. 5. Policy Design and Evaluation

Figure 72 Research Method for Stock & Flow Model (Sales General and Administrative Expenses)

- **Sales General and Administrative Expenses (SGA costs)**

This is the total 'costs' of all Pre-SSC Staff, SSC Staff, Temporary Staff and overhead costs. Figure 73 below depicts how it was constructed in the model.
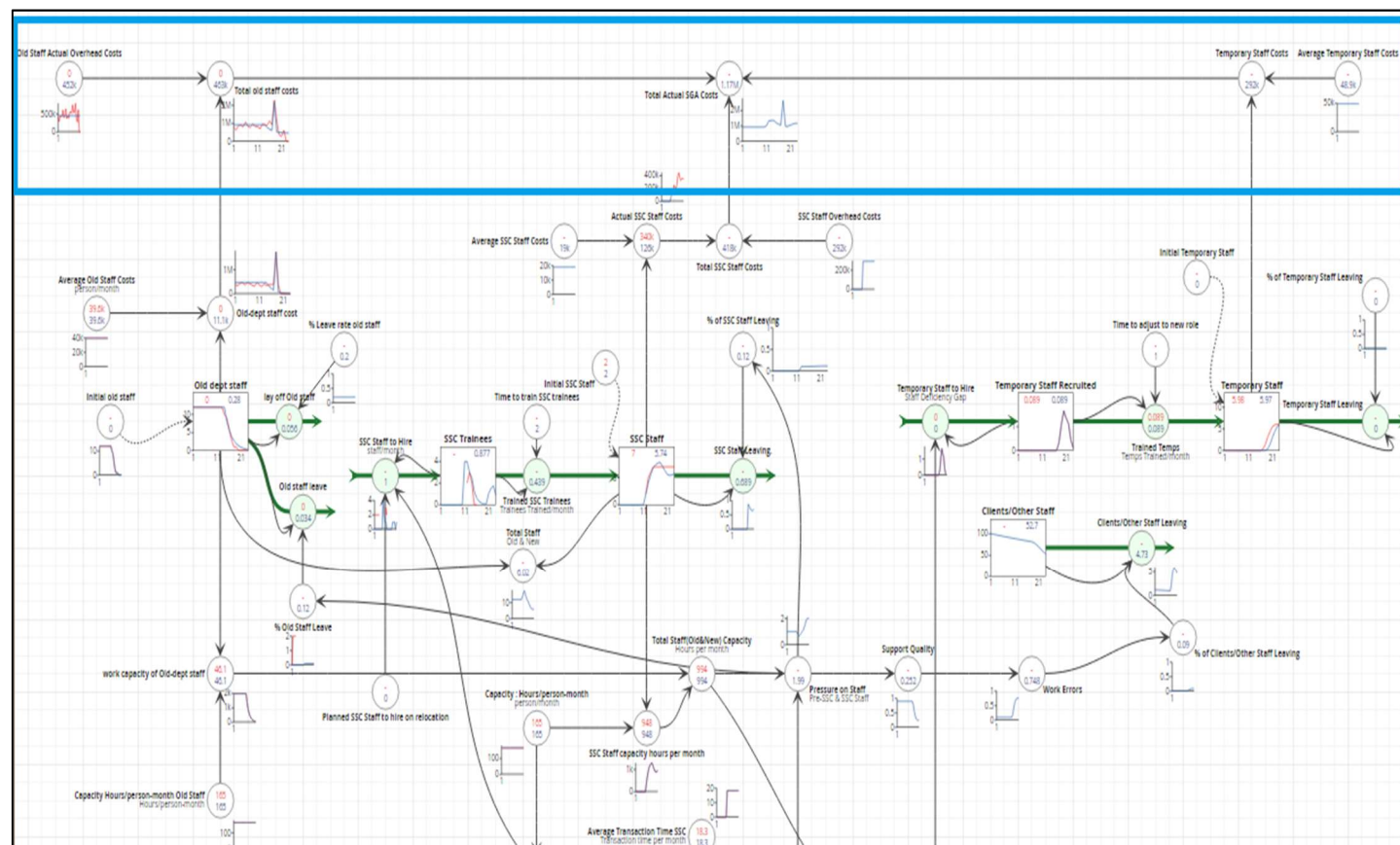
Figure 73   Sales General and Administrative Expenses (SGA costs)

Key (Main) variables

The key (main) variables are:

Total Actual SGA Costs

Total Actual SGA Costs is the total monetary costs associated with all the Temporary Staff, SSC Staff and the Old Staff (Pre-SSC staff).

Total SSC Staff Costs

Total SSC Staff Costs is the total monetary costs associated with the SSC Staff.

Temporary Staff Costs

Temporary Staff Costs is the total monetary costs of hiring the Temporary Staff.

Total Old Staff Costs

Total Old Staff Costs is the total monetary costs associated with the old Staff (pre SSC staff).

Key Assumptions of the model

The average staff costs, for the temporary, pre SSC Staff and the current SSC staff were used.

DATA COLLECTION (Reference model/Data)

The reference model / data is obtained from actual results of the company being analysed in question. The actual costs, for the old staff (Pre-SSC) and the new staff were obtained from the organisation.

MODEL BEHAVIOUR AND REFERENCE DATA

The model attempts to replicate the actual behaviour of the system.

SCENARIO SPECIFICATION

A sensitivity analysis is undertaken based upon the three (3) scenarios outlined in Figure 72. This was done based upon the scenario analysis of the other key variables Temporary Staff, SSC Staff, Pre-SSC Staff and also the Total SSC model.

EQUATIONS OF THE MODEL

The below equations were used in the base / reference model.

Equation 25 Temporary Staff Costs

Temporary Staff Costs = 'Average Temporary Staff Costs'*'Temporary Staff'

Equation 26 Total SSC Staff Costs

"SSC Staff Overhead Costs"+"Actual SSC Staff Costs"

Equation 27 Total Old Staff Costs

Total Old Staff Costs= 'Old-dept. staff cost '+'Old Staff Actual Overhead Costs'

Equation 28 Total Actual SGA Costs

Total Actual SGA Costs= 'Temporary Staff Costs '+'Total SSC Staff Costs '+'Total old staff costs'

Data Analysis and Policy Formulation

The scenario specification and the main base models are analysed against the literature review, the reference / base data, the hypotheses and policy intervention tools are then developed.

5.6 **Conclusion**

This Chapter has identified the key variables from literature search and personal experience; it has described how the initial Causal Loop Diagram has been built; how feedback was obtained and used to build the revised Causal Loop Diagram. In addition, it has described how agreement was obtained that this is reasonable and accurate as it relates to the current SSC under review and finally, described how the stock and flow diagram and model was built based upon the revised Causal Loop Diagram.

The next Chapter discusses the verification and analysis of the research results.

6   Chapter Six Verification Analysis and results

This Chapter starts with the verification of the model using feedback. The Chapter provides a summary and analysis of all respondents in stages one and two of the research process. The model is then abductively verified / validated using Pierce's (1865-1965) work on abduction. Four Scenarios of the model are developed, analysed and discussed. The Chapter concludes by discussing the model's relationship to the Implementation process.

The Chapter is organised as follows:

6.1   Feedback (Verification).

6.2   Abduction (Abducing the Model).

6.3   Four Scenarios.

6.4   Relationship to The Implementation Process.

6.1 Feuerdback (Verification)[21]

6.1.1 Summary of Response for All Three Respondents in Stage One

The purpose of this analysis is to provide an overall analysis and summary of the responses received from the three (3) respondents in the pilot survey (Stage One).

Regarding Objective One of the research; the three respondents identified the below.

Critical Success factors: Majority of respondents identified the following as factors that influenced the design of the SSC: Organisational / Other Strategy, Support from Senior Executives and Effective Project Execution.

Impact of factors on cost of SSC: Respondents identified at least one of Human Resources, Good Infrastructure and Project Management as factors that impact on the cost of an SSC.

Impact of factors on design of SSC: Respondents identified at least one of the SSC variables such as Infrastructure, Human Resources, Project Management, Costs/Benefits, Effective SSC Design and Build as having an impact on the design of the SSC and vice versa.

Impact of strategy design on variables / factors: Respondents identified at least one of the SSC variables / factors such as Human Resources, Infrastructure, Effective SSC Design and Project Management.

Impact of variables on strategy design: Respondents identified at least one of Human Resources, Effective SSC Design / Build and Infrastructure as having an impact on the initial SSC Strategy Design in the establishment of the SSC.

Impact of strategy design on other variables / factors: Respondents identified that the initial SSC Strategy Design had an impact on one or more of the factors in establishing the SSC such as Costs, Effective Organisation and Benefits.

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[21] See also Appendix I for further feedback analysis and verification

Impact of other variables / factors on strategy design: Respondents mainly identified that SSC Costs, Company Vision and Effective Organisation had an impact on the initial SSC Strategy Design in the establishment of the SSC.

This supports the initial argument relating to the interconnectivity (cause / effect relationship) of the variables as identified by this researcher in the CLD model.

In addition, this supports the variables identified that impact on the design and build of an SSC by writers such as (Fahy, Curry and Cacciaguidi-Fahy, 2002; Grant, 2005; BearingPoint, 2007; PWC, 2011; PWC, 2012; Miskon et al., 2011). It must be noted that in their models the cause and effect relationships are not clearly depicted.

Regarding Objective Two of the research; the three respondents identified the below.

All Respondents had never used an SD model in any of their SSC design approaches. The main tool used was a 6Sigma project methodology. This goes to buttress the point that there is a scarcity of data relating to SSCs as espoused by Janssen and Joha (2006); and that SD has not been used in the design of the SSC. Furthermore, all respondents agreed that the 6 Sigma tool used was beneficial.

Regarding Objective Three of the research; respondents largely agreed with the variables selected in the CLD. This confirmed the argument in this research that it is important to understand the linkages between the variables and the system as a whole. Furthermore, this to a larger extent supports the arguments regarding understanding the linkages between or amongst the variables within the system (e.g., Porter, 1985; Sterman, 2000; Sherwood, 2002). Feedback from respondents regarding the causal loop diagram shows that there is an interconnection between / amongst the various SSC phases/stages. For example, the announcement of the setting up of the SSC led various experienced staff to leave the company before a replacement was found. This would have been done in phase three of the SSC transition as advocated by PWC (2011) and Deloitte (2011); which was too late as the

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business suffered and more temporary staff had to be recruited, which then increased costs further, in addition to the loss of vital knowledge for the organisation. The causal loop diagram that was designed clearly showed the feedback between / amongst the various variables and this would have helped to minimise this type of risk.

Regarding Objective Four of the research; the following reasons / motives were established by respondents as the basis for the establishment of an SSC: these are political, strategic organisational, and economic. Information Technology (IT) was not a factor / motive in the establishment of the SSC.

Furthermore, the savings achieved for economic, political, strategic and organisational goals were somewhat mixed although all respondents agreed that some level of savings had been achieved. In effect, from the respondents' perspective not all savings target(s) had been achieved.

However, in terms of achieving the initial motives it appears most of the motives were achieved. Despite this, most respondents emphasised that 'cost' was an essential factor. This is in accordance with the findings regarding the motives for establishing the SSC (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Janssen and Joha, 2006; Deloitte, 2005; 2011; PWC, 2011; PWC, 2012; Tammel, 2017).

Regarding Objective Five of the research; respondents identified the following:

Phase I (Opportunity Assessment Stage): Majority of respondents claimed that this phase lasted between six to eight (6 to 8) months; 71 percent or more of the duration was achieved on time and less than 20 percent to 70 percent of the planned savings were achieved.

Management Review: Majority of respondents claimed that this phase lasted less than three (3) months; 71 percent or more of the duration was achieved on time and less than 21 percent to 70 percent of the planned savings were achieved.

Phase II (Design and pilot project): Respondents mainly claimed that this phase lasted between a minimum of six (6) months to more than twelve (12) months; 71 percent or more of the duration was achieved on time and 21 percent to 50 percent of the planned savings were achieved.

Phase III (Implementations and Rollout): Respondents mainly claimed that this phase lasted between a minimum of less than three (3) months to more than twelve (12) months; 51 percent to 70 percent of the duration was achieved on time and 51 percent to 70 percent of the planned savings were achieved on time.

Phase IV (Optimisation): Majority of respondents claimed that this phase lasted six to eight (6 to 8) months; a minimum of 21 percent to more than 71 percent of the duration was achieved on time and 21 percent to 50 percent of the planned savings were achieved.

Given that the main activities that were moved into the SSC were finance functions, the savings achieved were somewhat mixed, ranging from less than 20 percent to more than 71 percent. PWC (2011) asserts that the savings potential for a finance function would be 30 percent to 50 percent of targeted costs. Although there were savings made the results appears to be at variance with PWC's (2011) stance. We can therefore say that although there were savings the results are inconclusive. Furthermore, the responses of the experts did mainly validate the questionnaire that was sent out. The opportunity assessment stage took six to eight (6 to 8) months, and this is not in consonance with the PWC (2011) model. It is noted that the design and pilot stage took six to eight (6 to 8) months. This is similar to PWC's (2011) assertion that this stage takes six to eight (6 to 8) months.

6.1.2 **Summary of Response for All Three Respondents in Stage Two**

The purpose of this analysis is to provide an overall analysis and summary of the responses received from the three (3) respondents in Stage Two of the survey.

Regarding Objective One of the research; the respondents identified the below.

Critical Success factors: Majority of stage two respondents identified the following as the main factors that influenced the design of the SSC; these are: Organisational Strategy and Effective Project Execution. In addition, to the factors identified, stage one respondents also identified Support from Senior Executives.

Impact of factors on cost of SSC: Majority of stage two respondents identified all factors listed such as Human Resources, Good Infrastructure and Project Management as factors that impact on the cost of an SSC. Stage One respondents identified at least one of the factors.

Impact of factors on design of SSC: All of the stage two respondents identified all factors listed. Respondents claimed that the SSC variables / factors such as Infrastructure, Human Resources, Project Management, Costs/Benefits, Effective SSC Design and Build had an impact on the design of the SSC and vice versa. Stage one respondents identified at least one of the factors.

Impact of strategy design on variables / factors: All of the stage two respondents identified all factors listed. Respondents claimed that the SSC Strategy Design impacted on the SSC variables / factors such as Human Resources, Infrastructure, Effective SSC Design and Project Management. Stage one respondents identified at least one of the factors.

Impact of variables on strategy design: Majority of the stage two respondents identified all factors listed. Respondents claimed that Human Resources, Effective SSC Design and Build and Infrastructure had an impact on the initial SSC Strategy Design in the establishment of the SSC. Stage one respondents identified at least one of the factors.

Impact of strategy design on other variables / factors: All of the stage two respondents identified all the factors listed. Respondents claimed that the initial SSC Strategy Design had

an impact on one or more of the factors in establishing the SSC such as Costs, Effective Organisation, and Benefits. Stage one respondents identified at least one of the factors.

Impact of other variables / factors on strategy design: All of the stage two respondents and majority of stage one respondents identified all the factors listed. Respondents claimed that SSC Costs, Company Vision and Effective Organisation had an impact on the initial SSC Strategy Design in the establishment of the SSC. This supports the initial argument relating to the interconnectivity (cause / effect relationship) of the variables as identified by this researcher in the CLD model.

In addition, this supports the variables identified that impact on the design and build of an SSC by writers such as (Fahy, Curry and Cacciaguidi-Fahy, 2002; Grant, 2005; BearingPoint, 2007; Miskon et al., 2011; PWC, 2011). However, it must be observed that in their models the cause and effect relationships are not clearly depicted.

Regarding Objective Two of the research; similar to the respondents in stage one, all stage two respondents had never used an SD model in any of their SSC design approaches. The main tool used was a 6Sigma project methodology. This goes to buttress the point that SD has not been used in the design of the SSC and that there is a scarcity of data relating to SSCs (Janssen and Joha, 2006). Furthermore, all respondents agreed that the 6Sigma tool used was beneficial.

Regarding Objective Three of the research; similar to the respondents in stage one, majority of the stage two respondents largely agreed with the variables selected in the CLD. This confirmed the argument in this research that it is important to understand the linkages between the variables and the system as a whole. Furthermore, this supports the arguments regarding understanding the inter-connectivity between or amongst the variables within the system (e.g., Porter, 1985; Sterman, 2000; Sherwood, 2002).

Feedback from respondents regarding the causal loop diagram shows that there is an interconnection between / amongst the various SSC stages. However, feedback from

respondent five, the ultimate consumer, was not in support of the SSC Transition process. For example, the announcement of the setting up of the SSC led various experienced staff to leave the company before a replacement was found.

Regarding Objective Four of the research; similar to the respondents in stage one, majority of the stage two respondents identified the following reasons / motives as the basis for the establishment of an SSC; these were: political, strategic, organisational and economic. Information Technology (IT) was not a major factor / motive in the establishment of the SSC. Furthermore, the savings achieved for economic, political, strategic and organisational goals were somewhat mixed although all respondents agreed that some form of savings had been achieved. However, in terms of achieving the initial motives it appears most of the motives were achieved. This is in accordance with the findings regarding the motives for establishing the SSC (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Deloitte, 2005; 2011; Janssen and Joha, 2006; Miskon et al., 2011; PWC, 2011; PWC, 2012).

Regarding Objective Five of the research; majority of the stage two respondents identified the following:

Phase I (Opportunity Assessment Stage): Majority of the stage two respondents claimed that this phase lasted less than three (3) months (6-8 months for stage one); at least 51 percent to 71 percent or more of the duration was achieved (71 percent or more for stage one respondents) on time and 21 percent to 50 percent (less than 20 percent to 70 percent for stage one respondents) of the planned savings were achieved. It is important to note that, this was not applicable to respondent five.

Management Review: Majority of the stage two respondents claimed that this phase lasted less than three (3) months (less than 3 months for stage one respondents). More than 71 percent (similar to stage one respondents) of the duration was achieved on time and 21 percent to 50 percent (less than 20 percent to 70 percent for stage one respondents) of the planned savings were achieved.

Phase II (Design and pilot project): Majority of stage two respondents claimed that this phase lasted less than three (3) months (6 to more than 12 months for stage one respondents). 71 percent or more (similar to stage one respondents) of the duration was achieved on time and 21 percent to 50 percent (similar to stage one) of the planned savings were achieved.

Phase III (Implementations and Rollout): Majority of stage two respondents claimed that this phase lasted (six to eight) 6-8 months (less than 3 months to more than 12 months for stage one respondents). For the duration achieved on time, 51 percent to over 71 percent (51 percent to 70 percent for stage one respondents) of the duration was achieved on time and less than 20 percent to 70 percent (51 percent to 70 percent) of the planned savings were achieved on time. It is important to note that, this was answered not applicable by respondent five.

Phase IV (Optimisation): Majority of the stage two respondents claimed that this phase lasted 6-8 months (6-8 months for stage one respondents). For the duration achieved on time, 51 percent to 70 percent (21 percent to more than 71 percent for stage one) of the duration was achieved on time and up to 70 percent (21 percent to 50 percent for stage one respondents) of the planned savings were achieved.

Given that the main activities that were moved into the SSC were finance functions, the savings achieved were somewhat mixed, ranging from less than 20 percent to 70 percent. PWC (2011), asserts that the savings potential for a finance function would be 30 percent to 50 percent of targeted costs. We can therefore say that although there were savings the results are inconclusive. Furthermore, the responses of the experts did mainly validate the questionnaire that was sent out. The opportunity assessment stage took less than three (3) months, and this is in consonance with the PWC (2011) model. It is noted that the design and pilot stage took less than three (3) months. This again is different to the PWC (2011) assertion that this stage takes six to eight (6-8) months. It may be noted that there are complexities in every organisation and this may have accounted for the difference(s).

6.1.3 **Summary of Response for All Six Respondents in Stages One and Two**

The purpose of this analysis is to provide an overall analysis and summary of the survey responses received from all the six (6) respondents in Stages I & II (One and Two).

Regarding Objective One of the research; the six respondents identified the below.

Critical Success factors: Half of respondents identified Organisational Strategy, Support from Senior Executives and Effective Project Execution as factors that influenced the design of the SSC. On the other hand, the other half of respondents identified similar factors but did not identify Support from Senior Executives as a factor.

Impact of factors on cost of SSC: Respondents identified at least one of the factors such as Human Resources, Good Infrastructure and Project Management as factors that impact on the cost of an SSC.

Impact of factors on design of SSC: Most of the respondents identified all the factors listed. Respondents claimed that the SSC variables / factors such as Infrastructure, Human Resources, Project Management, Costs/Benefits, Effective SSC Design and Build has an impact on the design of the SSC and vice versa.

Impact of strategy design on variables / factors: Half of respondents identified all the factors listed and the other half identified at least one variable. Respondents claimed that the SSC Strategy Design impacted the other SSC variables / factors such as Human Resources, Infrastructure, Effective SSC Design and Project Management.

Impact of variables on strategy design: A third of respondents identified all the factors listed, another third identified infrastructure and the rest identified at least one variable. Respondents identified Human Resources, Effective SSC Design and Build and Infrastructure as impacting on the initial SSC Strategy Design in the establishment of the SSC.

Impact of strategy design on other variables / factors: Most respondents identified all the

variables listed. Respondents claimed that the initial SSC Strategy Design had an impact on one or more of the factors in establishing the SSC such as Costs, Effective Organisation, and Benefits.

Impact of other variables / factors on strategy design: Most respondents identified all the variables listed. Respondents claimed that SSC Costs, Company Vision and Effective Organisation had an impact on the initial SSC Strategy Design in the establishment of the SSC. This supports the initial argument relating to the interconnectivity (cause / effect relationship) of the variables as identified by this researcher in the CLD model.

In addition, this supports the variables identified that impact on the design and build of an SSC by writers such as (Fahy, Curry and Cacciaguidi-Fahy, 2002; Grant, 2005; BearingPoint, 2007; PWC, 2011; Miskon et al, 2011; PWC, 2012). As noted earlier in this report, in the SSC models currently available, the cause and effect relationships are not clearly depicted.

Regarding Objective Two of the research, all respondents had never used an SD model in any of their SSC design approaches. The main tool used was a 6Sigma project methodology. This goes to buttress the point that SD has not been used in the design of the SSC and that there is a scarcity of data relating to SSCs (Janssen and Joha, 2006). Furthermore, all respondents agreed that the 6Sigma tool used was beneficial.

Regarding Objective Three of the research; most respondents largely agreed with the variables selected in the CLD. This confirmed the argument in this research that it is important to understand the linkages between the variables and the system as a whole. Furthermore, this supports the arguments about understanding the linkages between or amongst the system variables (e.g., Porter, 1985; Sterman, 2000; Sherwood, 2002).

Regarding Objective Four of the research; respondents identified political, strategic, organisational, and economic factors as the reasons / motives for the establishment of an SSC. For most respondents, Information Technology (IT) was not a factor / motive in the

establishment of the SSC. Furthermore, the savings achieved for economic, political, strategic and organisational goals were somewhat mixed, although all respondents agreed that some level of savings had been achieved.

In terms of achieving the initial motives it appears most of the motives were achieved. Most respondents emphasised that 'cost' was an essential factor. This is in accordance with the findings regarding the motives for establishing the SSC (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Janssen and Joha, 2006; Deloitte, 2011; PWC, 2011; PWC, 2012; Tammel, 2017).

Regarding Objective Five of the research; respondents identified the following:

Phase I (Opportunity Assessment Stage): Half of respondents claimed that this phase lasted less than three (3) months; 71 percent or more of the duration was achieved on time and 21 percent to 50 percent of the planned savings were achieved.

Management Review: Most respondents claimed that this phase lasted less than three (3) months. More than 71 percent of the duration was achieved on time and 21 percent to 50 percent of the planned savings were achieved.

Phase II (Design and pilot project): Respondents claimed that this phase lasted between less than three (3) months and more than twelve (12) months (Most respondents claimed that this lasted from less than 3 months to 6-8 months). 71 percent of the duration was achieved on time and 21 percent to 50 percent of the planned savings were achieved.

Phase III (Implementations and Rollout): Respondents claimed that this phase lasted between less than three (3) months to more than twelve (12) months. For the duration achieved on time, 51 percent to 70 percent of the duration was achieved on time and 51 percent to 70 percent of the planned savings were achieved on time.

Phase IV (Optimisation): Most respondents claimed that this phase lasted six to eight (6-8) months. Regarding the duration, 51 percent to 70 percent was achieved on time and 21 percent to 50 percent of the planned savings were achieved.

6.1.4 **Comparison to Theory Propositions (Hypotheses) and Suggested Policy Analysis**

This section expands on the results obtained in stages one and two of the survey by further comparing the results obtained to the theory (literature review, hypotheses) and offering suggested policy designs.

With regards to objective one; 'to identify the factors and variables that are critical to the design and implementation of the case study SSC and how the results compares to the current SSC literature'; In the literature review section, the critical success factors for organisational change and SSCs have been depicted as: Effective Change Management; Culture; Understanding the process of change (Having a clear vision and a clear strategy); Effective communication; Strong Project Management Skills; Buy in of important stakeholders (Senior Managers); Clear Leadership and Using people with the right skills by writers such as (Kanter, Stein and Jick, 1992; Pugh, 1993; Beer and Nohria, 2000; Hammer and Champy, 2001; Fahy, Curry and Cacciaguidi-Fahy, 2002; Bergeron, 2003; Bangeman, 2005; Walsh, McGregor-Lowndes and Newton, 2006; Kotter, 2008; Senturia, Flees and Maceda, 2008; Burns and Yeaton, 2008; Maurer , 2010; Burnes and Jackson, 2011; Deloitte, 2011; Miskon et al.,2011; PWC, 2011; PWC, 2012; Burke, 2014).

In addition, 'Hypothesis 1', argues that there is a cause effect relationship between / amongst the various (key / critical success) factors influencing the design / build and implementation of Shared Service Centre, whilst 'Hypothesis 1a' argues that SSCs are organisations and the reasons for success / failures of organisational change are applicable to SSCs. Furthermore, 'Hypothesis 1b' advances the theory that there are some key factors (critical success factors) associated with SSCs that influence the design / build and implementation of SSCs. In comparing the literature review to the survey results obtained with regards to the above

objective and hypotheses, it is clear that the main critical success factors for an SSC are as follows:

Having a clear vision and a clear strategy: What is the vision and strategy of the organisation? Respondents identified, Company Goals and Vision, Effective Organisation, Other Strategy. This supports the arguments regarding having a clear vision and strategy (e.g., Kanter, Stein and Jick ;1992; Pugh, 1993; Beer and Nohria, 2000; Hammer and Champy, 2001; Fahy, Curry and Cacciaguidi-Fahy, 2002; Bergeron, 2003; Bangeman, 2005; Walsh, McGregor-Lowndes and Newton, 2006; Burns and Yeaton, 2008; Senturia, Flees and Maceda, 2008; Kotter, 2008; Maurer, 2010; Burnes and Jackson, 2011; Deloitte, 2011; Miskon et al., 2011; PWC, 2011; PWC, 2012; Burke, 2014). Furthermore, this ties in with the rational philosophy argued out by Smith and Graetz (2011) and the strategy discussions advanced by various writers (e.g., Lewin, 1947; Kanter, Stein and Jick, 1992; Rieley and Clarkson, 2001; Luecke, 2003; Grant, 2005; Todnem By, 2005; Koch, 2006; Kotter, 2008; Burnes and Jackson, 2011).

Buy in from senior management: This is needed to drive the process forward. From the questionnaire results obtained, respondents did identify the SSC, Organisational Strategy, Support from Senior Executives and Effective Project Execution as key critical success factors. This is in line with the arguments advanced by several writers regarding senior management buy in from an SSC perspective (e.g., Lewin, 1947; Fahy, Curry and Cacciaguidi-Fahy, 2002; Luecke, 2003; Burns and Yeaton, 2008; Senturia, Flees and Maceda, 2008; Kotter, 2008; Miskon et al., 2011). This also relates to the rational philosophy argued out by Smith and Graetz (2011) and the strategy discussions advanced by writers such as (Lewin, 1947; Kanter, Stein and Jick, 1992; Pugh, 1993; Rieley and Clarkson, 2001; Luecke, 2003; Todnem By, 2005; Kotter, 2008; Burnes and Jackson, 2011).

Effective Communication: Effective communication of change and issues are required. As discussed earlier, respondents identified Company Goals and Vision and Effective

Organisation. This supports the arguments regarding effective communication by various writers (e.g., Kanter, Stein and Jick ,1992; Beer and Nohria, 2000; Hammer and Champy, 2001; Fahy, Curry and Cacciaguidi-Fahy, 2002; Bergeron, 2003; Bangeman, 2005; Janssen and Joha, 2006; Walsh, McGregor-Lowndes and Newton, 2006; Kotter, 2008; 2012; Burns and Yeaton, 2008; Borman, 2008; Lacity and Fox, 2008; Senturia, Flees and Maceda, 2008; Maurer, 2010; Burnes and Jackson, 2011; Deloitte, 2011; Miskon et al.,2011; PWC, 2011; PWC, 2012).

Effective Change Management: Change in the organisation must be managed effectively. Respondents identified Company Goals and Vision and Effective Organisation. This supports the assertion regarding Effective Change Management by writers such as (Kanter, Stein and Jick, 1992, Hammer and Champy, 2001; Burns and Yeaton, 2008; Senturia, Flees and Maceda, 2008; Burnes and Jackson, 2011; Deloitte, 2011; Miskon et al., 2011; PWC 2011; PWC, 2012; Burke, 2014).

Robust IT Architecture: The IT infrastructure is a key component. Good Infrastructure and Project Management are factors that impact on the cost of an SSC and these were identified by respondents. This supports the arguments by various writers regarding the provision of a robust IT architecture (e.g., Kotter, 2008; Senturia, Flees and Maceda, 2008; Deloitte, 2011; Miskon et al., 2011; PWC, 2011; PWC,2012).

Strong Project Management Skills: As SSCs are projects, it is important to have people with the right skills to manage the process. From the earlier discussions in this report, respondents did identify Project Management, Effective SSC Design and Build and Effective Project Execution as a key critical success factors. This is in line with arguments advanced by several writers regarding possessing strong project management skills (e.g., Kanter, Stein and Jick, 1992; Beer and Nohria, 2000; Hammer and Champy, 2001; Fahy, Curry and Cacciaguidi-Fahy, 2002; Bergeron, 2003; Bangeman, 2005; Janssen and Joha, 2006;

Walsh, McGregor-Lowndes and Newton, 2006; Borman, 2008; Burns and Yeaton, 2008; Kotter, 2008; Lacity and Fox, 2008; Senturia, Flees and Maceda, 2008; Maurer, 2010; Burnes and Jackson, 2011; Deloitte, 2011; Miskon et al., 2011; PWC, 2011, PWC, 2012).

Organisation and HR: As most of the activities involved in an SSC affects people, the Human Resource function (HR) is very key and must be managed carefully. Respondents did identify Human Resources as a key criterion. This supports the arguments about Organisation and HR by writers such as (Lewin 1947; Kanter, Stein and Jick, 1992; Hammer and Champy, 2001; Fahy, Curry and Cacciaguidi-Fahy, 2002; Luecke, 2003; Kotter, 2008; Senturia, Flees and Maceda, 2008; Burnes and Jackson, 2011; Deloitte, 2011; Miskon et al., 2011; PWC, 2011; PWC, 2012)

Site Location: It is important that a convenient site is selected, which allows for the right level of skilled employees and facilities / infrastructure to be available. It is not conducive to site an SSC in a place where for example transportation facilities are not good. Respondents identified Other-Infrastructure Costs, Effective Organisation, and Benefits. This supports the arguments regarding the provision of a convenient site (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Deloitte, 2011).

Adequate Investments: This needs to be provided for an SSC to be successful. Respondents identified Costs, Effective Organisation and Benefits. This supports the arguments regarding the provision of adequate investments by writers such as (Kanter, Stein and Jick, 1992; Hammer and Champy, 2001; Fahy, Curry and Cacciaguidi-Fahy, 2002; Kotter, 2008; 2012; Miskon et al., 2011).

Change Measurement: Respondents identified Costs, Effective Organisation, and Benefits. This supports the view by writers such as (Lewin, 1947; Kanter, Stein and Jick, 1992, Hammer and Champy, 2001; Luecke, 2003; Kotter, 2008; 2012; Senturia, Flees and Maceda, 2008; Burnes and Jackson, 2011).

With regards to the objective of establishing whether SD has been used as a DSS tool in the implementation of the SSC under consideration in this research and, if so, if it was beneficial; all respondents did identify that they had never used an SD model and that the project methodology used was 6Sigma. This again supports the notion in this research about the fact that SD can be developed and used as a complementary tool in the SSC design.

With regards to the objective (Objective Three) of designing, building and developing a DSS tool based upon SD to be used in the implementation of the SSC; this was achieved via the feedback received from respondents regarding the CLD, which led to the construction of the stock and flow model.

With regards to the objective (Objective Four) of identifying and determining the reasons for establishing the SSC under consideration in this research (i.e. the case study) and determining if any benefits were achieved and how those benefits compare with the current SSC literature; it was elaborated earlier that the motives of having the SSCs can be ascribed to the philosophies of organisational change. It is a combination of the different philosophies of organisational change. However, the dualities philosophy advanced by Smith and Graetz (2011) which calls for using a combination of the various philosophies are applicable. The process of building the SSC is strategic (Rational); can be biological (the life cycle of the organisation); determined by internal and external factors such as competitor pressure (Institutional); a need to streamline processes and improve shareholder value (Resource); will affect people (Psychological); and has cultural implications (Cultural) etc.

The main primary motives of SSCs are cost reduction; process improvements; headcount reduction; centralisation of routine processes as argued out by writers such as (Bergeron, 2003; Bangeman, 2005; Jansson and Joha, 2006; Walsh, McGregor-Lowndes and Newton, 2006; Burns and Yeaton, 2008; Deloitte, 2011; Miskon et al., 2011; PWC, 2011; Tammel, 2017). From the survey results, respondents identified cost reduction (head count reduction)

as a main motive for creating SSCs. This supports the assertion regarding the motives of establishing the SSC by writers such as (Bergeron, 2003; Bangeman, 2005; Janssen and Joha, 2006; Walsh, McGregor-Lowndes and Newton, 2006; Burns and Yeaton, 2008; Deloitte, 2011; Miskon et al., 2011; PWC, 2011; Tammel, 2017). These findings also support the resource philosophy assertion by (Pfeffer and Salanic, 1978; Dunphy and Stace,1993). In addition, theory 'E and O' as advanced by Beer and Nohria (2000) is supported.

With regards to Process Improvements; respondents identified IT systems, Centralisation of Routine Processes and Customer Focus as a main motive. This is in congruence with the assertions by writers such as (Fahy, Curry and Cacciaguidi-Fahy, 2002; Bergeron, 2003; Bangeman, 2005; Jansson and Joha, 2006; Deloitte, 2011; PWC, 2011). This will also relate to the systems aspect of the philosophy of organisational change as advanced by (Sterman, 2000; Sherwood, 2002).

The dualities philosophy as advanced by Smith and Graetz (2011), which calls for using a combination of the various philosophies are applicable to the responses of respondents. The process of building the SSC is strategic (Rational) which includes support from senior management and having a robust plan (Smith and Graetz, 2011).

In addition, the responses of respondents relate to the life cycle of the organisation (biological) as determined by the stage at which cost reduction and streamlining of SSC processes occur (Hannan and Freeman, 1977 ; Van de Ven and Poole, 1995; Kezar, 2001); the response to internal and external factors (Institutional); and the fact that SSCs need to advance shareholder value and respond to the competition (Powell and DiMaggio, 1991;Todnem By, 2005). The responses showed that SSCs need the right resources such as people with the right skills (resource philosophy) as identified by (Pfeffer and Salanic, 1978, 2003; Dunphy and Stace,1993); and that the changes in the SSCs will have an effect on people (Psychological and Cultural) as people lose their jobs (Morgan, 1997; Beer and Nohria, 2000).

With regards to the objective (Objective Five) of determining whether the benefits envisaged during the SSC life cycle stages (being opportunity identification, management review, design and build, pilot stage, implementation and post implementation) with respect to the SSC under consideration in this research, have been achieved and how those benefits compare with the current SSC literature is discussed below using the SSC phases.

Phase I (Opportunity Assessment Stage): Half of respondents claimed that this phase lasted less than three (3) months; 71 percent or more of the duration was achieved on time. This is in line with the assertions by (BearingPoint, 2007; Deloitte, 2011; PWC, 2011).

Management Review: Majority of the respondents claimed that this phase lasted less than three (3) months; more than 71 percent of the duration was achieved on time. This supports the assertion by PWC (2011).

Phase II (Design and Pilot Project): For this phase, 33 percent of respondents claimed that this phase lasted less than three (3) months; another 33 percent claimed that this stage lasted six to eight (6 to 8) months and another 16.7% claimed that it lasted more than twelve (12) months. This is not in line with the arguments advanced by Deloitte (2011) and PWC (2011) who argued that the Design and Pilot Project should normally take about six to eight (6-8) months. Only a third of respondents got this stage right. It can be argued that when respondents got exposed to the SSC stage, some activities had already been designed and therefore they only experienced the latter stages of this stage. Furthermore, for respondents who believed it carried on, they must clearly have been doing some form of extra work which they believed that it was part of this stage. For policy makers, it is clear that it is important to provide clear and effective communication to ensure that all staff affected are aligned.

Phase III (Implementations and Rollout): For this phase, 33 percent of respondents claimed that this phase lasted less than three (3) months; another 33 percent claimed that this stage lasted six to eight (6-8) months and another 16.7% claimed that it lasted more than twelve

(12) months. The results from respondents are similar to the results of the Design and Pilot Stage. Clearly, respondents believe that this stage is not in line with the theory as advanced by writers such as (Deloitte, 2011; PWC, 2011). For policy makers a coherent plan is required, including having an effective change management and communication plan to avoid these misunderstandings. Lengthy implementation periods have been characterised as one of the failure factors for SSCs and organisations (Miskon et al., 2011). It is argued that this was one of the cases as staff had varying perceptions of the length of time it took to implement the SSC transition plan.

Phase IV (Optimisation): Majority of respondents claimed that this phase lasted between six to eight (6-8) months. The results from respondents is similar to the Design and Pilot Stage. Clearly, respondents believe that this stage is not in line with the arguments advanced by writers such as (BearingPoint, 2007; Deloitte, 2011; PWC, 2011). As stated earlier in this report, policy makers should have a coherent plan, including having an effective change management and communication plan to avoid these misunderstandings.

In summary, the total implementation period for all stages was over forty-three (43) months, which is much higher than the period proposed by the available literature.

6.2 Abduction (Abducing the model)

6.2.1 What is abduction

According to the Stanford Encyclopaedia of Philosophy (2011), the term abduction originated from the American philosopher Charles Sanders Peirce (1839–1914). He called it abduction, hypothesis, and retroduction over the years.

Abductive reasoning seeks to find the most likely and simplest explanation by starting from an observation or set of observations. Unlike deductive reasoning, the conclusion is not guaranteed from the premises. Abductive reasoning is understood as the inference to the best explanation (Fann, 1970; Josephson and Josephson,1996). Schurz (2008, p.201) describes 'abductions as special patterns of inference to the best explanation whose structure determines a particularly promising abductive conjecture (conclusion)'.

As argued by Peirce (1865-1967, CP 5.189 [hereinafter CP followed by volume and paragraph number]), abduction belongs to logic because it can be given a schematic characterisation as stated in the following example:

> The surprising fact C, is observed,
>
> But if A were true, C would be a matter of course.
>
> Hence, there is reason to suspect that A is true.

A major difference between Pierce's view of abduction and the modern view is that, the context or focus of Pierce's abduction is discovery or to discover; thus, its aim is generating new theories which can be later assessed; whereas the context or focus of the modern type of abduction as a scientific inquiry or logic is concerned with assessing theories and justification (Stanford Encyclopaedia of Philosophy, 2011).

From Pierce's (CP 5.171-172) viewpoint:

Abduction is the process of forming explanatory hypotheses. It is the only logical operation which introduces any new idea… Deduction proves that something must be; Induction shows that something actually is operative; Abduction merely suggests that something may be.

Deduction and induction enter at a later stage of the assessment of theory. Induction helps one to come to a verdict on the hypotheses generated, where the outcome is dependent on the number of verified testable consequences; whereas deduction assists in deriving theories that can be tested based upon the hypotheses originated from abduction (Svennevig, 2001; Stanford Encyclopedia of Philosophy, 2011).

Therefore, Schurz (2008, p.201) supported by Stanford Encyclopedia of Philosophy (2011), suggests that the most important function of abduction is to provide a 'search strategy; which for a given scenario provides the most likely or promising explanation which is then subject to further tests within a reasonable time frame.

What is abductive validation

Citing Pierce (1865-1967), Sebeok (1981) defines abductive validation as the use of abductive reasoning to validate a given hypothesis. An explanation is valid if it is the best possible explanation based upon a known set of data. In effect, this is reasoning through successive approximation.

According to Peirce (CP 1.369):

It has been found that there are three kinds of signs which
are all indispensable in all reasoning; the first is the diagrammatic sign or *icon,*
which exhibits a similarity or analogy to the subject of discourse; the second is the
index, which like a pronoun demonstrative or relative, forces the attention to the
particular object intended without describing it; the third [or **symbo**l] is the
general name or description which signifies its object by means of an association

of ideas or habitual connection between the name and the character signified.

The icon sign, he called a likeness, to reference, define or classify hypothesis (abductive inference). An example is a photograph which physically represents or resembles what is being depicted.

Induction was an inference via an index. This is a sign based upon factual connection and the sample represents an index of the total population it was drawn from. For example, to indicate fire one can use the image of a smoke.

Deduction was an inference via a symbol. In effect, a sign shown by the interpretative behaviour that occurs irrespective of the resemblance or connection to the object. Thus, a symbol doesn't resemble the signifier (i.e. the form a sign takes such as a sound, photograph, some words or the expression on the face) and or the signified (i.e. the representation of the object or concept, such as giving a command to stop something or a warning). This is learnt culturally. For example, the alphabets and numerals are learnt culturally. There is nothing inherently showing what they mean or actually represent. The above are supported by Bradley (2016).

Principles of Inference

According to Brenner and Werker (2007), the basic elements of inference are assumptions and implications. Implications are derived in a logical and analytical manner from assumptions. They argue that definitions and premises are usually part of the assumptions as they set the modelling boundaries. Occasionally, the premises and definitions can be part of the modelling. Data may be used in both parts of the modelling process. Data will normally provide the empirical basis to begin from in assumptions and for implications data is then used to verify or corroborate the implications originating from the definitions, premises or basis and the logical considerations. In modelling, logic is the driver of all modelling and brings the parts together.

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Three principles of inference; deduction, induction and abduction may be distinguished. Deduction is referred to as the inference from general to specific (Lawson, 1997, p.24 cited in Brenner and Werker, p.228).

Brenner and Werker (2007) used an example of the impact of patent laws in different countries on a particular industry in several countries to demonstrate inferences from deduction, induction and abduction.

- **Example Deduction:** In the example they used, they argue that countries with stricter patent laws protect the property rights of innovators and this provides innovators with the incentive to innovate. Thus, from this, one could deduce that an industry in a country with less stringent patent laws will inhibit the development of innovators. In their view, deduction does not create new information but rather sustains the information already stated within the assumptions. According to Brenner and Werner (2007, p.229), If 'A = B and B = C, (assumptions) then A = C, (implication)'. Assumptions in deductions contain all possible elements for the model. In effect, it is argued out that the conclusions originating from the deduction will normally be true.

- **Example Induction:** Induction is from specific to general. The assumptions describe a subset of the population and makes or infers conclusions about the characteristics of this population. Induction is described as creating information. According to Brenner and Werner (2007), inductive inference is based upon data.

  Following on from their earlier example, this would mean observing a number of countries or a case study of a country and their innovative output(s). Based upon this, one would infer inductively general mechanisms and relationships by investigating / reviewing the common characteristics of the observations and may conclude that industries from countries (or the case study country chosen) that have innovative patent laws are innovative.

- **Example Abduction:** According to Brenner and Werner (2007, p.229) citing (Lawson, 1997, p.24), abduction sometimes also called retroduction classifies 'particular events into general patterns'.

To explain observations, abduction can help to identify the underlying structural elements and also to develop theory in the areas we are researching. It provides a significant leap forward as compared to induction and deduction (Brenner and Werner, 2007).

Thus, in their example they argue that industries may vary in how they develop and therefore get affected by the patent laws in various or different ways. To be able to use abduction, this implies, one begins by collecting detailed information about how different industries have developed in different countries that have patent laws. From this, a classification of the common characteristics of different developments is undertaken. This helps to derive the underlying drivers, which then helps to explain, describe and predict the development laws with respect to patents in other countries.

As evidenced in the writings of Pierce (CP 5.145) and supported by Brenner and Werner (2007):

> Induction can never originate any idea whatever. No more can deduction. All the ideas of science come to it by the way of abduction. Abduction consists in studying the facts and devising a theory to explain them. Its only justification is that if we are ever to understand things at all, it must be in this way.

Brenner and Werker (2007) further argue that abductive simulation models are similar to scenario analysis. They both study different developments and the exact developments are uncertain. As a result, they both make predictions, but abductive simulation models are more modest with respect to predictions.

6.2.2 **Abducing the Stock and Flow Model (See also Appendix J).**

From the discussions and the example used above, one can abduce the stock and flow model. This is discussed under the three thematic themes of Staff Management, Transaction Management and Cause / Effect.

6.2.3 **Staff Management**

- **Deduction- Staff Management:** In Chapters one and two, the literature review showed that available research or empirical evidence suggests or deduces that SSC transitions have issues with staff management and this needs to be managed carefully (Fahy, Curry and Cacciaguidi-Fahy, 2002; Lacity and Fox 2008; Deloitte, 2011; Deloitte, 2017; Miskon et al.; 2011). This is in order to ensure a successful transition of the SSC.

- **Induction- Staff Management:** It is inferred that the SSC in this case study under consideration has or may have issues with staff management in the SSC transition. This is inferred from for example, the statement by the managing director in the research questionnaire I developed and used in this thesis (See Appendix A) and also from data gathered from the organisation. Based upon the survey I conducted in this research, the Managing Director made the statement below:

  The main purpose of establishing the SSC was to reduce cost and to concentrate the main processes with the SSC. The project management was mainly focusing on the costs and delivering the SSC within the deadline. This caused that all other relevant factors were ignored. The execution was forced through and it had a serious impact on employees, infrastructure and internal processes in a negative way. 6 years later (today) the SSC is still struggling with the internal processes and is lacking to understand the business in the Nordic countries. The implementation of the SSC failed to include aspects such as benefits and risks or at least the project

management did not review them in depth. This caused limited cost reductions and a big delay in delivering the benefits expected. In total the strategic plan was not effective, and goals were not well specified. This led to additional costs relating to the physical moving of local offices. Inefficient transfer of knowledge and a lot of experienced people left the company and with their knowledge of local business and processes were lost.

In addition, the survey results from both stages one and two showed that 'costs' (headcount reduction) was an issue. Added to this is that the current SSC under consideration lost a significant number of its Pre-Shared Service staff during the transition.

- **Abduction- Staff Management:**

As a consequence of the above one can abduce the below hypotheses under the theme Staff Management (**Hypotheses 2, 2a and 2b).**

Hypothesis 2:

Staff Retention

The performance of a newly established SSC is strongly determined by the ability to retain its staff.

Hypothesis 2a:

Staff Capacity

Staff capacity during the establishment of a new SSC is strongly dependent on the ability to manage workloads and keep turnover down to a minimum or low rate.

Hypothesis 2b:

Inefficient Staff Management

The inefficient management of staff turnover can lead to further increases in costs.

To verify / validate this via abduction, the stock and flow model uses, various scenarios / data and classifies various types of staff in the SSC transformation process. In effect, the sub classes, Pre-Shared SSC Staff, SSC Staff, Temporary Staff and the overall total model all support the above hypotheses. The outcome of the results shown in the various tables shown under this section, points to the fact that there are staff and 'cost' issues which affect(s) the SSC transition and the SSC in general.

In abducing the model, I use the sub staff classes of:

- Pre Shared Service Staff (Old Staff)
- SSC Staff and
- Temporary staff.

a. Pre-Shared Services

In terms of the old staff, Table 23 summarises the outcomes of various scenarios.

Reference model and behaviour

The reference model / data is obtained from actual / estimated results of the company being analysed in question. The reference model, shows the impact on the work capacity, old staff and SGA.

Scenarios

By leveraging various scenarios as shown in Table 23, there are various outcomes, which buttresses the fact that staff management is very critical and supports hypotheses 2, 2a and 2b.

For example, using scenario one in Table 23, the below impacts are observed in terms of the 'IMPACT ON Work Capacity'. By increasing the redundancy rate, the work capacity available reduces with varying effect. In effect, as employees are made redundant at a quicker pace, there are not enough employees to perform the work; therefore, there is not enough work capacity.

Similarly, using scenario one in terms of the 'IMPACT ON Old staff' (current staff and initial old staff); by increasing the redundancy rate the impact on the staff is drastic. Staff leave at a faster rate. This in effect will create problems for the transition.

In another vein, still using scenario one, another impact of this is the 'IMPACT on Old staff costs' (SGA). The impact is seen again in the 'Old dept staff cost'. This also has an effect on the total staff costs which is reduced.

Table 23 below summarises the results of the reference model (data), the three (3) scenarios and how they impact on work capacity, 'SGA costs' and the number of personnel (Old Staff or Pre-Shared Services). In general, Table 23 below, depicts that by reducing the number of employees, there is an impact on the 'SGA costs', the work capacity available and the number of employees available. In conclusion, by increasing the key variables in this model, it is noted that there is a decrease in 'Old staff' and decrease in 'SGA'. Conversely, by doing the opposite, 'SGA costs' will increase. This confirms hypothesis 2, 2a and 2b outlined above.

Table 23 SUMMARY OF BEHAVIOUR OF REFERENCE MODELS (OLD STAFF)

Area	Variable Type	Impact on Work Capacity	Impact on Old Staff (Pre-Shared Service Staff)	Impact on SGA (Sales General and Administrative Expenses)
Reference Model	Actual Data	Decrease/ Mainly Reflects Reference Data	Decrease/ Mainly Reflects Reference Data	Decrease/ Mainly Reflects Reference Data
Scenario One (1)	Increase of '%of Leave rate old Staff' (redundancy rate) and no change in other factors	Decrease	Decrease	Decrease
Scenario Two (2)	Increase of '% of Old Staff Leave' and no change in other factors	Decrease	Decrease	Decrease
Scenario Three (3)	Increase of '%of Leave rate old Staff' (redundancy rate) and - decrease of '%	Decrease at a faster rate	Decrease at a faster rate	Decrease at a faster rate

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Area	Variable Type	Impact on Work Capacity	Impact on Old Staff (Pre-Shared Service Staff)	Impact on SGA (Sales General and Administrative Expenses)
	of Old Staff Leave' and no change in other factors			

b. SSC Staff

The SSC Staff is the optimum required staff that is required post SSC transitioning. These are the Staff that have been recruited or transitioned to the SSC. SSC Staff are recruited at the required planned stage and are expected to take over the activities of the SSC.

Reference model and behaviour of SSC Staff

The total Staff includes both pre and post SSC Staff. Initial Staff are the pre-existing staff or staff recruited before the actual formation of the SSC. SSC Staff gradually increase or move from the pre-SSC to the SSC Stage. During both the pre and post transition period, the planned transition was done over a period of time (months) and this was dependent on the available potential staff on the employment market.

As with the Pre SSC-Staff above, by leveraging various scenarios as shown in Table 24, there are various outcomes, which buttresses the fact that staff management is very critical and can affect 'costs' in addition to having an effect on the management of the workload. This supports hypotheses 2, 2a and 2b.

Using scenario three as an example, one can observe the 'IMPACT ON SSC STAFF' as the simultaneous decrease in the time to train SSC trainees and decrease in the '% of SSC Staff Leaving', have an impact on the number of SSC Staff.

Using the same scenario, we notice that the 'IMPACT ON SGA Costs' effectively results in a slight decrease in 'SGA costs'.

Table 24 below summarises the results of the reference model (data), the three scenarios and how they impact on work capacity, 'SGA costs' and the number of personnel (SSC Staff number). In general, Table 24 below depicts that by reducing / increasing the number of employees, there is an impact on the 'SGA costs', and the number of employees available. This again supports hypotheses 2, 2a and 2b.

Table 24 SUMMARY OF BEHAVIOUR OF REFERENCE MODELS (SSC STAFF)

Area	Variable Type	SSC Staff number	SGA Costs
Reference Model	Actual Data	Mainly mirrors Reference data (Increases overtime)	Mainly Mirrors Reference data (Increases overtime)
Scenario One (1)	Increase % of SSC Staff Leaving	Decrease	Decrease
Scenario Two (2)	Increase Time to train SSC trainees	Decrease	Decrease
Scenario Three (3)	Decrease Time to train SSC trainees and Decrease % of SSC Staff Leaving	Modest Decrease	Decrease

c. Temporary Staff

These are staff that are employed temporarily when there is a shortage of permanent staff or there is extra pressure on staff.

REFERENCE DATA AND MODEL BEHAVIOUR

Temporary Staff is the total number of temporary staff that have been employed mainly as a result of the shortage of staff. From Table 25, it shows that the model behaviour (simulated) is at variance with the reference data. This is very interesting to note and what this shows is that there was a lack of planning regarding the number of SSC staff required. As a consequence, the actual workload that was available was not effectively compensated for by new staff. Another alternative was to introduce automation into the process instead of temporary staff. However, this was not done at this stage and therefore there was a significant amount of work that had to be covered.

REFERENCE MODEL BEHAVIOUR - Temporary Staff Costs (SGA)

The 'Temporary Staff Costs (SGA)' is the total monetary costs of hiring the Temporary Staff. From Table 25 below, it shows that the model behaviour (simulated) is at variance with the reference data (sketched data). Clearly, the planning cycle for Temporary Staff for this SSC is different to what is expected to be on the ground as reflected in the simulated data. It does falls on the project manager to anticipate this scenario in order to avoid any potential negative consequences.

Table 25 SUMMARY OF BEHAVIOUR OF REFERENCE MODELS (TEMPORARY STAFF)

Area	Variable Type	Impact on Temporary Staff	Impact on Staff Deficiency Gap	Impact on SGA Costs
Reference Model	Actual Data	At variance with actual situation (increase)	At variance with actual situation(increase)	At variance with actual situation (increase)
Scenario One (1)	Increase % of Temporary Staff Leaving	Increase	Increase	Increase
Scenario Two (2)	Increase Time to adjust to new role	Increase	No change	Increase
Scenario Three (3)	Decrease Time to adjust to new role and Increase % of Temporary Staff Leaving	Increase	Increase	Increase

Using scenario two, as an example, it can be observed that the 'IMPACT ON Temporary Staff' results in the trained temporary staff entering at a later stage.

With regards to Temporary Staff Costs (SGA), it can be observed that there is an increase. What this implies is that if the correct number of Temporary Staff were allocated, the impact on 'SGA costs' is increased as compared to no Temporary staff costs in the actual scenario. With regards to the theory regarding critical success factors, by using sensitivity analysis (flexing) of the 'Time to adjust to new role' and '% of Temporary Staff Leaving', SSC critical staff management functions could be managed more effectively. Furthermore, it is also observed that the reference model is at variance with the actual pertaining data. This is very

significant. What it shows is that even though there were not enough permanent employees to do the work, thus necessitating the need to employ more temporary staff, this is not what occurred. Therefore, even though the project assumed that there were cost savings, there were potential hidden costs that were not addressed. This is the case with all the three scenarios, which shows that the actual situation that occurred was not the most efficient. This supports hypotheses 2, 2a and 2b.

Furthermore, I abduce the model, to show that Hypotheses 1 to 3 are valid by using the sub-classes of:

- **Customer/Service Effect**

- **Workload/ (Work Capacity) Pre & Post SSC**

- **Transactions (Transactional Activities) and finally using**

- **All three (3) thematic Themes including cause /effect links**

d.   CUSTOMER/SERVICE EFFECT

The Customer/Service Effect consists of the following variables: Pressure on SSC Staff, Support Quality, Work errors, Clients / Other Staff. Collectively, they are known as the 'Customer / Service Effect' in this model.

Reference Model and its behaviour

The reference model attempts to mimic the equations and assumptions that have been incorporated into this part of the model.

Impact on Support Quality and Work Errors

The impact on support quality and work errors is consistent with the model assumptions.

Impact on Clients/Other Staff

This is consistent with the model assumptions. Using scenario one in Table 26 as an example, we observe the below impacts:

Impact on Support Quality and Work Errors

The impact on support quality and work errors (comparison run) is consistent with the simulated model assumptions. As the pressure on staff increases both the support quality and work errors deteriorate(s) respectively.

Impact on Clients/Other Staff

Following on from the support quality and work errors, the number of clients/other staff lost is at an increasing rate (comparison run) compared to the simulated run. What this tells us is that even though work errors are kept at the same rate, there are other variables that can influence the loss of customers/other staff and this will depend on the type of company in question. In effect, as the work errors increase, we lose clients/other staff at a much faster rate.

The reference model supports the simulated data. It shows the effect and pressure on staff if workloads / transactions are not managed properly. Where this occurs, then this would result in more work errors, extra pressure on clients, low work quality and could lead to either staff or clients leaving the organisation. This emphasises the importance of managing the SSC transition and ensuring that employee / workload management is (are) done in an effective manner as espoused in the SSC literature (e.g., Miskon et al., 2011; PWC, 2011; Burns and Yeaton, 2008). The above discussions support hypotheses 2, 2a, 2b and 3.

Table 26 SUMMARY OF BEHAVIOUR OF REFERENCE MODELS (CUSTOMER / SERVICE EFFECT)

Area	Variable Type	Impact on Support Quality	Impact on Work Errors	Impact on Clients/Other Staff
Reference Model	Actual Data/Estimated data	Supports Simulated Data (Not desirable)	Supports Simulated Data (Not desirable)	Supports Simulated Data (Not desirable)
Scenario One (1)	Increase % of Clients/Other Staff Leaving	Moderate Increase (Modest Positive)	Moderate Increase (Modest Positive)	Not Desirable Decrease (Faster rate)
Scenario Two (2)	Increase Pressure on Staff	Not Desirable decrease (Negative)	Not Desirable decrease (Negative	Modest Desirable Decrease (Modest rate)
Scenario Three (3(	Decrease % of Clients/Other Staff Leaving and Decrease Pressure on Staff	Desirable Increase (Positive)	Desirable Increase (Positive)	Desirable Decrease (Slower rate)

e. Workload/(Work Capacity) Pre & Post SSC

Workload Capacity shows the workload that is required or available. There are two key variables that impacts the workload capacity. These are the Average Transaction Time (Pre-SSC & SSC), which is the time it takes to complete a transaction (18.334 minutes which is a derived number) and the estimated number of hours (165 hours) that an employee can work in a month (Capacity: Hours/person-month).

Reference Model Behaviour

The reference model attempts to mimic the actual situation with regards to workload, total staff capacity, work capacity of old staff and SSC Staff Capacity hours per month. The model (simulated), reflects the initial assumptions made.

By leveraging various scenarios as shown in Table 27, there are various impacts to workload and staff deficiency gap. For example, using scenario one regarding the 'Impact on Staff Deficiency Gap', by increasing the 'Average Transaction Time', the staff deficiency gap increases. This means that there are more staff required as the time taken to complete the transactions are getting longer.

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Impact on 'Workload i.e. Total Staff Capacity, Work Capacity of Old Staff and SSC Staff Capacity Hours per Month'.

By increasing the Average Transaction Time, the Total Pre-SSC &SSC Workload is increased and the SSC Staff capacity hours is also reduced slightly whereas the work capacity of the old staff is slightly reduced. This then leads to a slight reduction in the total Staff (Old & New) Capacity. This reflects the staff deficiency gap, in that, there are not enough staff to do the work, hence the reduction in the staff capacity hours, whereas the workload hours available is higher.

The above discussions and Table 27 below support hypotheses 2, 2a, 2b and 3 espoused in Chapters Two and Four, that it is important to manage staff and staff turnover efficiently in addition to managing effectively the transactional activities. Furthermore, this supports the critical success factors as identified in the SSC literature (e.g., Hammer and Champy, 2001; Burns and Yeaton, 2008; Senturia, Flees and Maceda, 2008; Deloitte, 2011; Miskon et al., 2011).

Table 27 SUMMARY OF BEHAVIOUR OF REFERENCE MODELS (Workload/Work Capacity Pre-& Post SSC)

Area	Variable Type	Impact on Staff Deficiency Gap	Workload Impact			
			Total Pre-SSC &SSC Workload	SSC Staff capacity hours	total Staff (Old & New) Capacity	work capacity of the old staff
Reference Model	Actual Data/Estimated	Reflects the actual situation (Increase)	Reflects the actual situation (Increase)	Reflects the actual situation	Reflects the actual situation	Reflects the actual situation
Scenario One (1)	Increase Average Transaction Time	Strong Increase	Increase	Decrease	Decrease	Decrease
Scenario Two (2)	Increase Hours per person/month	Slight Decrease	No change	No change	No change	No change
Scenario Three (3)	Decrease Average Transaction Time and Decrease Hours/person-month	Strong Decrease	Strong Decrease	Slight Increase	Strong Increase	Slight Increase

6.2.4 TRANSACTIONS (Transactional Activities)

For the transactional activities, in addition to the issues discussed above, the below hypothesis also has an impact :

Hypothesis 3:

The inefficient management of transactional activities or errors created in the transactional activities can lead to increased costs for the organisation.

Pre and Post transitioned activities / Transactions

There is a stock of total Pre-SSC & SSC Transactional activities. This shows the total transactions that were transitioned into the SSC pre-and post-transitioning. An in-flow is added to this stock showing new transactional activities. These transactions are separated by new transactions undertaken before the transitioning of the SSC and new transactions after the transitioning of the SSC. An outflow shows the transactions that are leaving (Transactions Leaving) the SSC or have been discarded / modified.

REFERENCE MODEL BEHAVIOUR - Total Pre-SSC & SSC Transactions

The model attempts to replicate the actual behaviour of the system. During the pre-and post-transition stage there were 108 transactional activities that were affected.

By using different scenarios, we see the varying 'IMPACT ON Total Pre-SSC & SSC Transactions'. For example, in scenario one (see Table 28), by increasing the number of new transactions, the total number of transactions available increases. This implies that, ultimately, as the number of transactions increases, there will be an impact on other factors such as the workload, pressure on staff and also the costs.

Furthermore, one can also observe the IMPACT ON the 'Transaction Deficiency Gap' using scenario one. By increasing the number of new transactions, there is an impact on the total level of transactions and the transactions deficiency gap. The deficiency gap starts to grow.

Table 28 below summarises the results of the reference model, the three scenarios and how they impact the Total Pre-SSC & SSC Transactions and the Transaction Deficiency Gap. In general, the table depicts that by increasing the number of transactions there is an impact on the desired level of transactions and that it is important to manage the level of transactions efficiently.

Table 28 SUMMARY OF BEHAVIOUR OF REFERENCE MODELS (TRANSACTIONS)

Area	Variable Type	Total Pre-SSC & SSC Transactions	Transaction deficiency gap
Reference Model	Actual Data	No change	No change
Scenario One (1)	Increase the 'Total % of New Transactions Added' (new transactions added and no change in other factors	Increase	Increase
Scenario Two (2)	Increase the '% Total transactions leaving'	Decrease	Decrease
Scenario Three (3)	Increase the '% Transactions leaving' and Decrease the '% of New Transactions Added'	Decrease	Decrease

6.2.5 **All three (3) thematic Themes including cause /effect links (Hypotheses 1 to 3)**

Table 29 summarises the results of the reference model(data), the four (4) scenarios and how they impact on work capacity, SGA costs and the number of personnel (Old Staff or Pre-Shared Services).

In general, Table 29 depicts that by having the various scenarios, the impact on total staff is increased as there are more temporary staff which are not planned for. In addition, there is an impact on the SGA costs, the workload available, transactions and the customer service. These are discussed further in the next section (Section 6.3).

Table 29 TOTAL MODEL FOR ALL THREE THEMATIC THEMES (HYPOTHESES)

Area	Variable Type	Impact on Staff (Old Staff, SSC Staff and Temporary Staff, Staff Deficiency Gap)	Impact on SGA Costs (Old Staff, Temporary Staff, SSC Staff, Total Staff)	Impact on Transactions (Total, Pre &SSC Transactions, Transaction Deficiency Gap)	Impact on Workload (Total Pre SSC & Post SSC Workload, Total Staff, Old & New Capacity)	Impact on Customer Service Effect (Client/Other Staff, Support Quality, Work Errors)
Reference Model	See discussions under the sub-scenarios					
Scenario One (1)	Decrease of '%of Leave rate old Staff' (redundancy rate)	Moderate Increase	Increase	No Impact or change	**No Impact** Workload **Mainly Increase** Staff Capacity Hours	**Decrease** (Pressure on Staff, Work Errors) **Increase** in Client/Other Staff, Support Quality
Scenario Two (2)	Increase the 'Total % of New Transactions Added'	Increase	Increase	Increase	**Mainly Increase** Workload **Mainly Increase** Staff Capacity Hours	**Increase** (Pressure on Staff, Work Errors) **Decrease** in Client/Other Staff, Support Quality
Scenario Three (3)	Increase Time to train SSC trainees	Moderate Increase	Moderate Increase	No Impact or change	**No Impact** Workload **Mainly Decrease** Staff Capacity Hours	**Increase** (Pressure on Staff, Work Errors) **Decrease** in Client/Other Staff, Support Quality
Scenario Four (4)	Simultaneously decreasing the '%of Leave rate old Staff' (redundancy rate); increasing the 'Total % of New Transactions Added' and increasing the 'Time to train SSC trainees'.	Increase	Increase	Increase	**Mainly Increase** Workload **Mainly Increase** Staff Capacity Hours	**Increase** (Pressure on Staff, Work Errors) **Decrease** in Client/Other Staff, Support Quality

6.3 **Four Scenarios (Scenario Building)**

Four (4) scenarios or sensitivity combinations are discussed under the themes outlined in

'a' to '**d**' under this section (6.3).

a) **Scenario One (1)**

Scenario 1 -Decrease of '% of Leave rate old Staff'(redundancy rate)		
	Current	Simulated or Change
% Old Staff Leave	20%	10%

Scenario One (1) involves decreasing the '% of Leave rate old Staff' (redundancy rate). This

(scenario one) is shown in Figures 74 and 75 below.
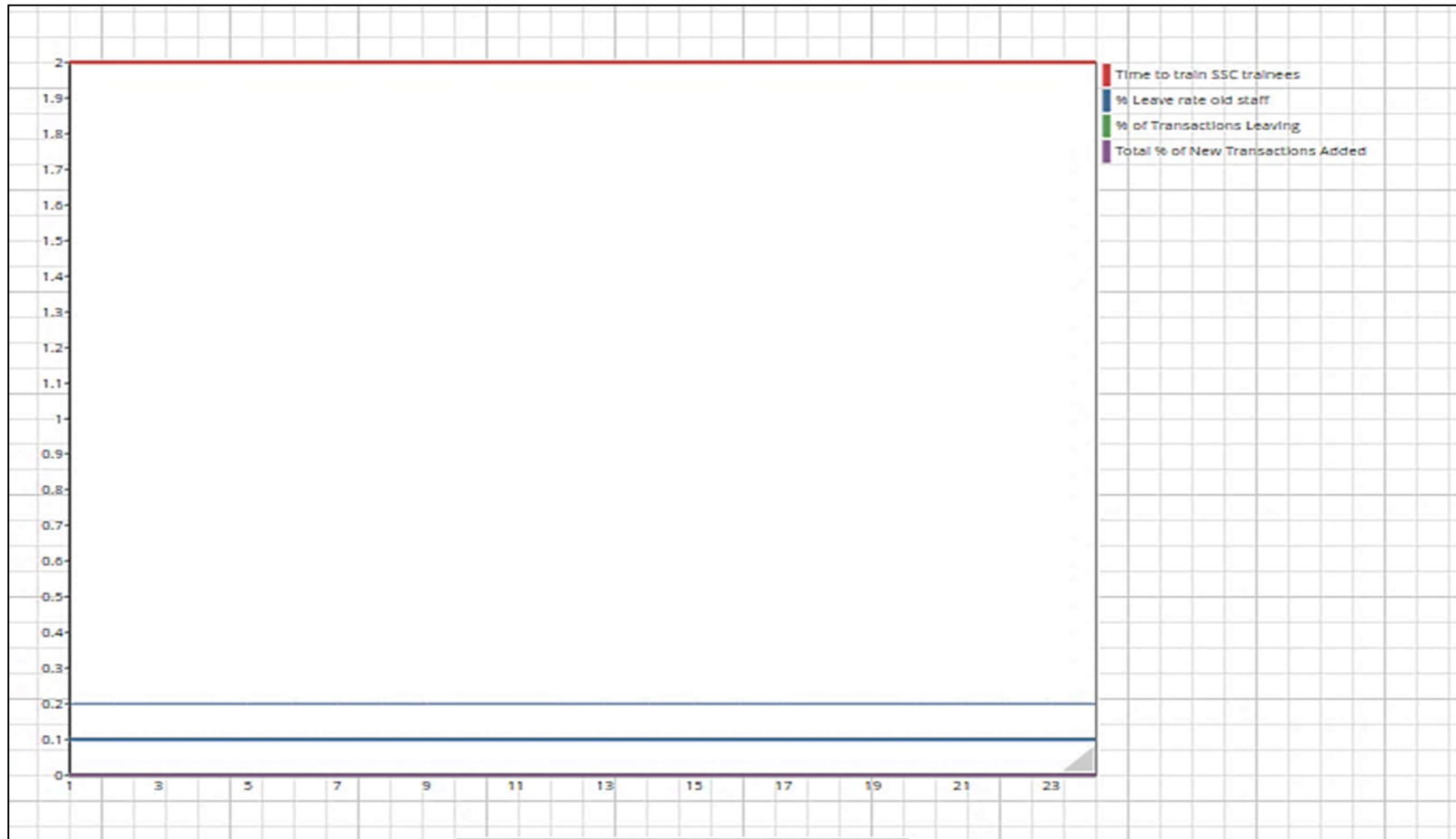
Figure 74 Decrease of '%of Leave rate old Staff'(redundancy rate)

	% Leave rate old staff			Time to train SSC trainees			Total % of New Transactions Added			% of Transactions Leaving		
	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison Ru...	Sketched	Simulated	Comparison Ru...
1	-	0.2	0.1	-	2	2	0	0	0	0	0	0
2	-	0.2	0.1	-	2	2	0	0	0	0	0	0
3	-	0.2	0.1	-	2	2	0	0	0	0	0	0
4	-	0.2	0.1	-	2	2	0	0	0	0	0	0
5	-	0.2	0.1	-	2	2	0	0	0	0	0	0
6	-	0.2	0.1	-	2	2	0	0	0	0	0	0
7	-	0.2	0.1	-	2	2	0	0	0	0	0	0
8	-	0.2	0.1	-	2	2	0	0	0	0	0	0
9	-	0.2	0.1	-	2	2	0	0	0	0	0	0
10	-	0.2	0.1	-	2	2	0	0	0	0	0	0
11	-	0.2	0.1	-	2	2	0	0	0	0	0	0
12	-	0.2	0.1	-	2	2	0	0	0	0	0	0
13	-	0.2	0.1	-	2	2	0	0	0	0	0	0
14	-	0.2	0.1	-	2	2	0	0	0	0	0	0
15	-	0.2	0.1	-	2	2	0	0	0	0	0	0
16	-	0.2	0.1	-	2	2	0	0	0	0	0	0
17	-	0.2	0.1	-	2	2	0	0	0	0	0	0
18	-	0.2	0.1	-	2	2	0	0	0	0	0	0
19	-	0.2	0.1	-	2	2	0	0	0	0	0	0
20	-	0.2	0.1	-	2	2	0	0	0	0	0	0
21	-	0.2	0.1	-	2	2	0	0	0	0	0	0
22	-	0.2	0.1	-	2	2	0	0	0	0	0	0
23	-	0.2	0.1	-	2	2	0	0	0	0	0	0
24	-	0.2	0.1	-	2	2	0	0	0	0	0	0

Figure 75 Tabular Depiction of 'Decrease of '%of Leave rate old Staff'(redundancy rate)'.

Impact on Staff (Old Staff, SSC Staff and Temporary Staff, Staff Deficiency Gap)

By decreasing the '% of Leave rate old Staff', the required number of staff by month 24 is 11.63 (comparison run) made up of Old Staff of one (1.1), SSC Staff of 5.8 and Temporary Staff of 4.7 compared to 7 (sketched) in month 24. This implies that there were extra costs required in the form of extra staff, but as the SSC was about 'cost savings' the staff numbers were reduced. This will affect the productivity of staff and put pressure on servicing the customer. Figures 76 and 77 below depict this.
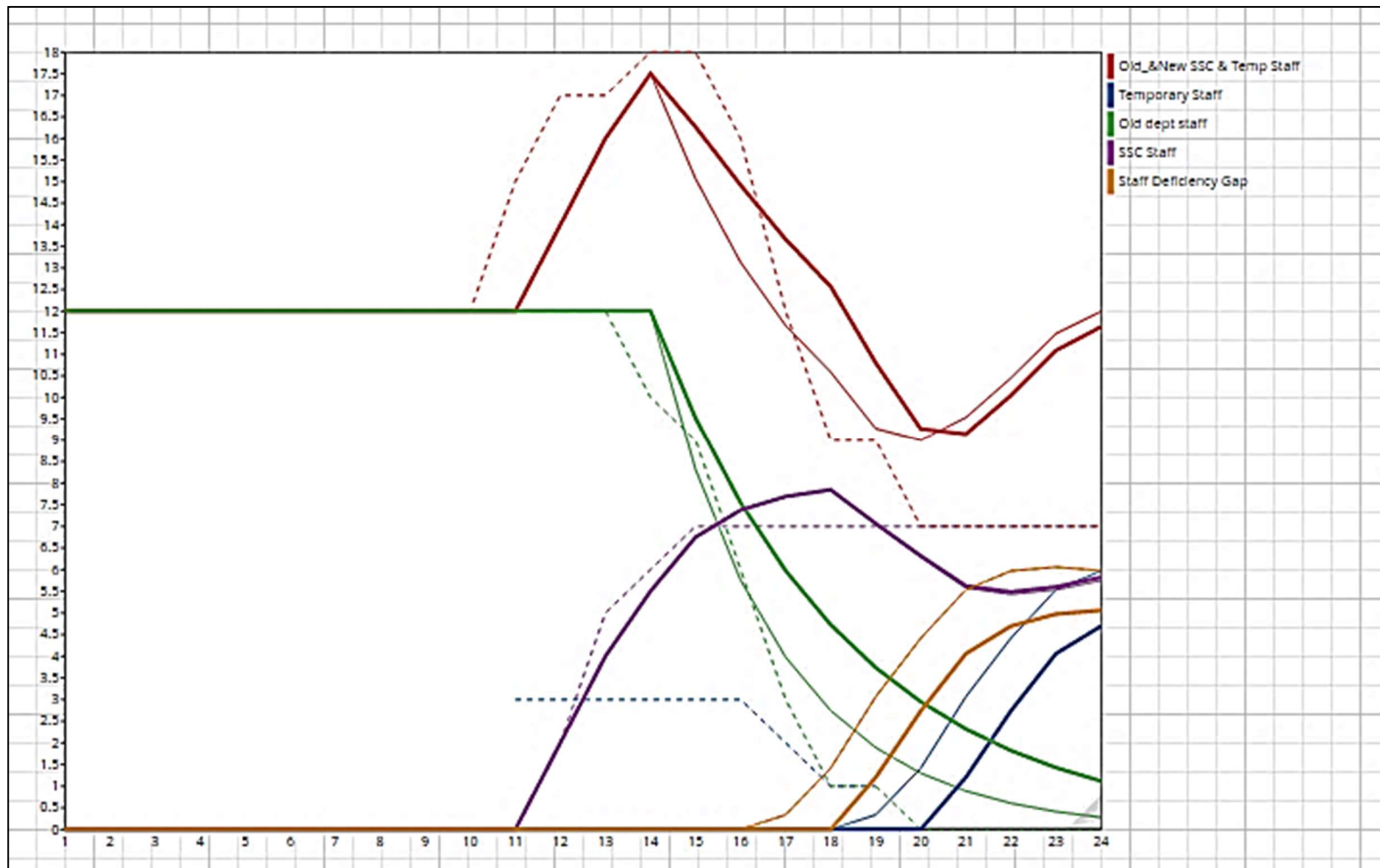
Figure 76 Impact on Staff (Old Staff, SSC Staff and Temporary Staff, Staff Deficiency Gap)

	Old_&New SSC & Temp Staff			Old dept staff			SSC Staff			Temporary Staff			Staff Deficiency Gap		
	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...
1	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
2	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
3	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
4	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
5	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
6	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
7	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
8	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
9	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
10	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
11	15	12	12	12	12	12	-	0	0	3	0	0	0	0	0
12	17	14	14	12	12	12	2	2	2	3	0	0	0	0	0
13	17	16	16	12	12	12	5	4	4	3	0	0	0	0	0
14	18	17.5	17.5	10	12	12	6	5.5	5.5	3	0	0	0	0	0
15	18	15.068	16.268	9	8.318	9.518	7	6.75	6.75	3	0	0	0	0	0
16	16	13.132	14.919	6	5.756	7.544	7	7.375	7.375	3	0	0	0	0	0
17	12	11.665	13.662	3	3.977	5.974	7	7.688	7.688	2	0	0	0.336	0.336	0
18	9	10.587	12.571	1	2.743	4.727	7	7.844	7.844	1	0	0	1.414	1.414	0
19	9	9.274	10.8	1	1.889	3.737	7	7.049	7.063	1	0.336	0	3.063	3.063	1.201
20	7	8.999	9.265	0	1.297	2.948	7	6.288	6.317	-	1.414	0	4.415	4.415	2.736
21	7	9.53	9.144	0	0.887	2.32	7	5.579	5.623	-	3.063	1.201	5.534	5.534	4.057
22	7	10.448	10.042	0	0.605	1.821	7	5.428	5.485	-	4.415	2.736	5.968	5.968	4.694
23	7	11.477	11.086	0	0.411	1.427	7	5.532	5.602	-	5.534	4.057	6.057	6.057	4.972
24	7	11.992	11.634	0	0.28	1.117	7	5.744	5.823	-	5.968	4.694	5.977	5.977	5.06

Figure 77 Impact on Staff (Old Staff, SSC Staff and Temporary Staff, Staff Deficiency Gap)

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Impact on SGA Costs (Old Staff, Temporary Staff, SSC Staff, Total Staff)

Following on from the staff scenario discussed above, the impact is shown by the increase in 'SGA costs'. This impact is shown in Figures 78 and 79 below. By month 24, the 'Total Actual SGA Costs' is 1.24 million (comparison run) which is higher than the 'actual costs' of 550K (sketched).
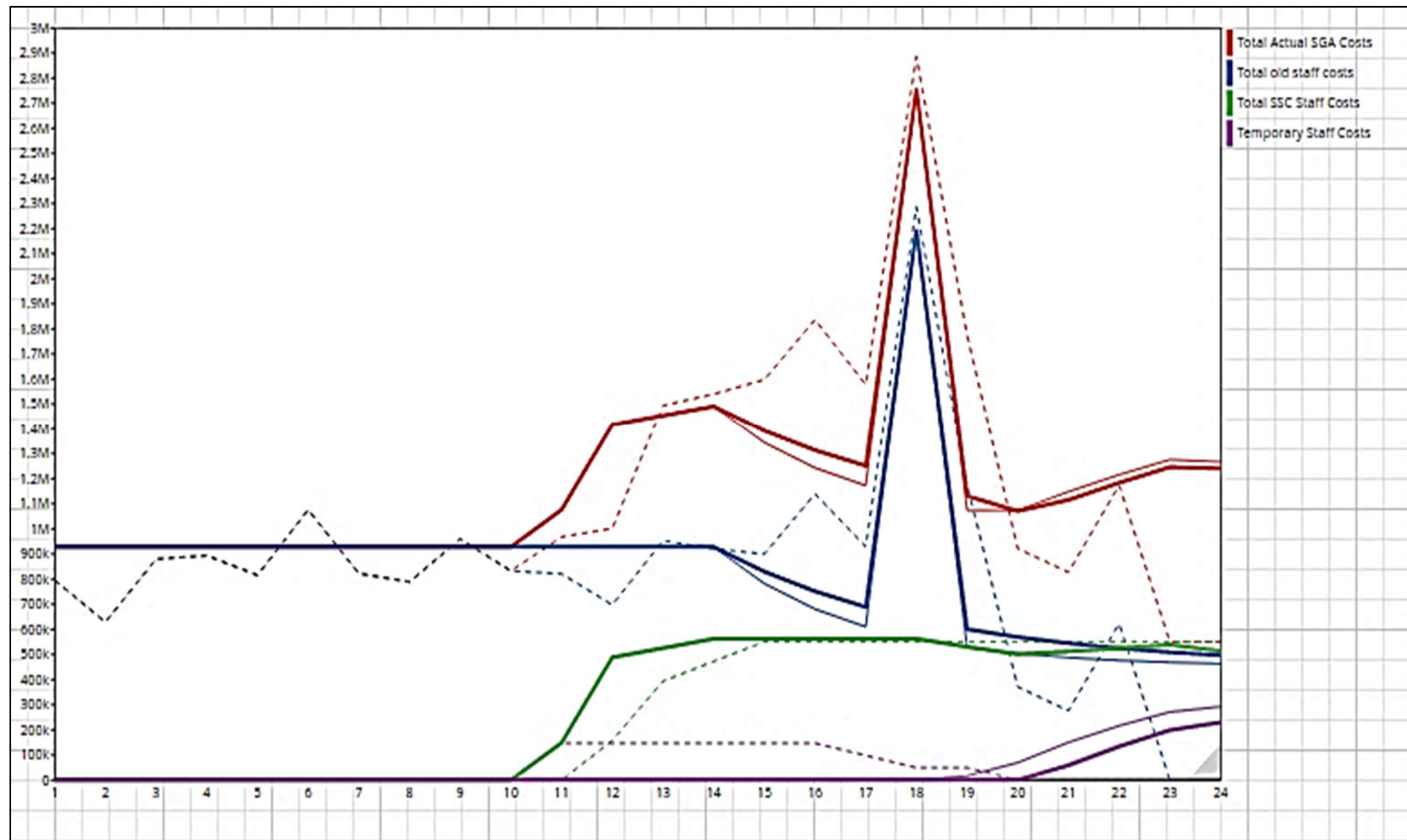
Figure 78 Impact on SGA Costs (Old Staff, Temporary Staff, SSC Staff, Total Staff)

	Total Actual SGA Costs			Total old staff costs			Temporary Staff Costs			Total SSC Staff Costs		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	795098	927870	927870	795098	927870	927870	0	0	0	0	0	0
2	628685	927870	927870	628685	927870	927870	0	0	0	0	0	0
3	879731	927891.343	927891.343	879731	927870	927870	0	21.343	21.343	0	0	0
4	893446	927891.343	927891.343	893446	927870	927870	0	21.343	21.343	0	0	0
5	815313	927891.343	927891.343	815313	927870	927870	0	21.343	21.343	0	0	0
6	1075910	927891.343	927891.343	1075910	927870	927870	0	21.343	21.343	0	0	0
7	821928	927891.343	927891.343	821928	927870	927870	0	21.343	21.343	0	0	0
8	788949	927891.343	927891.343	788949	927870	927870	0	21.343	21.343	0	0	0
9	959368	927891.343	927891.343	959368	927870	927870	0	21.343	21.343	0	0	0
10	832424	927891.343	927891.343	832424	927870	927870	0	21.343	21.343	0	0	0
11	967519	1076007.343	1076007.343	820783	927870	927870	146736	21.343	21.343	0	148116	148116
12	1001363	1416030.343	1416030.343	697256	927870	927870	146736	21.343	21.343	157371	488139	488139
13	1493433	1453059.343	1453059.343	953269	927870	927870	146736	21.343	21.343	393429	525168	525168
14	1539426	1490088.343	1490088.343	920575	927870	927870	146736	21.343	21.343	472114	562197	562197
15	1597098	1344140.831	1391702.831	899562	781922.487	829484.487	146736	21.343	21.343	550800	562197	562197
16	1836583	1242613.461	1313473.133	1139047	680395.117	751254.79	146736	21.343	21.343	550800	562197	562197
17	1577370	1172084.929	1251267.056	928746	609866.586	689048.712	97824	21.343	21.343	550800	562197	562197
18	2885769	2757238.343	2757238.343	2286057	2195020	2195020	48912	21.343	21.343	550800	562197	562197
19	1774828	1073420.613	1130749.66	1175116	527114.716	600348.606	48912	16445.893	21.343	550800	529860.004	530379.711
20	921669	1073062.441	1070425.909	370869	503650.081	569083.161	0	69157.082	21.343	550800	500255.278	501321.405
21	826643	1147550.105	1114888.499	275843	487416.84	544203.199	0	149817.264	58755.704	550800	510316	511929.595
22	1173686	1215033.983	1183226.898	622886	476214.182	524423.305	0	215968.623	133811.965	550800	522851.179	524991.627
23	550800	1275000.813	1245635.104	0	468548.192	508803.233	0	270668.801	198459.566	550800	535783.82	538372.305
24	550800	1266407.604	1240208.913	0	463329.633	496527.007	0	291914.056	229593.725	550800	511163.915	514088.181

Figure 79 Impact on SGA Costs (Old Staff, Temporary Staff, SSC Staff, Total Staff)

Impact on Transactions (Total, Pre-&SSC Transactions, Transaction Deficiency Gap)

Despite the expected decrease in staff (headcount) and staff costs (SGA), the number of transactions remain the same (comparison run vs sketched). This implies that the only reduction from an SSC perspective was from the staff. However, these hidden extra costs should manifest itself in other forms such as productivity issues etc. Figures 80 and 81 below depict this.
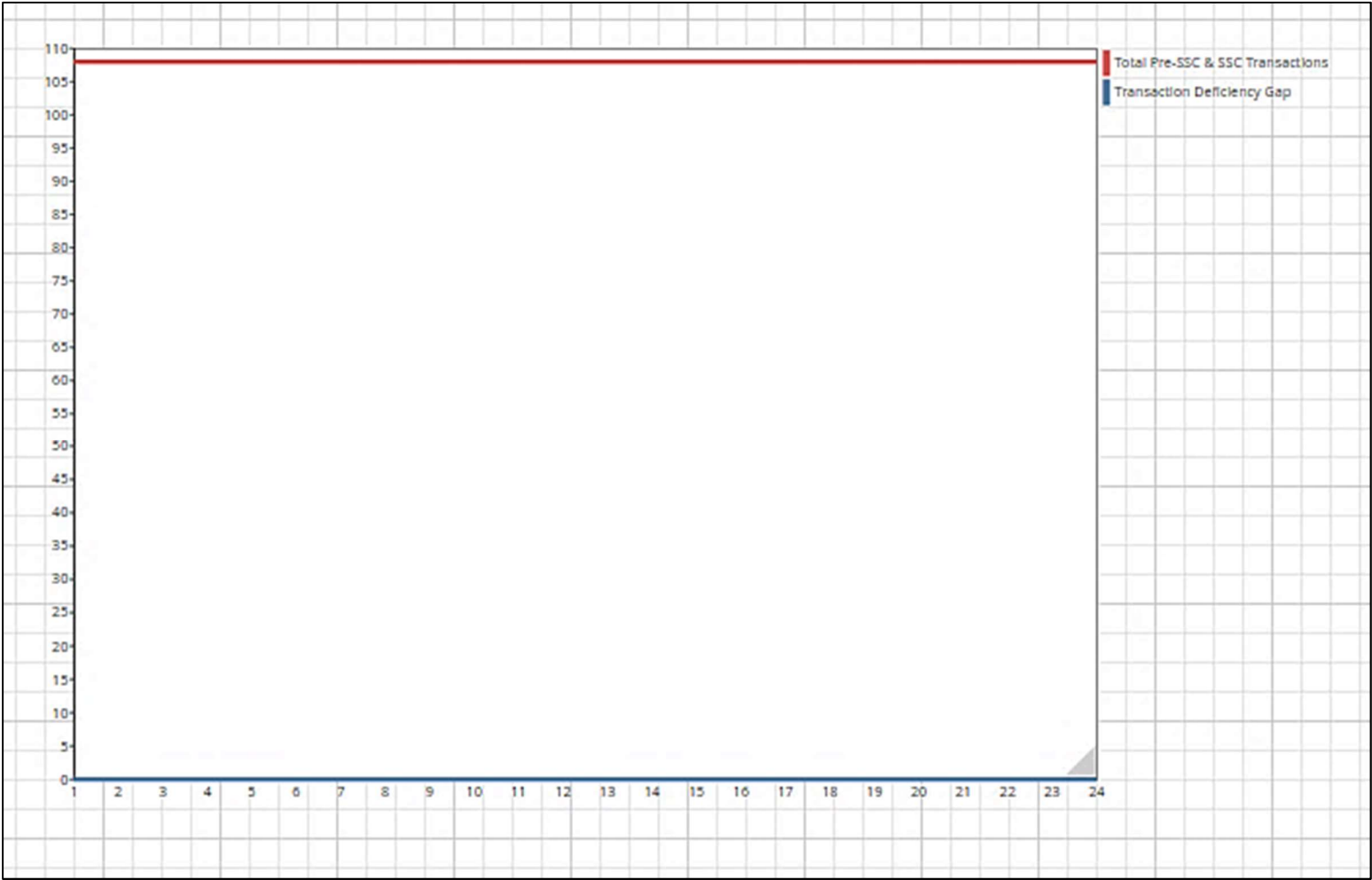
Figure 80 Impact on Transactions (Total, Pre &SSC Transactions, and Transaction Deficiency Gap)

	Total Pre-SSC & SSC Transactions			Transaction Deficiency Gap		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	108	108	108	0	0	0
2	108	108	108	0	0	0
3	108	108	108	0	0	0
4	108	108	108	0	0	0
5	108	108	108	0	0	0
6	108	108	108	0	0	0
7	108	108	108	0	0	0
8	108	108	108	0	0	0
9	108	108	108	0	0	0
10	108	108	108	0	0	0
11	108	108	108	0	0	0
12	108	108	108	0	0	0
13	108	108	108	0	0	0
14	108	108	108	0	0	0
15	108	108	108	0	0	0
16	108	108	108	0	0	0
17	108	108	108	0	0	0
18	108	108	108	0	0	0
19	108	108	108	0	0	0
20	108	108	108	0	0	0
21	108	108	108	0	0	0
22	108	108	108	0	0	0
23	108	108	108	0	0	0
24	108	108	108	0	0	0

Figure 81 Tabular Depiction of 'Impact on Transactions (Total, Pre &SSC Transactions, and Transaction Deficiency Gap)'

Impact on Workload (Total Pre SSC & Post SSC Workload, Total Staff, Old & New Capacity).

The workload (comparison run vs sketched) is unchanged following the decrease in the '% of Leave rate old Staff'. This is because the workload (number of transactions divided by the average transaction time) remains the same and is independent of the staff movement as the transactions are the same. Furthermore, for the Staff Capacity Hours, especially between month 15 to month 24 (comparison vs sketched), there is a significant increase in the staff hours available (1145 vs 993) as a result of the old or existing staff leaving at a slower rate. Figures 82 and 83 below depict this.
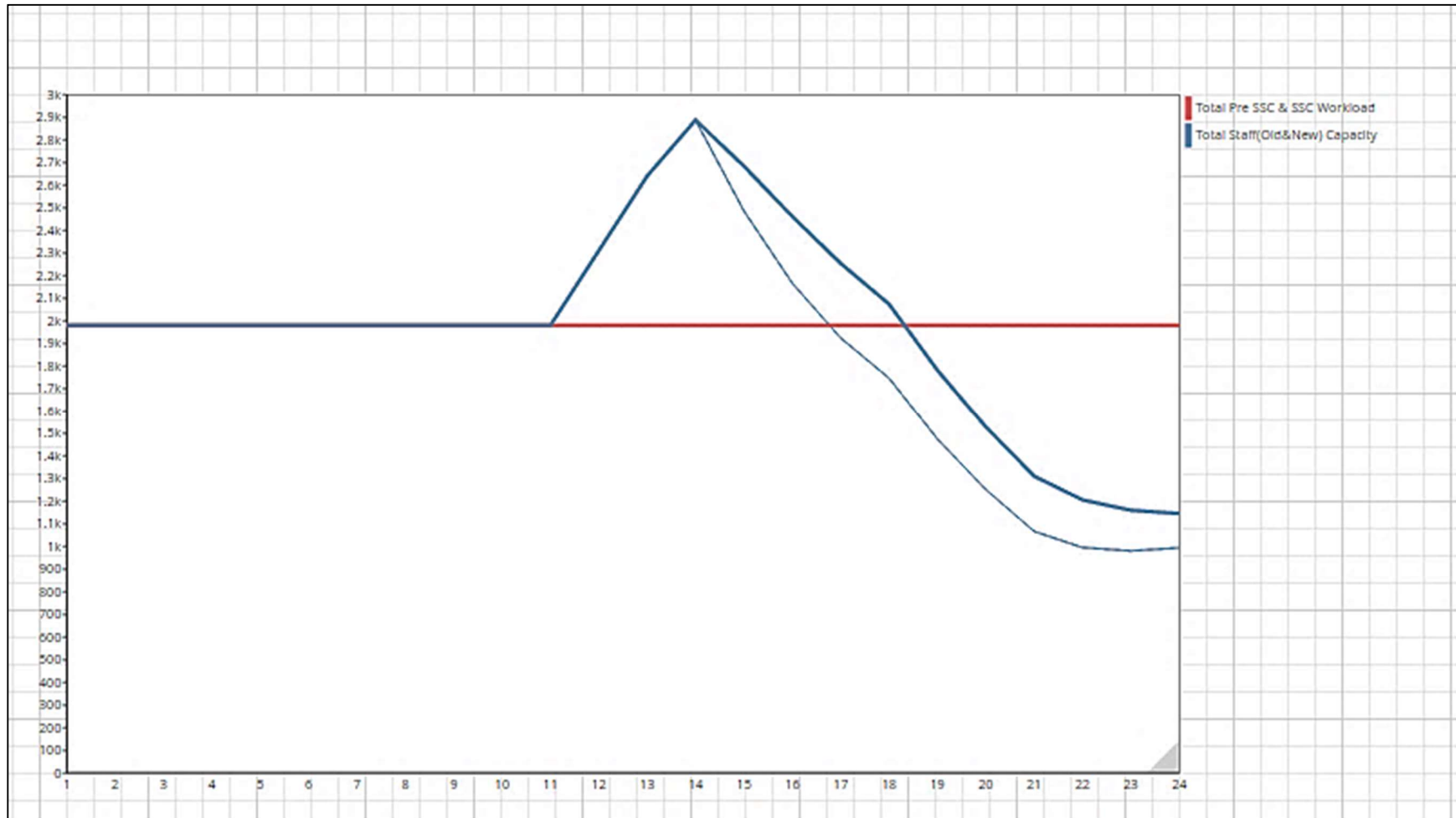
Figure 82 Impact on Workload (Total Pre SSC & Post SSC Workload, Total Staff, Old & New Capacity)

	Total Pre SSC & SSC Workload			Total Staff(Old&New) Capacity		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	1980.072	1980.072	1980.072	1980	1980	1980
2	1980.072	1980.072	1980.072	1980	1980	1980
3	1980.072	1980.072	1980.072	1980	1980	1980
4	1980.072	1980.072	1980.072	1980	1980	1980
5	1980.072	1980.072	1980.072	1980	1980	1980
6	1980.072	1980.072	1980.072	1980	1980	1980
7	1980.072	1980.072	1980.072	1980	1980	1980
8	1980.072	1980.072	1980.072	1980	1980	1980
9	1980.072	1980.072	1980.072	1980	1980	1980
10	1980.072	1980.072	1980.072	1980	1980	1980
11	1980.072	1980.072	1980.072	1980	1980	1980
12	1980.072	1980.072	1980.072	2310	2310	2310
13	1980.072	1980.072	1980.072	2640	2640	2640
14	1980.072	1980.072	1980.072	2887.5	2887.5	2887.5
15	1980.072	1980.072	1980.072	2486.172	2486.172	2084.172
16	1980.072	1980.072	1980.072	2166.64	2166.64	2461.628
17	1980.072	1980.072	1980.072	1924.593	1924.593	2254.228
18	1980.072	1980.072	1980.072	1746.777	1746.777	2074.192
19	1980.072	1980.072	1980.072	1474.678	1474.678	1781.865
20	1980.072	1980.072	1980.072	1251.522	1251.522	1528.67
21	1980.072	1980.072	1980.072	1066.996	1066.996	1310.587
22	1980.072	1980.072	1980.072	995.328	995.328	1205.559
23	1980.072	1980.072	1980.072	980.597	980.597	1159.713
24	1980.072	1980.072	1980.072	993.945	993.945	1145.175

Figure 83 Tabular Depiction of 'Impact on Workload (Total Pre SSC & Post SSC Workload, Total Staff, Old & New Capacity)

Impact on Customer Service Effect (Client/Other Staff, Support Quality, Work Errors)

As a consequence of the decrease of the '% of Leave rate old Staff', the pressure on staff decreases, there is a reduction in employee work errors, support for clients / other staff increases and there is a reduction in the potential impact of losing the clients/other staff but all at a slightly lower level compared to scenario one. These are shown in Figures 84 and 85 below.
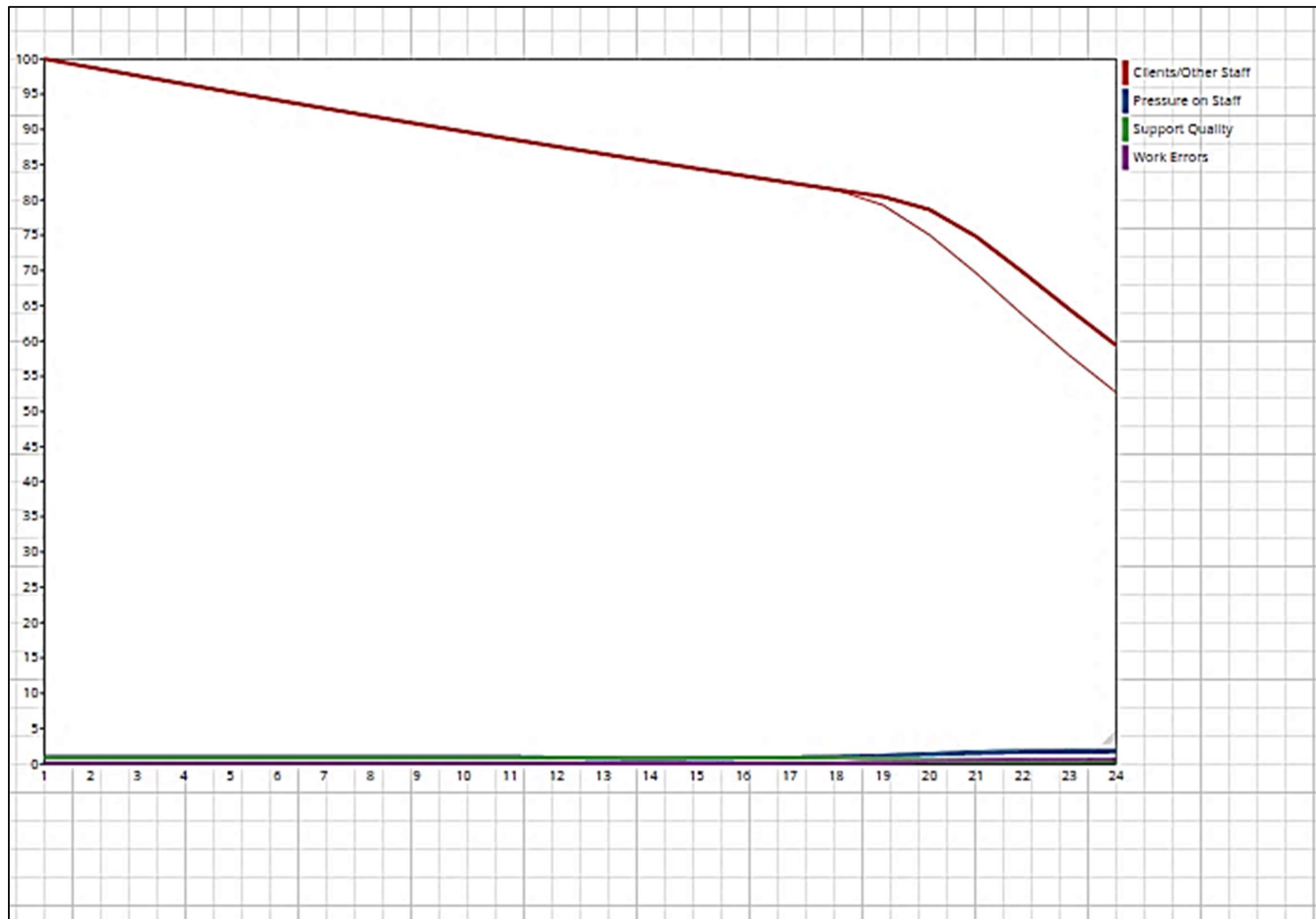
Figure 84 Impact on Customer Service Effect (Client/Other Staff, Support Quality, Work Errors)

	Clients/Other Staff			Pressure on Staff			Support Quality			Work Errors		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	-	100	100	-	1	1	-	0.9	0.9	-	0.1	0.1
2	-	98.8	98.8	-	1	1	-	0.9	0.9	-	0.1	0.1
3	-	97.614	97.614	-	1	1	-	0.9	0.9	-	0.1	0.1
4	-	96.443	96.443	-	1	1	-	0.9	0.9	-	0.1	0.1
5	-	95.286	95.286	-	1	1	-	0.9	0.9	-	0.1	0.1
6	-	94.142	94.142	-	1	1	-	0.9	0.9	-	0.1	0.1
7	-	93.013	93.013	-	1	1	-	0.9	0.9	-	0.1	0.1
8	-	91.896	91.896	-	1	1	-	0.9	0.9	-	0.1	0.1
9	-	90.794	90.794	-	1	1	-	0.9	0.9	-	0.1	0.1
10	-	89.704	89.704	-	1	1	-	0.9	0.9	-	0.1	0.1
11	-	88.628	88.628	-	1	1	-	0.9	0.9	-	0.1	0.1
12	-	87.564	87.564	-	0.857	0.857	-	0.9	0.9	-	0.1	0.1
13	-	86.513	86.513	-	0.75	0.75	-	0.9	0.9	-	0.1	0.1
14	-	85.475	85.475	-	0.686	0.686	-	0.9	0.9	-	0.1	0.1
15	-	84.45	84.45	-	0.796	0.738	-	0.9	0.9	-	0.1	0.1
16	-	83.436	83.436	-	0.914	0.804	-	0.9	0.9	-	0.1	0.1
17	-	82.435	82.435	-	1.029	0.878	-	0.9	0.9	-	0.1	0.1
18	-	81.446	81.446	-	1.134	0.955	-	0.778	0.9	-	0.222	0.1
19	-	79.278	80.468	-	1.343	1.111	-	0.555	0.81	-	0.445	0.19
20	-	75.042	78.632	-	1.582	1.295	-	0.399	0.596	-	0.601	0.404
21	-	69.634	74.82	-	1.856	1.511	-	0.29	0.438	-	0.71	0.562
22	-	63.704	69.775	-	1.989	1.642	-	0.253	0.371	-	0.747	0.629
23	-	57.992	64.506	-	2.019	1.707	-	0.245	0.343	-	0.755	0.657
24	-	52.739	59.421	-	1.992	1.729	-	0.252	0.334	-	0.748	0.666

Figure 85 Tabular Depiction of 'Impact on Customer Service Effect (Client/Other Staff, Support Quality, Work Errors)'

b) Scenario Two (2)

Scenario 2_ Increase the 'Total % of New Transactions Added'		
	Current	Simulated or Change
Total % of New Transactions Added	0%	1%

Scenario Two (2) involves increasing the 'Total % of New Transactions Added'. Figures 86 and 87 below depict this.
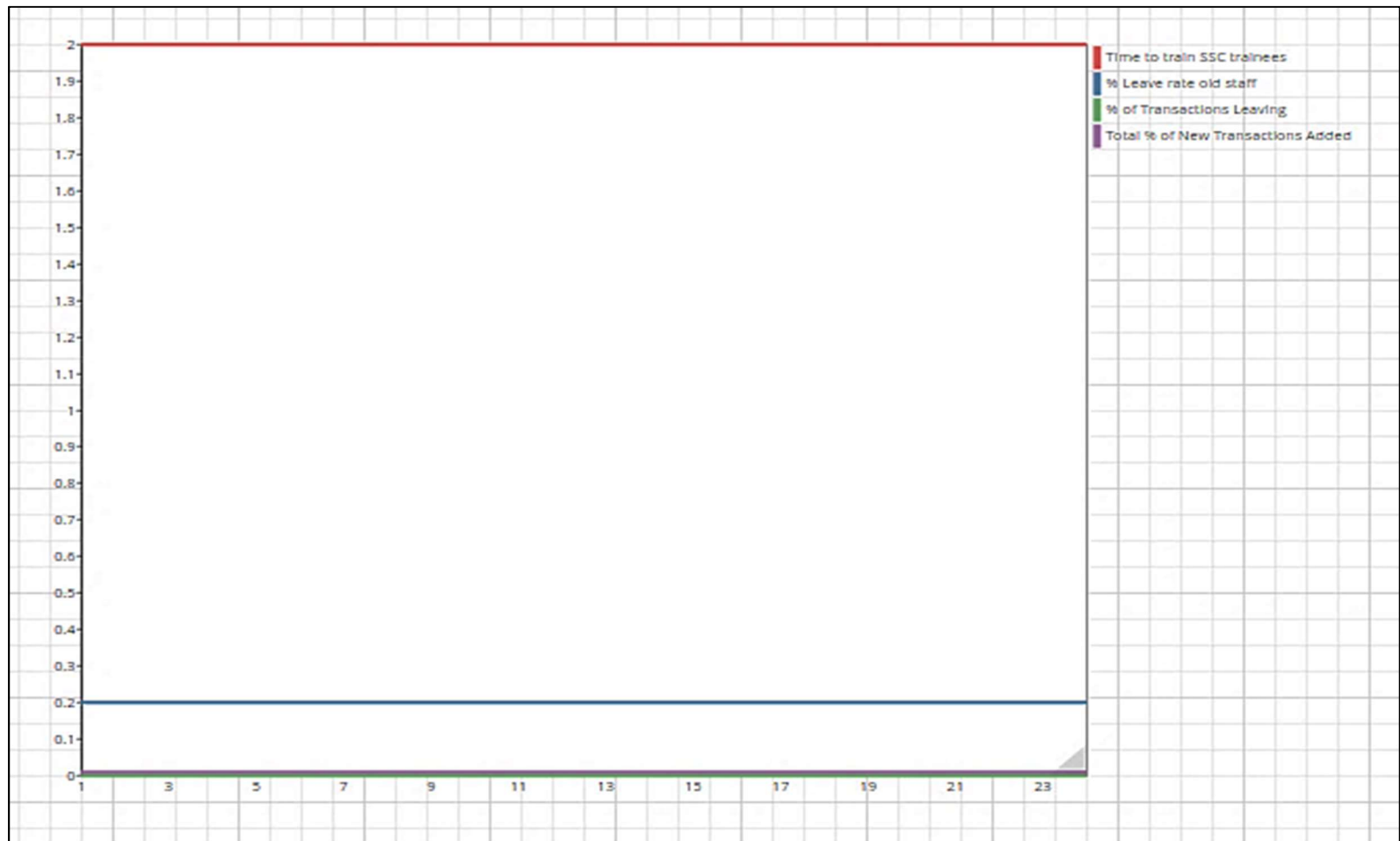
Figure 86 'Increase the 'Total % of New Transactions Added'

	% Leave rate old staff			Time to train SSC trainees			Total % of New Transactions Added			% of Transactions Leaving		
	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison Ru...	Sketched	Simulated	Comparison Ru...
1	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
2	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
3	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
4	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
5	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
6	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
7	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
8	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
9	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
10	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
11	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
12	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
13	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
14	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
15	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
16	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
17	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
18	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
19	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
20	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
21	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
22	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
23	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0
24	-	0.2	0.2	-	2	2	0	0	0.01	0	0	0

Figure 87 Tabular Depiction of 'Increase the 'Total % of New Transactions Added'

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Impact on Staff (Old Staff, SSC Staff and Temporary Staff, Staff Deficiency Gap)

By increasing the 'Total % of New Transactions Added', the required number of staff by month 24 is 14.67 (comparison run) made up of Old Staff of 0.3, SSC Staff of 6.9 and Temporary Staff of 7.5 compared to a total staff of the SSC of 7 (sketched) in month 24. This implies that to effectively manage the SSC, there needs to be a very good case made in terms of increasing the number of transactions required as this will create extra costs in the form of extra staff required. This is shown in the number of extra Temporary Staff or excess staff required (Staff of 7.5 in the comparison run compared to no staff in the sketched run). If this is not managed well, this will affect the productivity of staff and put pressure on servicing the customer. Figures 88 and 89 depict this.
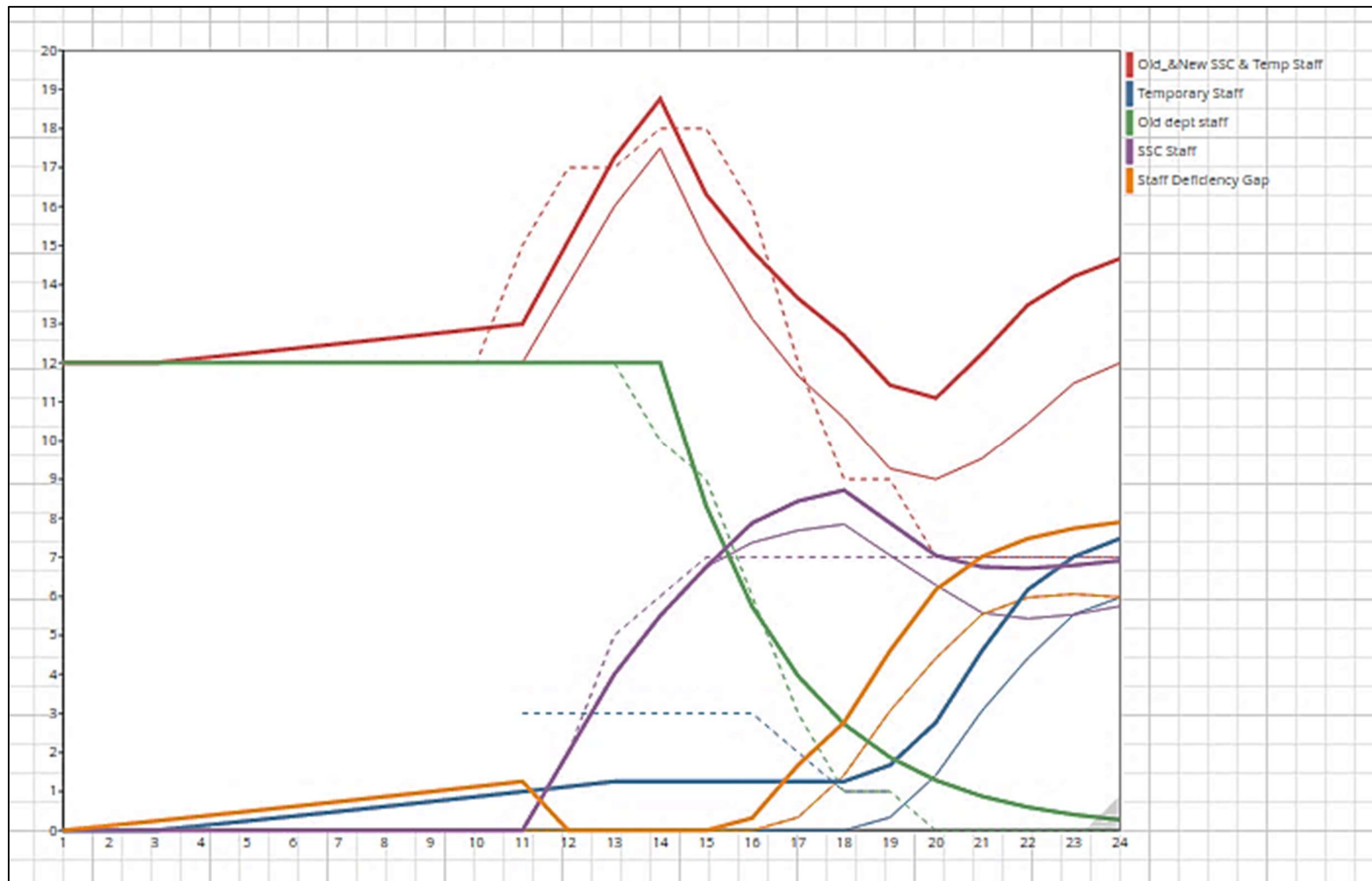
Figure 88 Impact on Staff (Old Staff, SSC Staff and Temporary Staff, Staff Deficiency Gap)

	Old_&New SSC & Temp Staff			Old dept staff			SSC Staff			Temporary Staff			Staff Deficiency Gap		
	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...
1	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
2	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0.12
3	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0.242
4	12	12	12.12	12	12	12	-	0	0	-	0	0.12	0	0	0.364
5	12	12	12.242	12	12	12	-	0	0	-	0	0.242	0	0	0.488
6	12	12	12.364	12	12	12	-	0	0	-	0	0.364	0	0	0.613
7	12	12	12.488	12	12	12	-	0	0	-	0	0.488	0	0	0.739
8	12	12	12.613	12	12	12	-	0	0	-	0	0.613	0	0	0.866
9	12	12	12.739	12	12	12	-	0	0	-	0	0.739	0	0	0.995
10	12	12	12.866	12	12	12	-	0	0	-	0	0.866	0	0	1.125
11	15	12	12.995	12	12	12	-	0	0	3	0	0.995	0	0	1.256
12	17	14	15.125	12	12	12	2	2	2	3	0	1.125	0	0	0
13	17	16	17.256	12	12	12	5	4	4	3	0	1.256	0	0	0
14	18	17.5	18.756	10	12	12	6	5.5	5.5	3	0	1.256	0	0	0
15	18	15.068	16.312	9	8.318	8.306	7	6.75	6.75	3	0	1.256	0	0	0
16	16	13.132	14.869	6	5.756	5.738	7	7.375	7.875	3	0	1.256	0	0	0.319
17	12	11.665	13.652	3	3.977	3.958	7	7.688	8.438	2	0	1.256	0.336	0.336	1.676
18	9	10.587	12.7	1	2.743	2.726	7	7.844	8.719	1	0	1.256	1.414	1.414	2.768
19	9	9.274	11.429	1	1.889	1.874	7	7.049	7.879	1	0.336	1.676	3.063	3.063	4.601
20	7	8.999	11.098	0	1.297	1.284	7	6.288	7.046	-	1.414	2.768	4.415	4.415	6.168
21	7	9.53	12.231	0	0.887	0.877	7	5.579	6.754	-	3.063	4.601	5.534	5.534	7.013
22	7	10.448	13.481	0	0.605	0.597	7	5.428	6.716	-	4.415	6.168	5.968	5.968	7.476
23	7	11.477	14.211	0	0.411	0.406	7	5.532	6.793	-	5.534	7.013	6.057	6.057	7.739
24	7	11.992	14.666	0	0.28	0.276	7	5.744	6.914	-	5.968	7.476	5.977	5.977	7.897

Figure 89 Tabular Depiction of 'Impact on Staff (Old Staff, SSC Staff and Temporary Staff, Staff Deficiency Gap)'

Impact on SGA Costs (Old Staff, Temporary Staff, SSC Staff, Total Staff)

Following on from the staff scenario discussed above, a further impact is shown by the significant increase in 'SGA costs'. Figures 90 and 91 depict this. By month 24, the 'Total Actual SGA Costs' of 1.4 million (comparison run) is higher than the 'actual costs' of 550K (sketched). The main increase is shown in the level of temporary or excess staff required. For example, in month 24, the SGA for temporary staff increases to 366K (comparison run) compared to zero for the actual data (sketched).
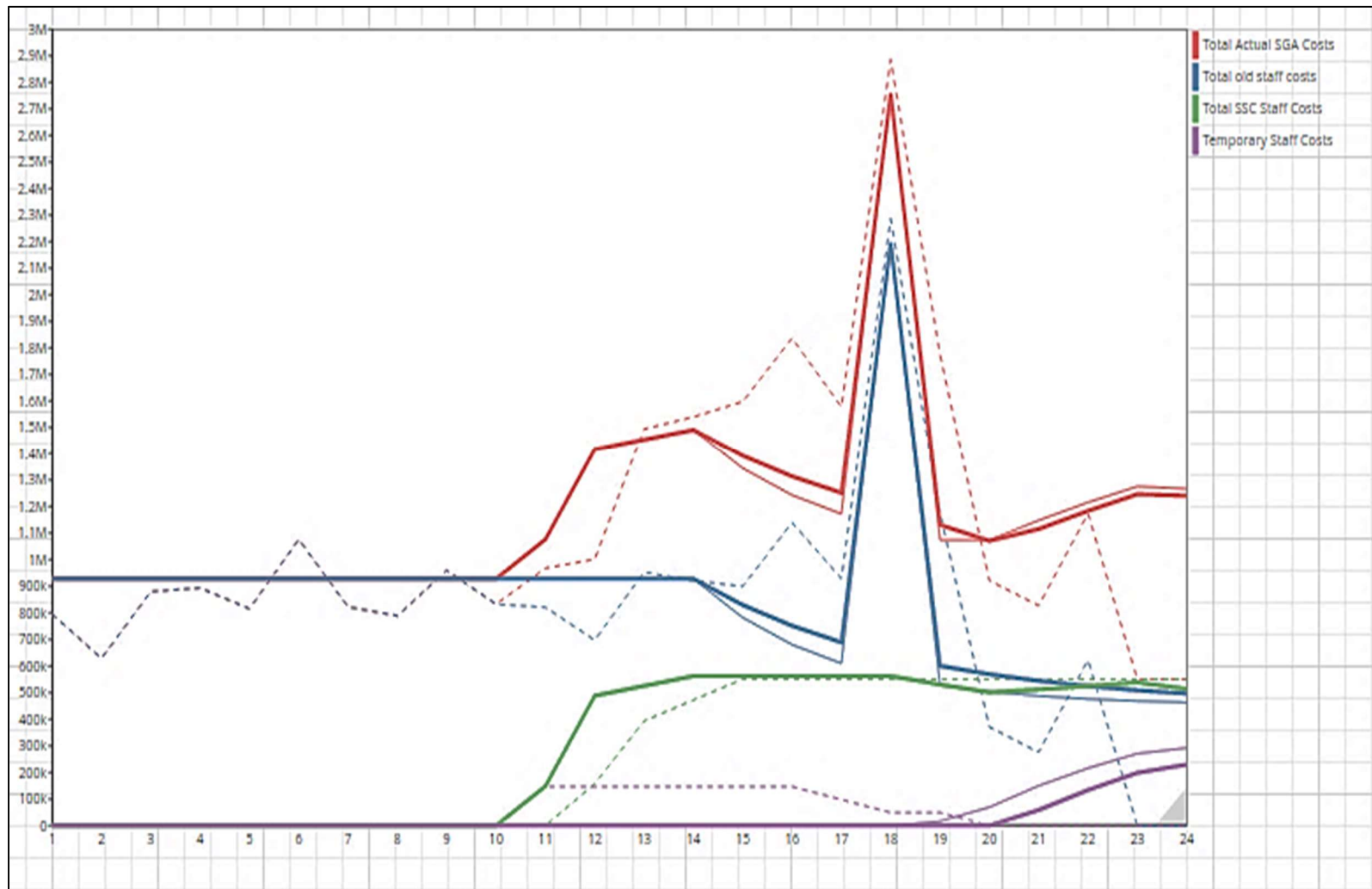
Figure 90 Impact on SGA Costs (Old Staff, Temporary Staff, SSC Staff, Total Staff)

	Total Actual SGA Costs			Total old staff costs			Temporary Staff Costs			Total SSC Staff Costs		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	795098	927870	927870	795098	927870	927870	0	0	0	0	0	0
2	628685	927870	927870	628685	927870	927870	0	0	0	0	0	0
3	879731	927891.343	927891.343	879731	927870	927870	0	21.343	21.343	0	0	0
4	893446	927891.343	933760.997	893446	927870	927870	0	21.343	5890.997	0	0	0
5	815313	927891.343	939689.347	815313	927870	927870	0	21.343	11819.347	0	0	0
6	1075910	927891.343	945676.98	1075910	927870	927870	0	21.343	17806.98	0	0	0
7	821928	927891.343	951724.49	821928	927870	927870	0	21.343	23854.49	0	0	0
8	788949	927891.343	957832.475	788949	927870	927870	0	21.343	29962.475	0	0	0
9	959368	927891.343	964001.54	959368	927870	927870	0	21.343	36131.54	0	0	0
10	832424	927891.343	970232.295	832424	927870	927870	0	21.343	42362.295	0	0	0
11	967519	1076007.343	1124641.358	820783	927870	927870	146736	21.343	48655.358	0	148116	148116
12	1001363	1416030.343	1471020.352	697256	927870	927870	146736	21.343	55011.352	157371	488139	488139
13	1493433	1453059.343	1514468.905	953269	927870	927870	146736	21.343	61430.905	393429	525168	525168
14	1539426	1490088.343	1551497.905	920575	927870	927870	146736	21.343	61430.905	472114	562197	562197
15	1597098	1344140.831	1442128.999	899562	781922.487	781472.094	146736	21.343	61430.905	550800	562197	599226
16	1836583	1242613.461	1340346.133	1139047	680395.117	679689.228	146736	21.343	61430.905	550800	562197	599226
17	1577370	1172084.929	1269786.712	928746	609866.586	609129.807	97824	21.343	61430.905	550800	562197	599226
18	2885769	2757238.343	2855676.905	2286057	2195020	2195020	48912	21.343	61430.905	550800	562197	599226
19	1774828	1073420.613	1171433.791	1175116	527114.716	526532.864	48912	16445.893	81968.807	550800	529860.004	562932.12
20	921669	1073062.441	1205018.437	370869	503650.081	503154.768	0	69157.082	135372.434	550800	500255.278	566491.235
21	826643	1147550.105	1284926.318	275843	487416.84	486997.372	0	149817.264	225038.764	550800	510316	572890.182
22	1173686	1215033.983	1357699.755	622886	476214.182	475906.347	0	215968.623	301681.331	550800	522851.179	580112.077
23	550800	1275000.813	1398568.935	0	468548.192	468331.041	0	270668.801	342995.721	550800	535783.82	587242.173
24	550800	1266407.604	1422746.209	0	463329.633	463173.033	0	291914.056	365673.554	550800	511163.915	593899.623

Figure 91 Impact on SGA Costs (Old Staff, Temporary Staff, SSC Staff, Total Staff)

Impact on Transactions (Total, Pre-&SSC Transactions, Transaction Deficiency Gap)

The number of transactions increases as a result of the increase in the 'Total % of New Transactions Added' (comparison run vs sketched). This implies that it is important to manage the level of transactional activities during the SSC transition to avoid extra costs which will affect productivity etc. Figures 92 and 93 below depict this.
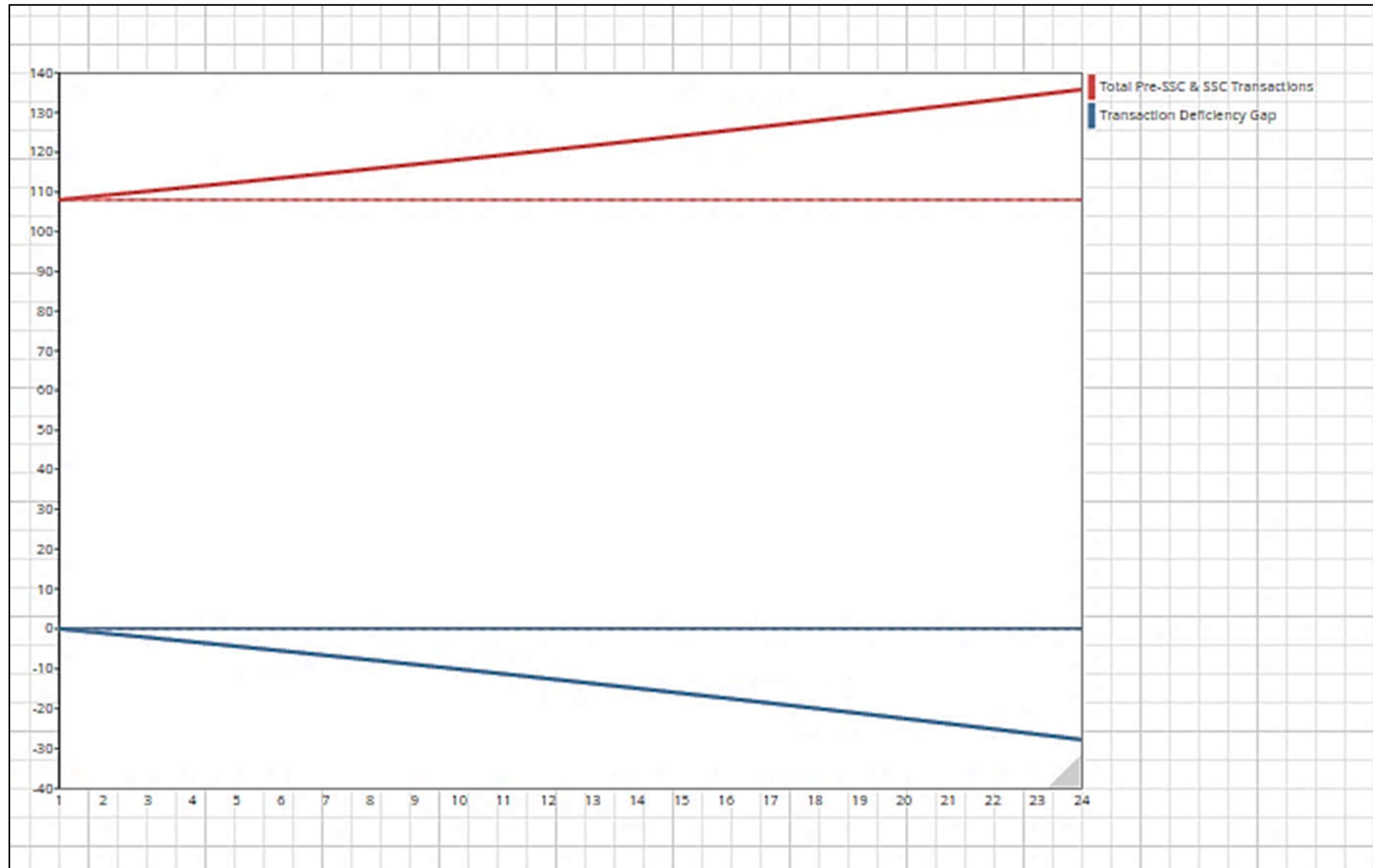
Figure 92 Impact on Transactions (Total, Pre-&SSC Transactions, Transaction Deficiency Gap)

	Total Pre-SSC & SSC Transactions			Transaction Deficiency Gap		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	108	108	108	0	0	0
2	108	108	109.08	0	0	-1.08
3	108	108	110.171	0	0	-2.171
4	108	108	111.273	0	0	-3.273
5	108	108	112.385	0	0	-4.385
6	108	108	113.509	0	0	-5.509
7	108	108	114.644	0	0	-6.644
8	108	108	115.791	0	0	-7.791
9	108	108	116.949	0	0	-8.949
10	108	108	118.118	0	0	-10.118
11	108	108	119.299	0	0	-11.299
12	108	108	120.492	0	0	-12.492
13	108	108	121.697	0	0	-13.697
14	108	108	122.914	0	0	-14.914
15	108	108	124.143	0	0	-16.143
16	108	108	125.385	0	0	-17.385
17	108	108	126.638	0	0	-18.638
18	108	108	127.905	0	0	-19.905
19	108	108	129.184	0	0	-21.184
20	108	108	130.476	0	0	-22.476
21	108	108	131.781	0	0	-23.781
22	108	108	133.098	0	0	-25.098
23	108	108	134.429	0	0	-26.429
24	108	108	135.774	0	0	-27.774

Figure 93 Tabular Depiction of 'Impact on Transactions (Total, Pre &SSC Transactions, Transaction Deficiency Gap)'

Impact on Workload (Total Pre-SSC & Post SSC Workload, Total Staff, Old & New Capacity)

The workload (comparison run vs sketched) increases following the increase in the 'Total % of New Transactions Added'. For the Staff Capacity Hours, especially between month 17 to month 24 (comparison vs sketched), there is an increase in the staff hours available (1186 vs 993) as a result of the fact that temporary or excess staff are being used instead of using SSC staff. Figures 94 and 95 depict this.
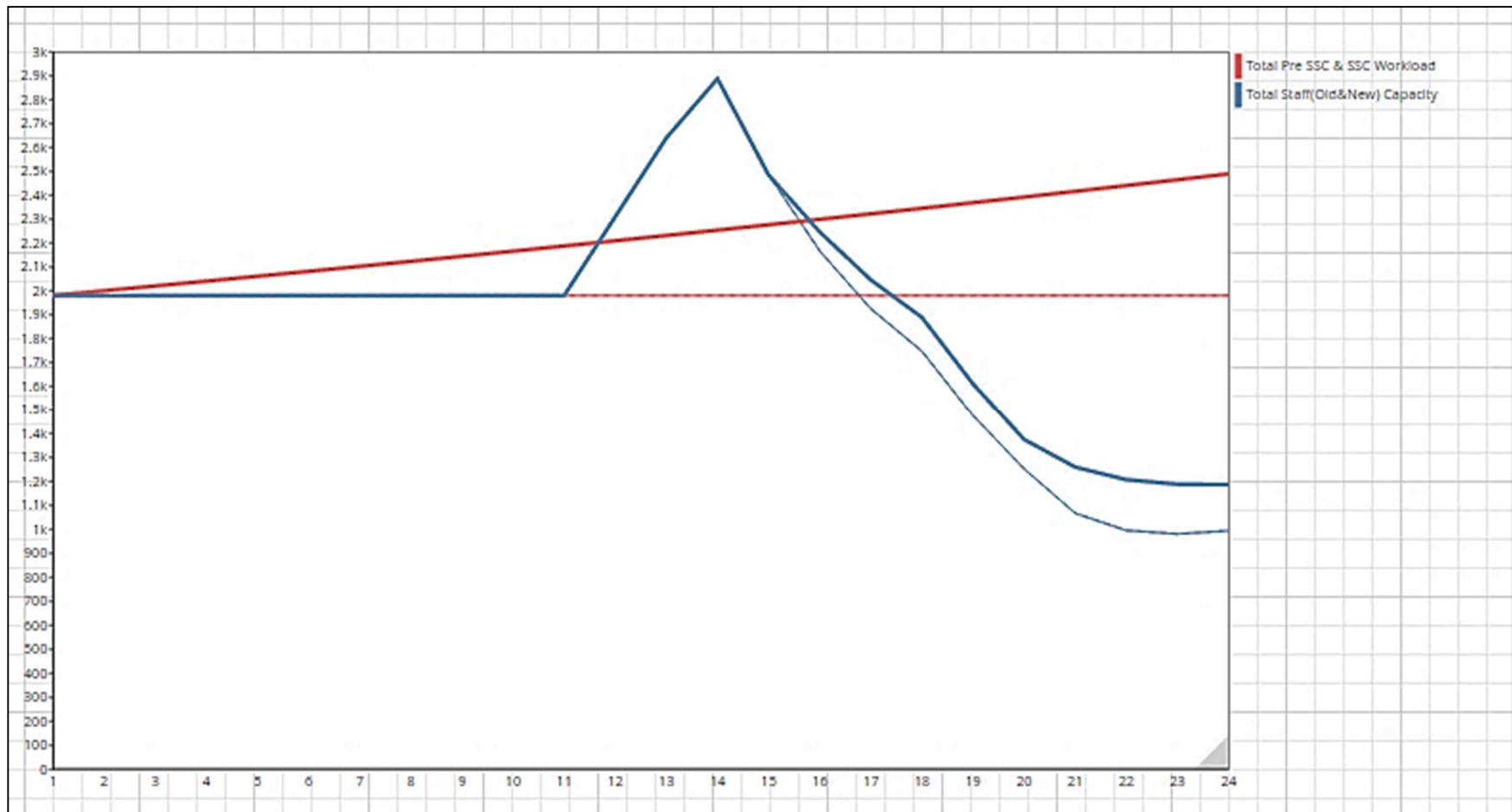
Figure 94 Impact on Workload (Total Pre SSC & Post SSC Workload, Total Staff, Old & New Capacity)

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	Total Pre SSC & SSC Workload			Total Staff(Old&New) Capacity		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	1980.072	1980.072	1980.072	1980	1980	1980
2	1980.072	1980.072	1999.873	1980	1980	1980
3	1980.072	1980.072	2019.871	1980	1980	1980
4	1980.072	1980.072	2040.07	1980	1980	1980
5	1980.072	1980.072	2060.471	1980	1980	1980
6	1980.072	1980.072	2081.076	1980	1980	1980
7	1980.072	1980.072	2101.886	1980	1980	1980
8	1980.072	1980.072	2122.905	1980	1980	1980
9	1980.072	1980.072	2144.134	1980	1980	1980
10	1980.072	1980.072	2165.576	1980	1980	1980
11	1980.072	1980.072	2187.231	1980	1980	1980
12	1980.072	1980.072	2209.104	2310	2310	2310
13	1980.072	1980.072	2231.195	2640	2640	2640
14	1980.072	1980.072	2253.507	2887.5	2887.5	2887.5
15	1980.072	1980.072	2276.042	2486.172	2486.172	2484.297
16	1980.072	1980.072	2298.802	2166.64	2166.64	2246.202
17	1980.072	1980.072	2321.79	1924.593	1924.593	2045.276
18	1980.072	1980.072	2345.008	1746.777	1746.777	1888.342
19	1980.072	1980.072	2368.458	1474.678	1474.678	1609.311
20	1980.072	1980.072	2392.143	1251.522	1251.522	1374.449
21	1980.072	1980.072	2416.064	1066.996	1066.996	1259.001
22	1980.072	1980.072	2440.225	995.328	995.328	1206.66
23	1980.072	1980.072	2464.627	980.597	980.597	1187.72
24	1980.072	1980.072	2489.273	993.945	993.945	1186.326

Figure 95 Tabular Depiction of 'Impact on Workload (Total Pre SSC & Post SSC Workload, Total Staff, Old & New Capacity)'

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Impact on Customer Service Effect (Client/Other Staff, Support Quality, Work Errors)

As a consequence of the increase of the 'Total % of New Transactions Added' the pressure on staff increases, employees are more prone to work errors, support for clients / other staff reduces and there is a potential impact of losing the clients/other staff. Although it is assumed that this will be covered by temporary or excess staff, a company with very little resources will find this situation problematic, as it may suddenly realise that it does not have enough resources to be able to employ excess staff. Miskon et al. (2011) identified resources as a critical success factor in the establishment of an SSC. Figures 96 and 97 show the impact on Customer Service Effect.
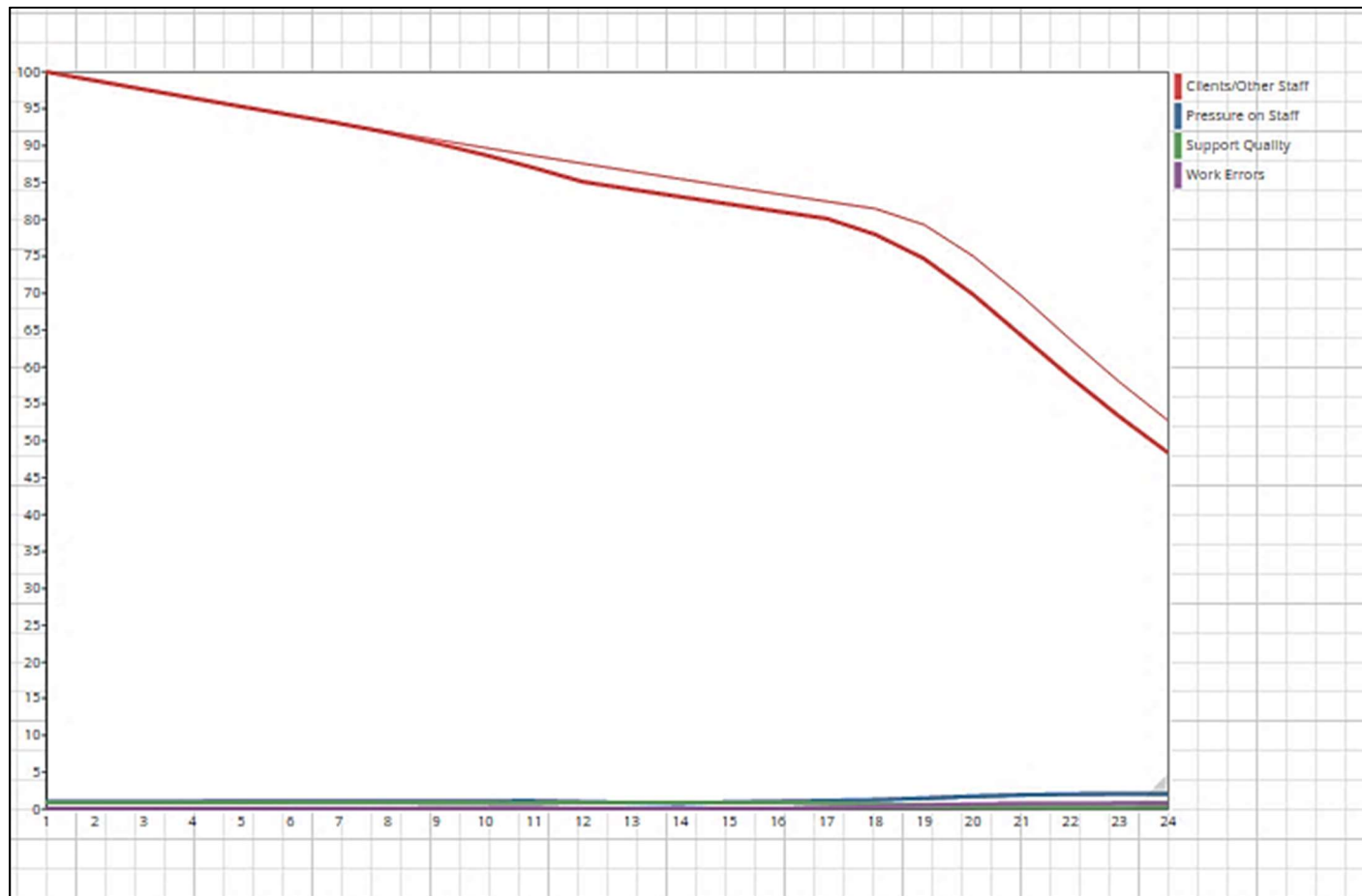
Figure 96 Impact on Customer Service Effect (Client/Other Staff, Support Quality, Work Errors)

	Clients/Other Staff			Pressure on Staff			Support Quality			Work Errors		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	-	100	100	-	1	1	-	0.9	0.9	-	0.1	0.1
2	-	98.8	98.8	-	1	1.01	-	0.9	0.9	-	0.1	0.1
3	-	97.614	97.614	-	1	1.02	-	0.9	0.9	-	0.1	0.1
4	-	96.443	96.443	-	1	1.03	-	0.9	0.9	-	0.1	0.1
5	-	95.286	95.286	-	1	1.041	-	0.9	0.9	-	0.1	0.1
6	-	94.142	94.142	-	1	1.051	-	0.9	0.9	-	0.1	0.1
7	-	93.013	93.013	-	1	1.062	-	0.9	0.887	-	0.1	0.113
8	-	91.898	91.756	-	1	1.072	-	0.9	0.87	-	0.1	0.13
9	-	90.794	90.323	-	1	1.083	-	0.9	0.853	-	0.1	0.147
10	-	89.704	88.727	-	1	1.094	-	0.9	0.836	-	0.1	0.164
11	-	88.628	86.981	-	1	1.105	-	0.9	0.819	-	0.1	0.181
12	-	87.564	85.096	-	0.857	0.956	-	0.9	0.9	-	0.1	0.1
13	-	86.513	84.075	-	0.75	0.845	-	0.9	0.9	-	0.1	0.1
14	-	85.475	83.066	-	0.686	0.78	-	0.9	0.9	-	0.1	0.1
15	-	84.45	82.07	-	0.796	0.916	-	0.9	0.9	-	0.1	0.1
16	-	83.436	81.085	-	0.914	1.023	-	0.9	0.9	-	0.1	0.1
17	-	82.435	80.112	-	1.029	1.135	-	0.9	0.776	-	0.1	0.224
18	-	81.446	77.958	-	1.134	1.242	-	0.778	0.648	-	0.222	0.352
19	-	79.278	74.669	-	1.343	1.472	-	0.555	0.462	-	0.445	0.538
20	-	75.042	69.846	-	1.582	1.74	-	0.399	0.33	-	0.601	0.67
21	-	69.634	64.231	-	1.856	1.919	-	0.29	0.272	-	0.71	0.728
22	-	63.704	58.617	-	1.989	2.022	-	0.253	0.245	-	0.747	0.755
23	-	57.992	53.303	-	2.019	2.075	-	0.245	0.232	-	0.755	0.768
24	-	52.739	48.392	-	1.992	2.098	-	0.252	0.227	-	0.748	0.773

Figure 97 Tabular Depiction of Impact on Customer Service Effect (Client/Other Staff, Support Quality, Work Errors)

c) Scenario Three (3)

Scenario 3: Increase Time to train SSC trainees		
	Current	Simulated or Change
Increase Time to train SSC trainees	2	4

Scenario Three (3) involves increasing the 'Time to train SSC trainees'.

Figures 98 and 99 depict this.
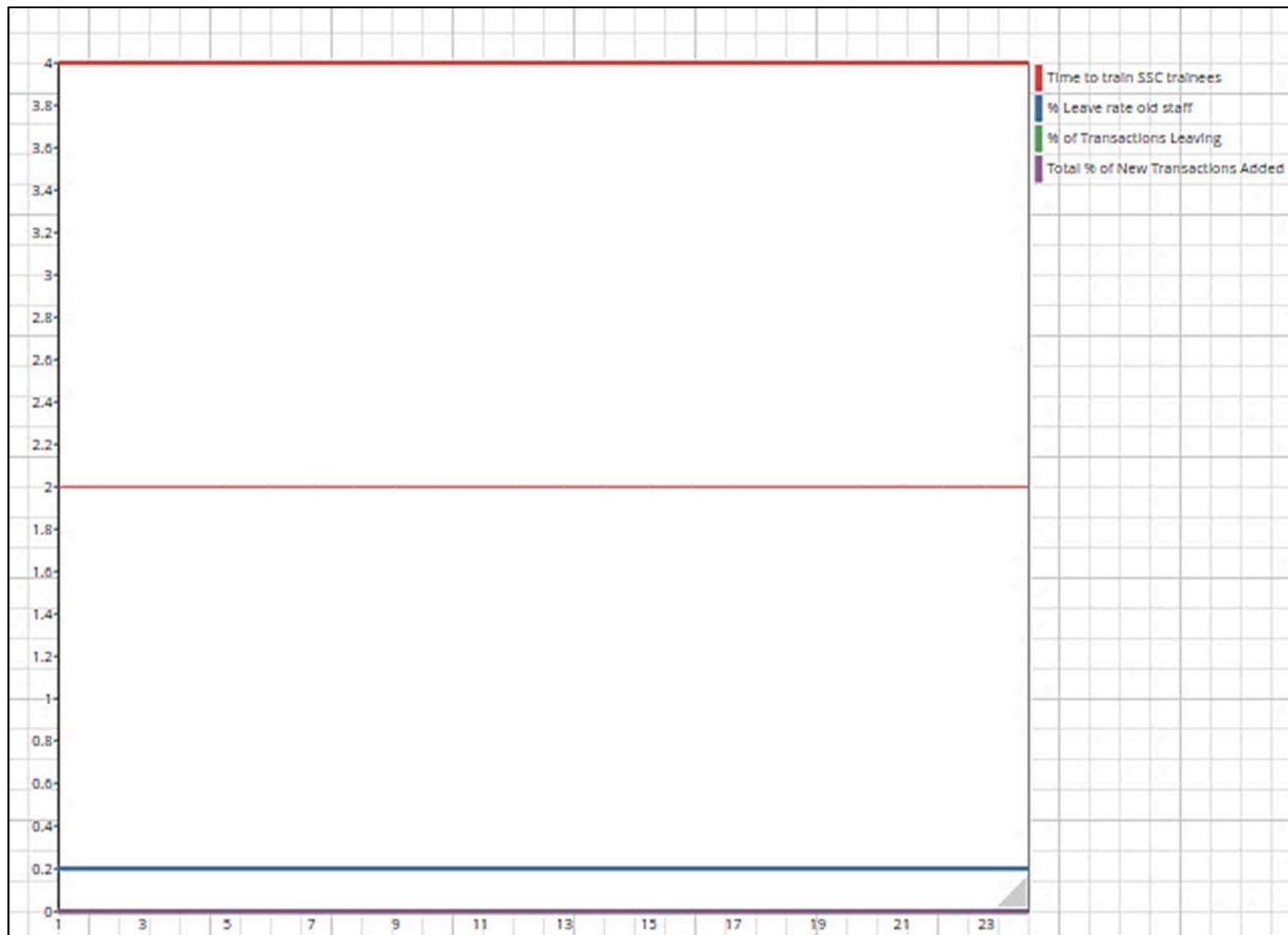
Figure 98 Increase Time to train SSC trainees

	% Leave rate old staff			Time to train SSC trainees			Total % of New Transactions Added			% of Transactions Leaving		
	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison Ru...	Sketched	Simulated	Comparison Ru...
1	-	0.2	0.2	-	2	4	0	0	0	0	0	0
2	-	0.2	0.2	-	2	4	0	0	0	0	0	0
3	-	0.2	0.2	-	2	4	0	0	0	0	0	0
4	-	0.2	0.2	-	2	4	0	0	0	0	0	0
5	-	0.2	0.2	-	2	4	0	0	0	0	0	0
6	-	0.2	0.2	-	2	4	0	0	0	0	0	0
7	-	0.2	0.2	-	2	4	0	0	0	0	0	0
8	-	0.2	0.2	-	2	4	0	0	0	0	0	0
9	-	0.2	0.2	-	2	4	0	0	0	0	0	0
10	-	0.2	0.2	-	2	4	0	0	0	0	0	0
11	-	0.2	0.2	-	2	4	0	0	0	0	0	0
12	-	0.2	0.2	-	2	4	0	0	0	0	0	0
13	-	0.2	0.2	-	2	4	0	0	0	0	0	0
14	-	0.2	0.2	-	2	4	0	0	0	0	0	0
15	-	0.2	0.2	-	2	4	0	0	0	0	0	0
16	-	0.2	0.2	-	2	4	0	0	0	0	0	0
17	-	0.2	0.2	-	2	4	0	0	0	0	0	0
18	-	0.2	0.2	-	2	4	0	0	0	0	0	0
19	-	0.2	0.2	-	2	4	0	0	0	0	0	0
20	-	0.2	0.2	-	2	4	0	0	0	0	0	0
21	-	0.2	0.2	-	2	4	0	0	0	0	0	0
22	-	0.2	0.2	-	2	4	0	0	0	0	0	0
23	-	0.2	0.2	-	2	4	0	0	0	0	0	0
24	-	0.2	0.2	-	2	4	0	0	0	0	0	0

Figure 99 Tabular Depiction of 'Increase Time to train SSC trainees'

Impact on Staff (Old Staff, SSC Staff and Temporary Staff, Staff Deficiency Gap)

By increasing the 'Time to train SSC trainees', the required number of staff by month 24 is 11.4 (comparison run) made up of Old Staff of 0.3, SSC Staff of 4.8, and Temporary Staff of 6.3 compared to a total staff of the SSC of 7 (sketched) in month 24. This implies that in order to effectively manage the SSC, it is important that an optimum solution is found when increasing the length to train staff or the calibre of staff recruited. This is shown in the significant number of extra temporary or excess staff required (Staff of 6.3 in the comparison run compared to no staff in the sketched run). If this is not managed well, this will affect the productivity of staff and put pressure on servicing the customer. Figures 100 and 101 depict this.
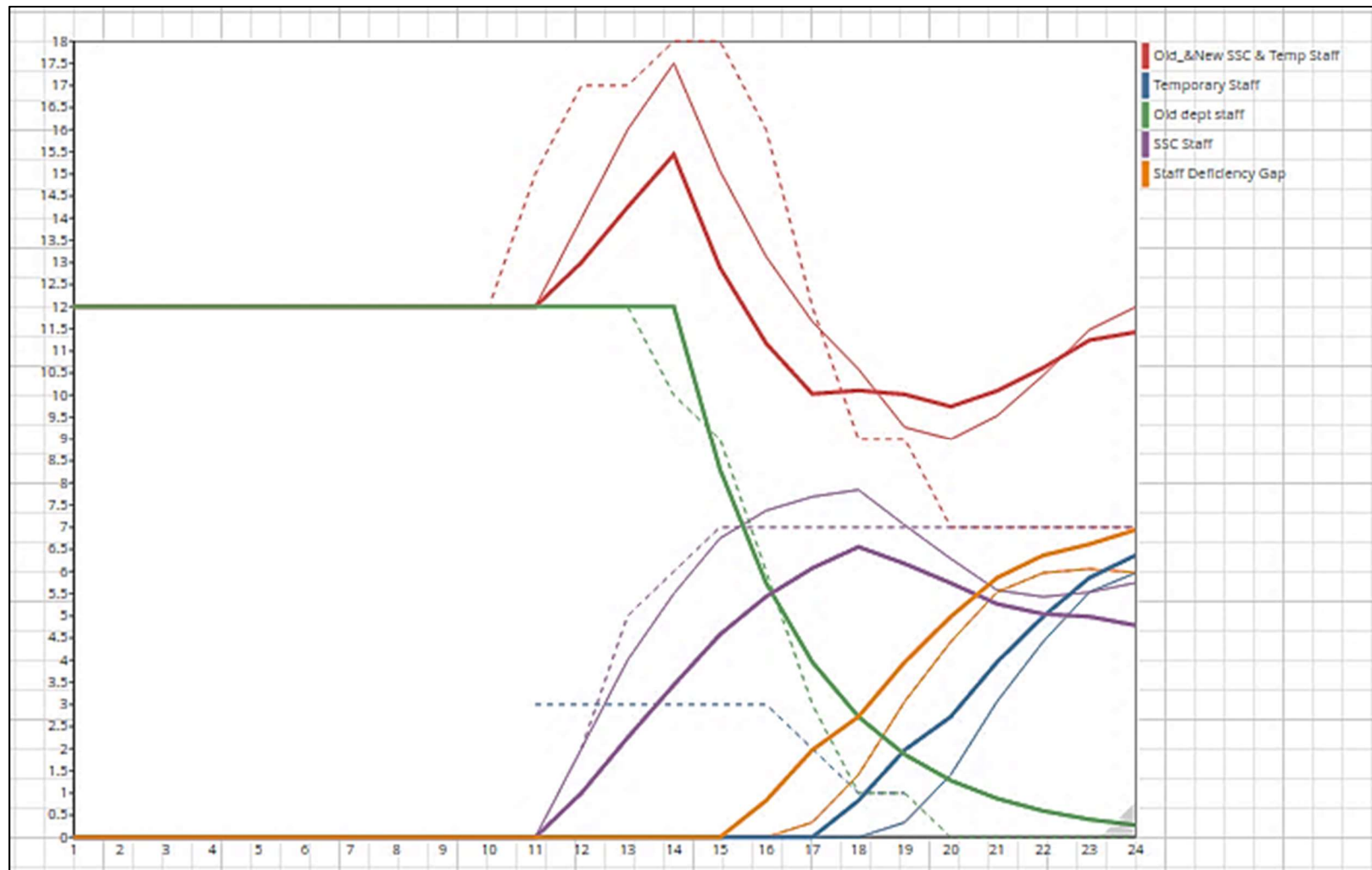
Figure 100 Impact on Staff (Old Staff, SSC Staff and Temporary Staff, Staff Deficiency Gap)

	Old_&New SSC & Temp Staff			Old dept staff			SSC Staff			Temporary Staff			Staff Deficiency Gap		
	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...
1	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
2	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
3	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
4	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
5	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
6	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
7	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
8	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
9	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
10	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
11	15	12	12	12	12	12	-	0	0	3	0	0	0	0	0
12	17	14	13	12	12	12	2	2	1	3	0	0	0	0	0
13	17	16	14.25	12	12	12	5	4	2.25	3	0	0	0	0	0
14	18	17.5	15.438	10	12	12	6	5.5	3.438	3	0	0	0	0	0
15	18	15.068	12.885	9	8.318	8.307	7	6.75	4.578	3	0	0	0	0	0
16	16	13.132	11.171	6	5.756	5.737	7	7.375	5.434	3	0	0	0	0	0.83
17	12	11.665	10.03	3	3.977	3.955	7	7.688	6.075	2	0	0	0.336	0.336	1.971
18	9	10.587	10.107	1	2.743	2.721	7	7.844	6.556	1	0	0.83	1.414	1.414	2.723
19	9	9.274	10.017	1	1.889	1.869	7	7.049	6.177	1	0.336	1.971	3.063	3.063	3.954
20	7	8.999	9.742	0	1.297	1.281	7	6.288	5.738	-	1.414	2.723	4.415	4.415	4.982
21	7	9.53	10.098	0	0.887	0.875	7	5.579	5.269	-	3.063	3.954	5.534	5.534	5.857
22	7	10.448	10.618	0	0.605	0.595	7	5.428	5.041	-	4.415	4.982	5.968	5.968	6.364
23	7	11.477	11.242	0	0.411	0.404	7	5.532	4.982	-	5.534	5.857	6.057	6.057	6.615
24	7	11.992	11.424	0	0.28	0.274	7	5.744	4.786	-	5.968	6.364	5.977	5.977	6.941

Figure 101 Tabular Depiction of 'Impact on Staff (Old Staff, SSC Staff and Temporary Staff, Staff Deficiency Gap)'

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Impact on SGA Costs (Old Staff, Temporary Staff, SSC Staff, Total Staff)

Following on from the staff scenario discussed above, the impact is shown by the significant increase in 'SGA costs'. By month 24, the 'Total Actual SGA Costs' of 1.3 million (comparison run) is higher than the 'actual costs' of 550K (sketched). The main increase is shown in the level of temporary or excess staff required. For example, in month 24 the 'SGA costs' for temporary staff increases to 311K (comparison run) compared to zero for the actual data (sketched). Figures 102 and 103 depict this.
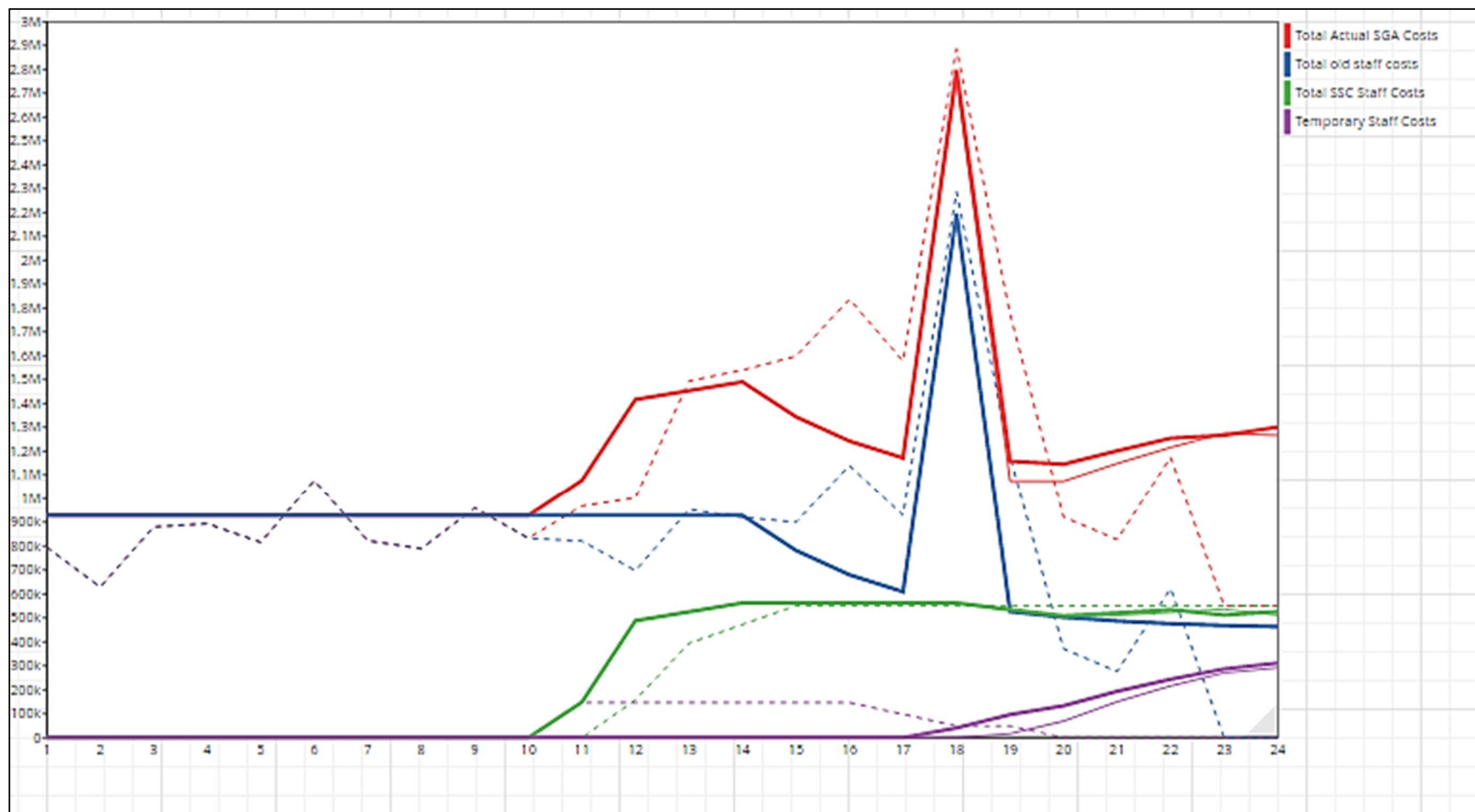
Figure 102 Impact on SGA Costs (Old Staff, Temporary Staff, SSC Staff, Total Staff)

	Total Actual SGA Costs			Total old staff costs			Temporary Staff Costs			Total SSC Staff Costs		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	795098	927870	927870	795098	927870	927870	0	0	0	0	0	0
2	628685	927870	927870	628685	927870	927870	0	0	0	0	0	0
3	879731	927891.343	927891.343	879731	927870	927870	0	21.343	21.343	0	0	0
4	893446	927891.343	927891.343	893446	927870	927870	0	21.343	21.343	0	0	0
5	815313	927891.343	927891.343	815313	927870	927870	0	21.343	21.343	0	0	0
6	1075910	927891.343	927891.343	1075910	927870	927870	0	21.343	21.343	0	0	0
7	821928	927891.343	927891.343	821928	927870	927870	0	21.343	21.343	0	0	0
8	788949	927891.343	927891.343	788949	927870	927870	0	21.343	21.343	0	0	0
9	959368	927891.343	927891.343	959368	927870	927870	0	21.343	21.343	0	0	0
10	832424	927891.343	927891.343	832424	927870	927870	0	21.343	21.343	0	0	0
11	967519	1076007.343	1076007.343	820783	927870	927870	146736	21.343	21.343	0	148116	148116
12	1001363	1416030.343	1416030.343	697256	927870	927870	146736	21.343	21.343	157371	488139	488139
13	1493433	1453059.343	1453059.343	953269	927870	927870	146736	21.343	21.343	393429	525168	525168
14	1539426	1490088.343	1490088.343	920575	927870	927870	146736	21.343	21.343	472114	562197	562197
15	1597098	1344140.831	1343705.082	899562	781922.487	781486.738	146736	21.343	21.343	550800	562197	562197
16	1836583	1242613.461	1241867.079	1139047	680395.117	679649.335	146736	21.343	21.343	550800	562197	562197
17	1577370	1172084.929	1171205.028	928746	609866.586	608986.684	97824	21.343	21.343	550800	562197	562197
18	2885769	2757238.343	2797789.799	2286057	2195020	2195020	48912	21.343	40572.799	550800	562197	562197
19	1774828	1073420.613	1157514.989	1175116	527114.716	526343.284	48912	16445.893	96392.792	550800	529860.004	534778.914
20	921669	1073062.441	1144703.004	370869	503650.081	503010.246	0	69157.082	133197.342	550800	500255.278	508495.416
21	826643	1147550.105	1200967.413	275843	487416.84	486914.247	0	149817.264	193407.719	550800	510316	520645.446
22	1173686	1215033.983	1253872.224	622886	476214.182	475837.85	0	215968.623	243680.971	550800	522851.179	534353.403
23	550800	1275000.813	1266448.669	0	468548.192	468259.289	0	270668.801	286477.842	550800	535783.82	511711.538
24	550800	1266407.604	1300560.566	0	463329.633	463099.765	0	291914.056	311276.704	550800	511163.915	526184.097

Figure 103 Impact on SGA Costs (Old Staff, Temporary Staff, SSC Staff, Total Staff)

Impact on Transactions (Total, Pre &SSC Transactions, Transaction Deficiency Gap)

Regarding the impact on SSC Transactions, the number of transactions remain the same (comparison run vs sketched). This implies that by increasing the 'Time to train SSC trainees' the only reduction from an SSC perspective was from the staff. However, these hidden extra costs should manifest itself in other forms such as productivity etc. The implication is that it is important to manage carefully the level of activities (transactional) during the SSC transition. Figures 104 and 105 below depict this.
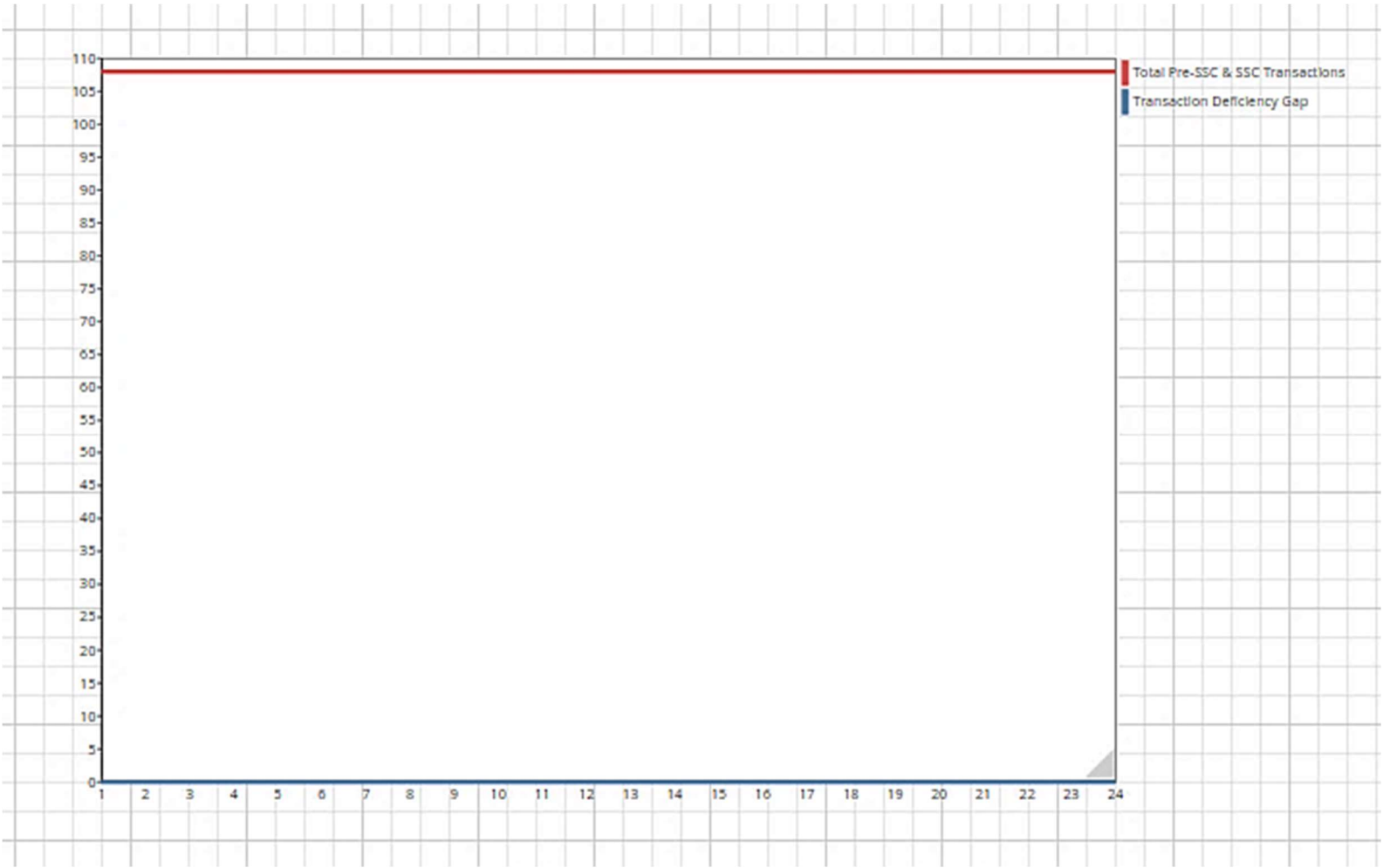
Figure 104 Impact on Transactions (Total, Pre &SSC Transactions, Transaction Deficiency Gap)

	Total Pre-SSC & SSC Transactions			Transaction Deficiency Gap		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	108	108	108	0	0	0
2	108	108	108	0	0	0
3	108	108	108	0	0	0
4	108	108	108	0	0	0
5	108	108	108	0	0	0
6	108	108	108	0	0	0
7	108	108	108	0	0	0
8	108	108	108	0	0	0
9	108	108	108	0	0	0
10	108	108	108	0	0	0
11	108	108	108	0	0	0
12	108	108	108	0	0	0
13	108	108	108	0	0	0
14	108	108	108	0	0	0
15	108	108	108	0	0	0
16	108	108	108	0	0	0
17	108	108	108	0	0	0
18	108	108	108	0	0	0
19	108	108	108	0	0	0
20	108	108	108	0	0	0
21	108	108	108	0	0	0
22	108	108	108	0	0	0
23	108	108	108	0	0	0
24	108	108	108	0	0	0

Figure 105 Tabular Depiction of Impact on Transactions (Total, Pre &SSC Transactions, Transaction Deficiency Gap)

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Impact on Workload (Total Pre-SSC & Post SSC Workload, Total Staff, Old & New Capacity)

Regarding the impact on workload, the workload (comparison run vs sketched) remains the same following the increase in the 'Time to train SSC trainees. Furthermore, for the 'Staff Capacity Hours' especially between month 17 to month 24 (comparison vs sketched), there is a decrease in the staff hours available (835 vs 993). Figures 106 and 107 depict this.
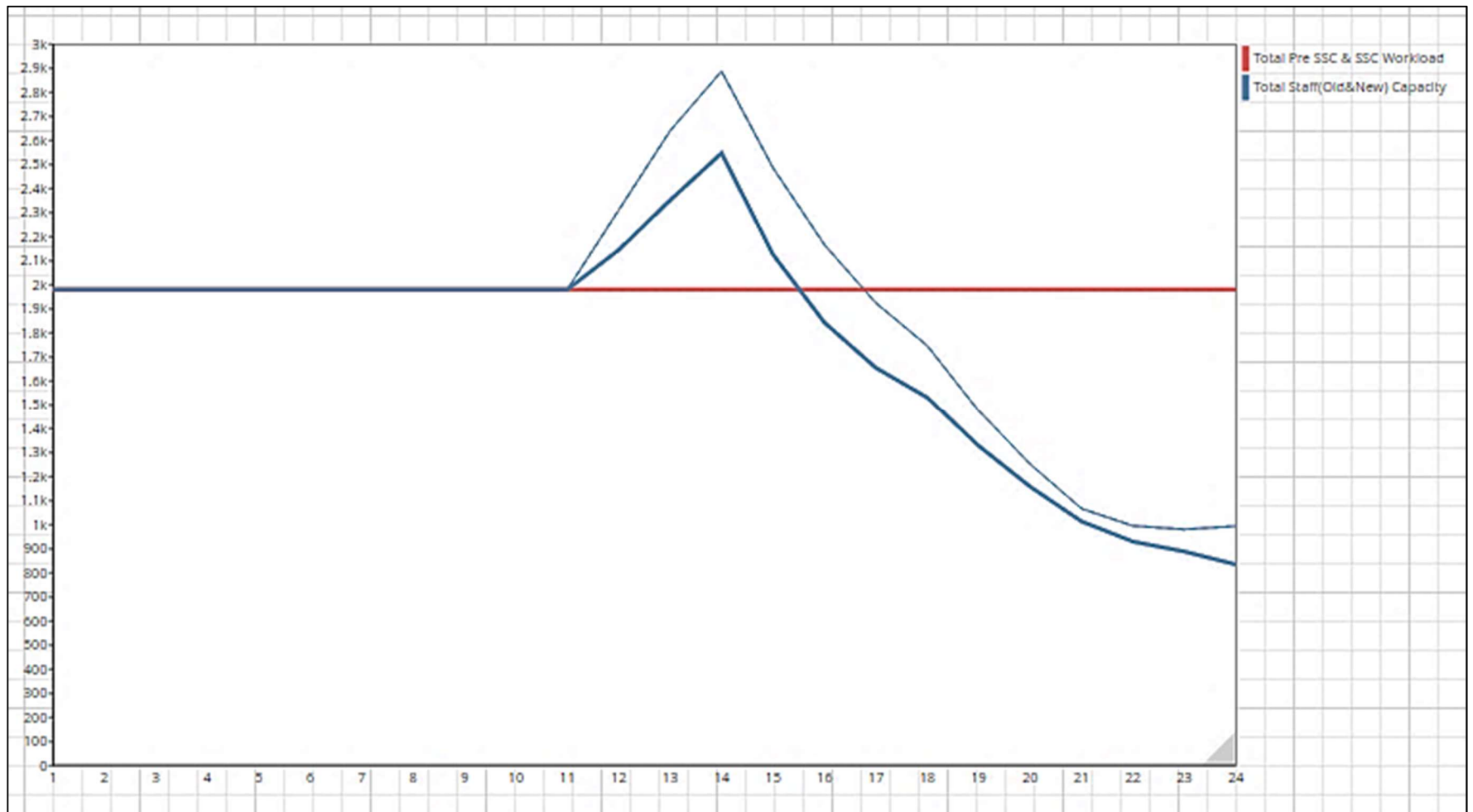
Figure 106 Impact on Workload (Total Pre SSC & Post SSC Workload, Total Staff, Old & New Capacity)

	Total Pre SSC & SSC Workload			Total Staff(Old&New) Capacity		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	1980.072	1980.072	1980.072	1980	1980	1980
2	1980.072	1980.072	1980.072	1980	1980	1980
3	1980.072	1980.072	1980.072	1980	1980	1980
4	1980.072	1980.072	1980.072	1980	1980	1980
5	1980.072	1980.072	1980.072	1980	1980	1980
6	1980.072	1980.072	1980.072	1980	1980	1980
7	1980.072	1980.072	1980.072	1980	1980	1980
8	1980.072	1980.072	1980.072	1980	1980	1980
9	1980.072	1980.072	1980.072	1980	1980	1980
10	1980.072	1980.072	1980.072	1980	1980	1980
11	1980.072	1980.072	1980.072	1980	1980	1980
12	1980.072	1980.072	1980.072	2310	2310	2145
13	1980.072	1980.072	1980.072	2640	2640	2351.25
14	1980.072	1980.072	1980.072	2887.5	2887.5	2547.188
15	1980.072	1980.072	1980.072	2486.172	2486.172	2125.999
16	1980.072	1980.072	1980.072	2166.64	2166.64	1843.204
17	1980.072	1980.072	1980.072	1924.593	1924.593	1654.9
18	1980.072	1980.072	1980.072	1746.777	1746.777	1530.743
19	1980.072	1980.072	1980.072	1474.678	1474.678	1327.629
20	1980.072	1980.072	1980.072	1251.522	1251.522	1158.037
21	1980.072	1980.072	1980.072	1066.996	1066.996	1013.666
22	1980.072	1980.072	1980.072	995.328	995.328	930.01
23	1980.072	1980.072	1980.072	980.597	980.597	888.598
24	1980.072	1980.072	1980.072	993.945	993.945	834.88

Figure 107 Tabular Depiction of 'Impact on Workload (Total Pre SSC & Post SSC Workload, Total Staff, Old & New Capacity)'

Impact on Customer Service Effect (Client/Other Staff, Support Quality, Work Errors)

As a consequence of the increase in the 'Time to train SSC trainees', the pressure on staff in month 24, which is 2.37 (comparison run) compared to 1.992 (simulated) increases significantly thereby resulting in employees more prone to work errors. In addition, support for 'clients/other staff' reduce significantly and the potential impact of losing 'clients/other staff' becomes much greater. Although it is assumed that this will be covered by temporary or excess staff, a company with very little resources will find this situation problematic, as it may suddenly realise that it does not have enough resources to be able to employ excess staff. Figures 108 and 109 depict this.
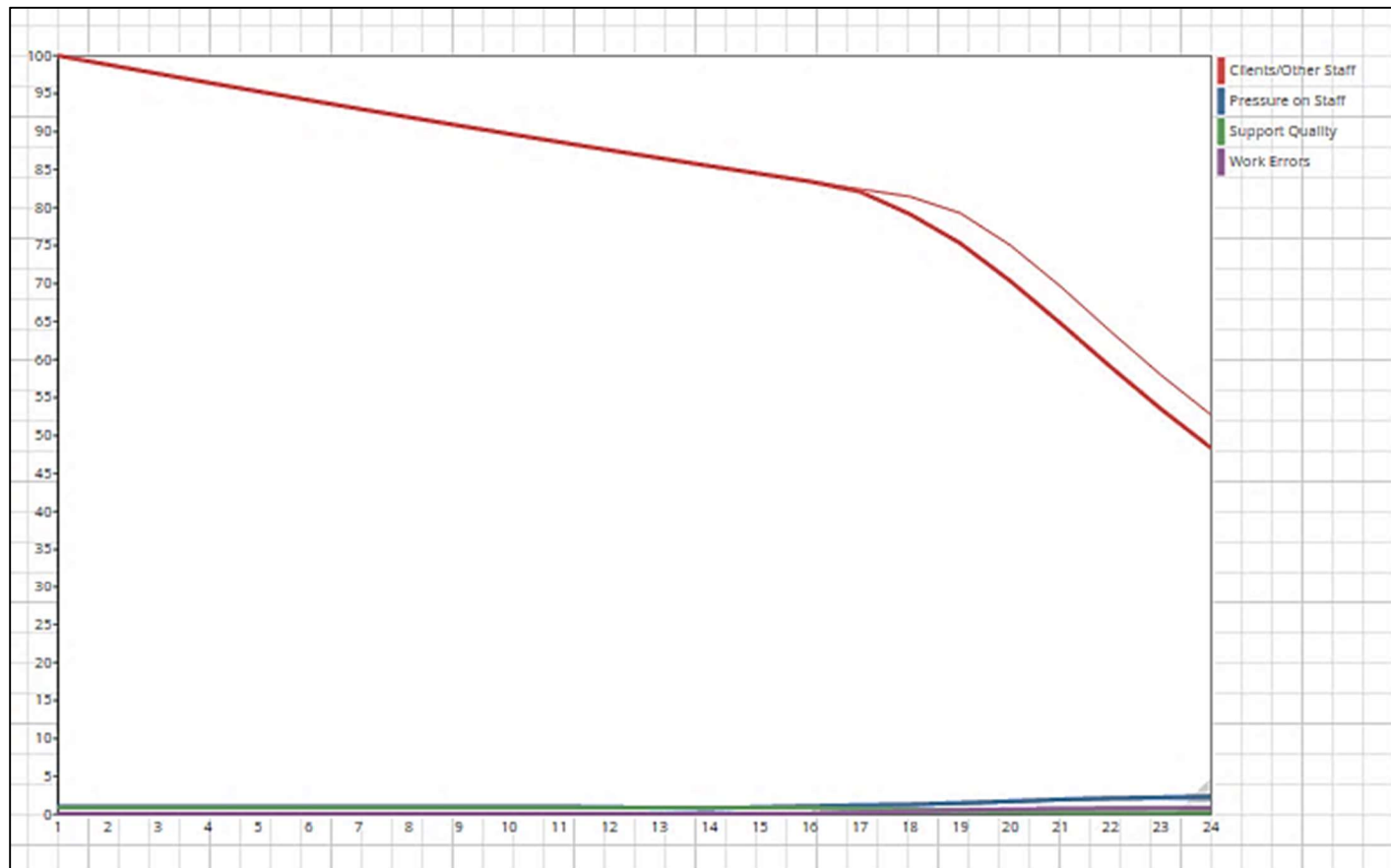
Figure 108 Impact on Customer Service Effect (Client/Other Staff, Support Quality, Work Errors)

	Clients/Other Staff			Pressure on Staff			Support Quality			Work Errors		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	-	100	100	-	1	1	-	0.9	0.9	-	0.1	0.1
2	-	98.8	98.8	-	1	1	-	0.9	0.9	-	0.1	0.1
3	-	97.614	97.614	-	1	1	-	0.9	0.9	-	0.1	0.1
4	-	96.443	96.443	-	1	1	-	0.9	0.9	-	0.1	0.1
5	-	95.286	95.286	-	1	1	-	0.9	0.9	-	0.1	0.1
6	-	94.142	94.142	-	1	1	-	0.9	0.9	-	0.1	0.1
7	-	93.013	93.013	-	1	1	-	0.9	0.9	-	0.1	0.1
8	-	91.896	91.896	-	1	1	-	0.9	0.9	-	0.1	0.1
9	-	90.794	90.794	-	1	1	-	0.9	0.9	-	0.1	0.1
10	-	89.704	89.704	-	1	1	-	0.9	0.9	-	0.1	0.1
11	-	88.628	88.628	-	1	1	-	0.9	0.9	-	0.1	0.1
12	-	87.564	87.564	-	0.857	0.923	-	0.9	0.9	-	0.1	0.1
13	-	86.513	86.513	-	0.75	0.842	-	0.9	0.9	-	0.1	0.1
14	-	85.475	85.475	-	0.686	0.777	-	0.9	0.9	-	0.1	0.1
15	-	84.45	84.45	-	0.796	0.931	-	0.9	0.9	-	0.1	0.1
16	-	83.436	83.436	-	0.914	1.074	-	0.9	0.867	-	0.1	0.133
17	-	82.435	82.1	-	1.029	1.196	-	0.9	0.699	-	0.1	0.301
18	-	81.446	79.13	-	1.134	1.294	-	0.778	0.598	-	0.222	0.402
19	-	79.278	75.309	-	1.343	1.491	-	0.555	0.45	-	0.445	0.55
20	-	75.042	70.335	-	1.582	1.71	-	0.399	0.342	-	0.601	0.658
21	-	69.634	64.781	-	1.856	1.953	-	0.29	0.262	-	0.71	0.738
22	-	63.704	59.045	-	1.989	2.129	-	0.253	0.221	-	0.747	0.779
23	-	57.992	53.523	-	2.019	2.228	-	0.245	0.201	-	0.755	0.799
24	-	52.739	48.393	-	1.992	2.372	-	0.252	0.178	-	0.748	0.822

Figure 109 Tabular Depiction of 'Impact on Customer Service Effect (Client/Other Staff, Support Quality, Work Errors)'

d) Scenario Four (4)

Scenario 4		
	Current	Simulated or Change
Decrease of '%of Leave rate old Staff' (redundancy rate)	20%	10%
Increase the 'Total % of New Transactions Added'	0%	1%
Increase Time to train SSC trainees	2	4

Scenario Four (4) involves simultaneously decreasing the '% of Leave rate old Staff' (redundancy rate); increasing the 'Total % of New Transactions Added' and increasing the 'Time to train SSC trainees'. Figures 110 and 111 depict this.

Figure 110 Decreasing the '%of Leave rate old Staff'(redundancy rate); increasing the 'Total % of New Transactions Added' and increasing the 'Time to train SSC trainees'

	% Leave rate old staff			Time to train SSC trainees			Total % of New Transactions Added			% of Transactions Leaving		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
2	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
3	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
4	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
5	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
6	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
7	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
8	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
9	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
10	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
11	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
12	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
13	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
14	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
15	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
16	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
17	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
18	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
19	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
20	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
21	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
22	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
23	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0
24	-	0.2	0.1	-	2	4	0	0	0.01	0	0	0

Figure 111 Tabular Depiction of 'Decreasing the '%of Leave rate old Staff'(redundancy rate); increasing the 'Total % of New Transactions Added' and increasing the 'Time to train SSC trainees'

Impact on Staff (Old Staff, SSC Staff and Temporary Staff, Staff Deficiency Gap)

By simultaneously decreasing the '% of Leave rate old Staff' (redundancy rate); increasing the 'Total % of New Transactions Added' and increasing the 'Time to train SSC trainees'; the required number of staff by month 24 is 13.7 (comparison run). This is made up of Old Staff of 1.08, SSC Staff of 5.7 and Temporary Staff of 6.9 compared to a total staff of the SSC of 7 staff (sketched) in month 24. Figures 112 and 113 show the significant number of extra temporary or excess staff required (Staff of 6.9 in the comparison run compared to zero temporary staff in the sketched run). Therefore, it is important to manage well the required staff level(s) as this will affect the productivity of staff and put pressure on servicing the customer. Figures 112 and 113 below depict the impact on Staff.
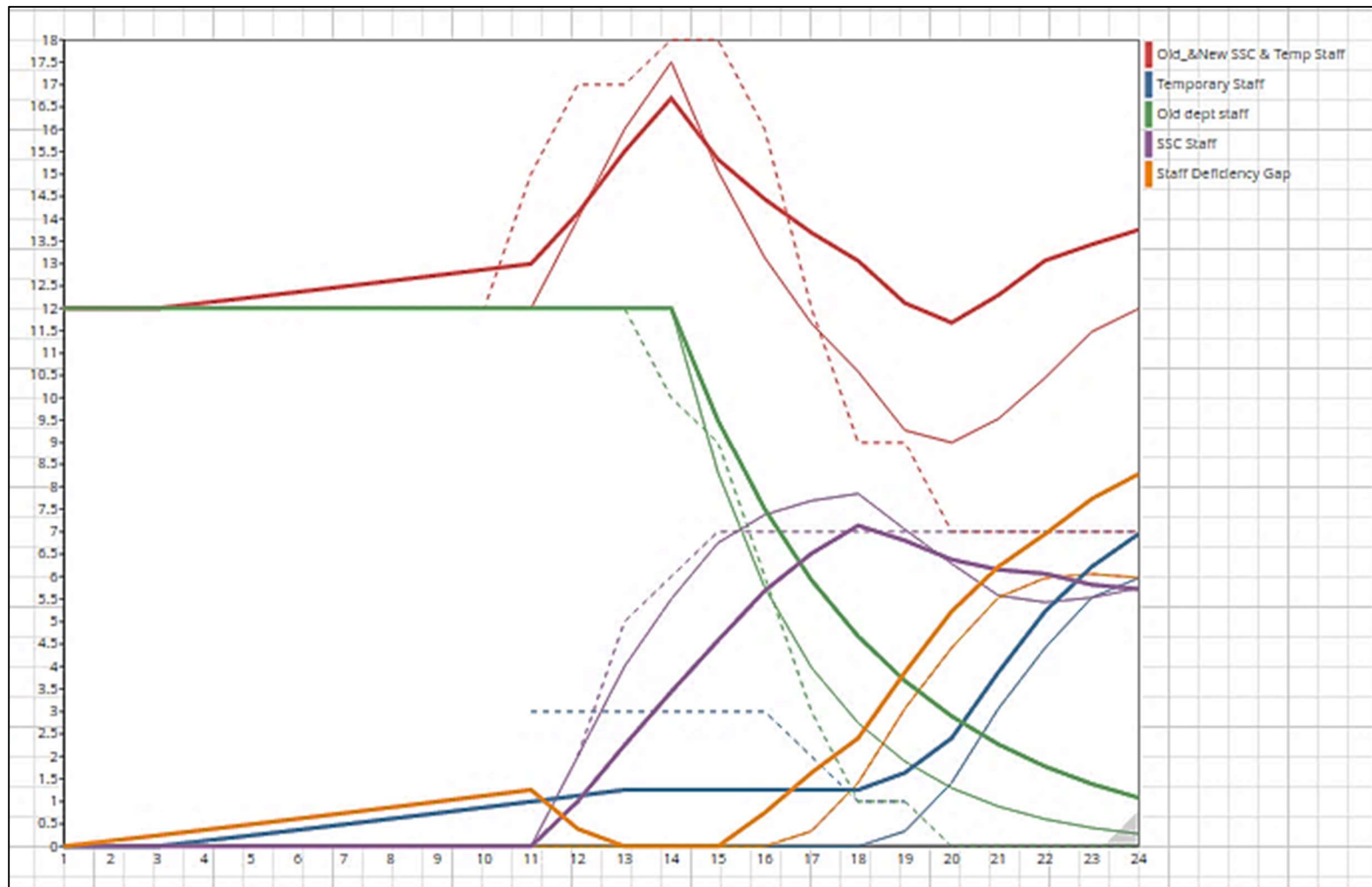
Figure 112 Impact on Staff (Old Staff, SSC Staff and Temporary Staff, Staff Deficiency Gap)

	Old_&New SSC & Temp Staff			Old dept staff			SSC Staff			Temporary Staff			Staff Deficiency Gap		
	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...
1	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0
2	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0.12
3	12	12	12	12	12	12	-	0	0	-	0	0	0	0	0.242
4	12	12	12.12	12	12	12	-	0	0	-	0	0.12	0	0	0.364
5	12	12	12.242	12	12	12	-	0	0	-	0	0.242	0	0	0.488
6	12	12	12.364	12	12	12	-	0	0	-	0	0.364	0	0	0.613
7	12	12	12.488	12	12	12	-	0	0	-	0	0.488	0	0	0.739
8	12	12	12.613	12	12	12	-	0	0	-	0	0.613	0	0	0.866
9	12	12	12.739	12	12	12	-	0	0	-	0	0.739	0	0	0.995
10	12	12	12.866	12	12	12	-	0	0	-	0	0.866	0	0	1.125
11	15	12	12.995	12	12	12	-	0	0	3	0	0.995	0	0	1.256
12	17	14	14.125	12	12	12	2	2	1	3	0	1.125	0	0	0.389
13	17	16	15.506	12	12	12	5	4	2.25	3	0	1.256	0	0	0
14	18	17.5	16.693	10	12	12	6	5.5	3.438	3	0	1.256	0	0	0
15	18	15.068	15.328	9	8.318	9.494	7	6.75	4.578	3	0	1.256	0	0	0
16	16	13.132	14.442	6	5.756	7.502	7	7.375	5.684	3	0	1.256	0	0	0.747
17	12	11.665	13.691	3	3.977	5.922	7	7.688	6.513	2	0	1.256	0.336	0.336	1.636
18	9	10.587	13.061	1	2.743	4.671	7	7.844	7.135	1	0	1.256	1.414	1.414	2.407
19	9	9.274	12.118	1	1.889	3.68	7	7.049	6.802	1	0.336	1.636	3.063	3.063	3.872
20	7	8.999	11.679	0	1.297	2.894	7	6.288	6.378	-	1.414	2.407	4.415	4.415	5.226
21	7	9.53	12.295	0	0.887	2.27	7	5.579	6.153	-	3.063	3.872	5.534	5.534	6.22
22	7	10.448	13.067	0	0.605	1.776	7	5.428	6.065	-	4.415	5.226	5.968	5.968	6.948
23	7	11.477	13.427	0	0.411	1.388	7	5.532	5.82	-	5.534	6.22	6.057	6.057	7.73
24	7	11.992	13.753	0	0.28	1.081	7	5.744	5.724	-	5.968	6.948	5.977	5.977	8.281

Figure 113 Impact on Staff (Old Staff, SSC Staff and Temporary Staff, Staff Deficiency Gap)

Impact on SGA Costs (Old Staff, Temporary Staff, SSC Staff, Total Staff)

Following on from the staff scenario discussed above, the impact is shown by the significant increase in 'SGA costs'. By month 24, the 'Total Actual SGA Costs' of 1.4 million (comparison run) is higher than the 'actual costs' of 550K (sketched). The main increase is shown in the level of temporary or excess staff required. For example, in month 24 the SGA for temporary staff increases to 339K (comparison run) compared to zero for the actual data (sketched). Figures 114 and 115 depict this.
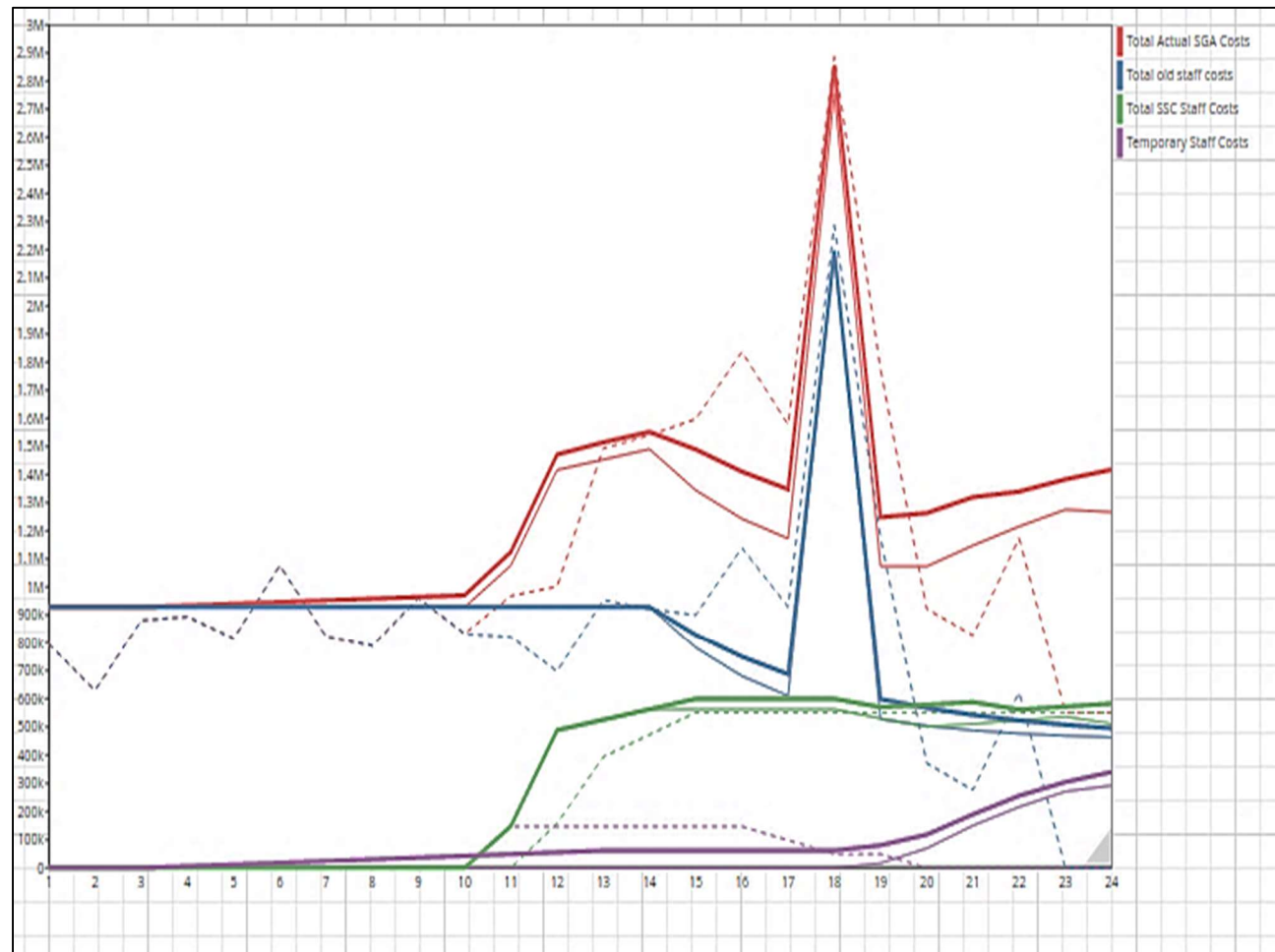
Figure 114 Impact on SGA Costs (Old Staff, Temporary Staff, SSC Staff, Total Staff)

	Total Actual SGA Costs			Total old staff costs			Temporary Staff Costs			Total SSC Staff Costs		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	795098	927870	927870	795098	927870	927870	0	0	0	0	0	0
2	628685	927870	927870	628685	927870	927870	0	0	0	0	0	0
3	879731	927891.343	927891.343	879731	927870	927870	0	21.343	21.343	0	0	0
4	893446	927891.343	933760.997	893446	927870	927870	0	21.343	5890.997	0	0	0
5	815313	927891.343	939689.347	815313	927870	927870	0	21.343	11819.347	0	0	0
6	1075910	927891.343	945676.98	1075910	927870	927870	0	21.343	17806.98	0	0	0
7	821928	927891.343	951724.49	821928	927870	927870	0	21.343	23854.49	0	0	0
8	788949	927891.343	957832.475	788949	927870	927870	0	21.343	29962.475	0	0	0
9	959368	927891.343	964001.54	959368	927870	927870	0	21.343	36131.54	0	0	0
10	832424	927891.343	970232.295	832424	927870	927870	0	21.343	42362.295	0	0	0
11	967519	1076007.343	1124641.358	820783	927870	927870	146736	21.343	48655.358	0	148116	148116
12	1001363	1416030.343	1471020.352	697256	927870	927870	146736	21.343	55011.352	157371	488139	488139
13	1493433	1453059.343	1514468.905	953269	927870	927870	146736	21.343	61430.905	393429	525168	525168
14	1539426	1490088.343	1551497.905	920575	927870	927870	146736	21.343	61430.905	472114	562197	562197
15	1597098	1344140.831	1489195.077	899562	781922.487	828538.171	146736	21.343	61430.905	550800	562197	599226
16	1836583	1242613.461	1410248.837	1139047	680395.117	749591.931	146736	21.343	61430.905	550800	562197	599226
17	1577370	1172084.929	1347638.683	928746	609866.586	686981.778	97824	21.343	61430.905	550800	562197	599226
18	2885769	2757238.343	2855676.905	2286057	2195020	2195020	48912	21.343	61430.905	550800	562197	599226
19	1774828	1073420.613	1247792.567	1175116	527114.716	598124.642	48912	16445.893	80040.787	550800	529860.004	569627.138
20	921669	1073062.441	1262695.052	370869	503650.081	566952.072	0	69157.082	117721.25	550800	500255.278	578021.73
21	826643	1147550.105	1319360.461	275843	487416.84	542218.157	0	149817.264	189401.602	550800	510316	587740.702
22	1173686	1215033.983	1339263.594	622886	476214.182	522660.444	0	215968.623	255606.609	550800	522851.179	560996.541
23	550800	1275000.813	1382818.632	0	468548.192	507250.365	0	270668.801	304235.824	550800	535783.82	571332.443
24	550800	1266407.604	1417293.69	0	463329.633	495110.412	0	291914.056	339837.551	550800	511163.915	582345.727

Figure 115 Tabular Depiction of Impact on SGA Costs (Old Staff, Temporary Staff, SSC Staff, Total Staff)

Impact on Transactions (Total, Pre &SSC Transactions, Transaction Deficiency Gap)
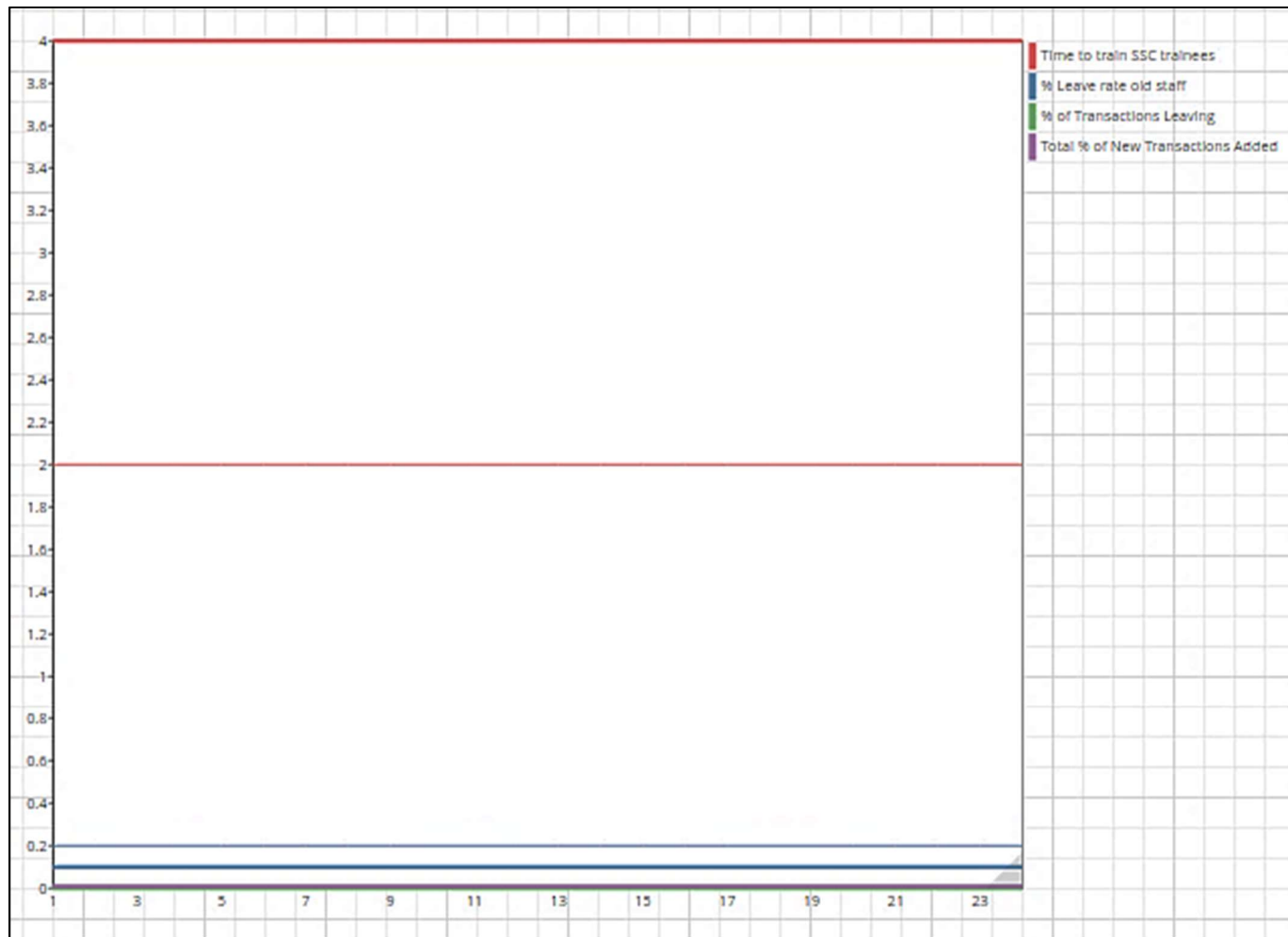
The number of transactions change due to simultaneously decreasing the '% of Leave rate old Staff' (redundancy rate); increasing the 'Total % of New Transactions Added' and increasing the 'Time to train SSC trainees' as shown in Figures 116 and 117 (comparison run of 135 vs sketched of 108 by month 24). This implies that there are hidden extra costs that would manifest itself in other forms such as reduction in productivity etc. The lesson for policy makers is that, it is important to manage carefully the level of transactional activities during the SSC transition.
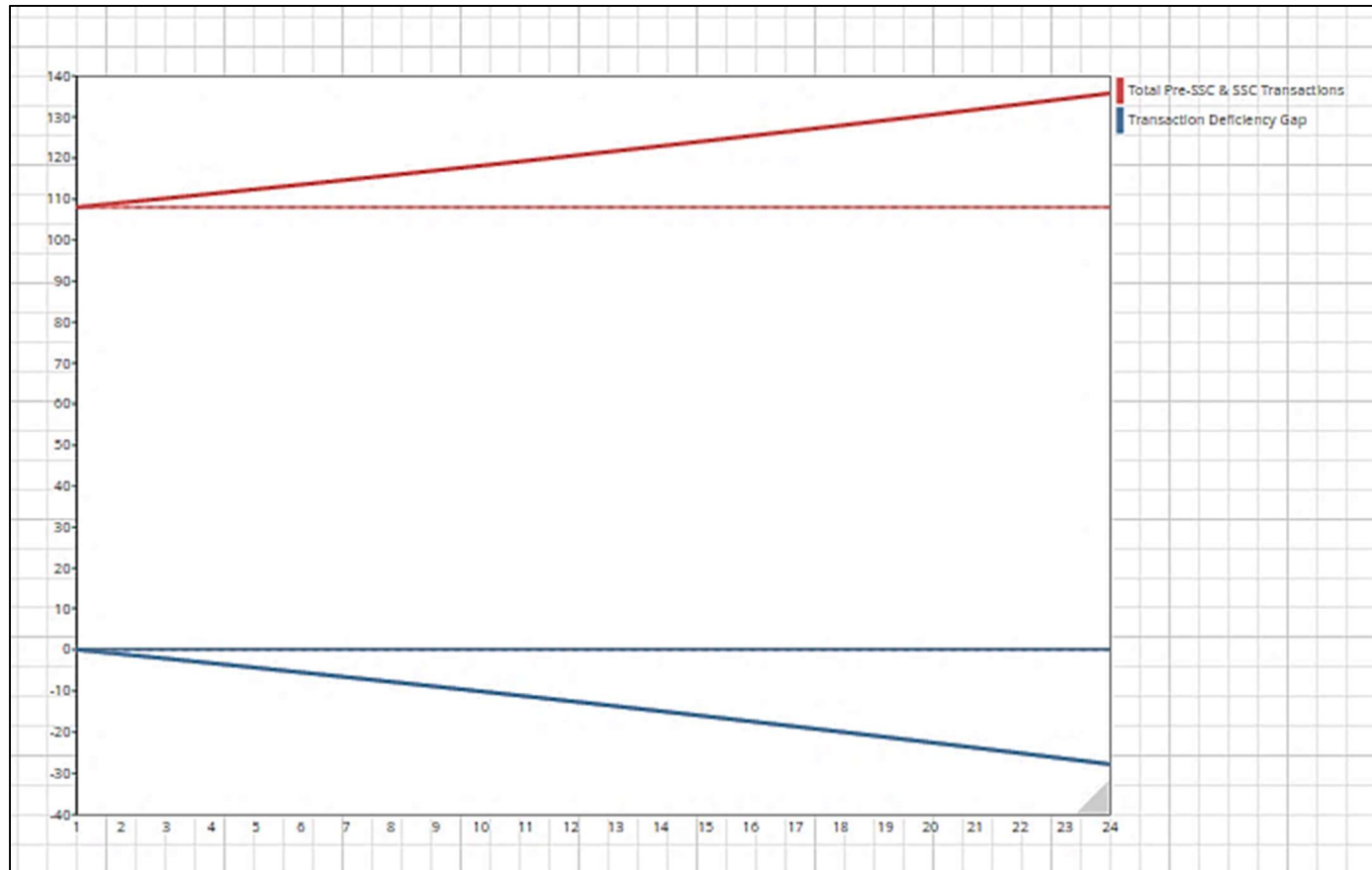
Figure 116 Impact on Transactions (Total, Pre &SSC Transactions, Transaction Deficiency Gap)

	Total Pre-SSC & SSC Transactions			Transaction Deficiency Gap		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	108	108	108	0	0	0
2	108	108	109.08	0	0	-1.08
3	108	108	110.171	0	0	-2.171
4	108	108	111.273	0	0	-3.273
5	108	108	112.385	0	0	-4.385
6	108	108	113.509	0	0	-5.509
7	108	108	114.644	0	0	-6.644
8	108	108	115.791	0	0	-7.791
9	108	108	116.949	0	0	-8.949
10	108	108	118.118	0	0	-10.118
11	108	108	119.299	0	0	-11.299
12	108	108	120.492	0	0	-12.492
13	108	108	121.697	0	0	-13.697
14	108	108	122.914	0	0	-14.914
15	108	108	124.143	0	0	-16.143
16	108	108	125.385	0	0	-17.385
17	108	108	126.638	0	0	-18.638
18	108	108	127.905	0	0	-19.905
19	108	108	129.184	0	0	-21.184
20	108	108	130.476	0	0	-22.476
21	108	108	131.781	0	0	-23.781
22	108	108	133.098	0	0	-25.098
23	108	108	134.429	0	0	-26.429
24	108	108	135.774	0	0	-27.774

Figure 117 Tabular Depiction of Impact on Transactions (Total, Pre &SSC Transactions, Transaction Deficiency Gap)

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Impact on Workload (Total Pre SSC & Post SSC Workload, Total Staff, Old & New Capacity)

The workload (comparison run vs sketched) increases following the change. Furthermore, for the 'Staff Capacity Hours' especially between month 17 to month 24 (comparison vs sketched), there is an increase in the staff capacity hours available (1123 vs 993). Figures 118 and 119 depict this.
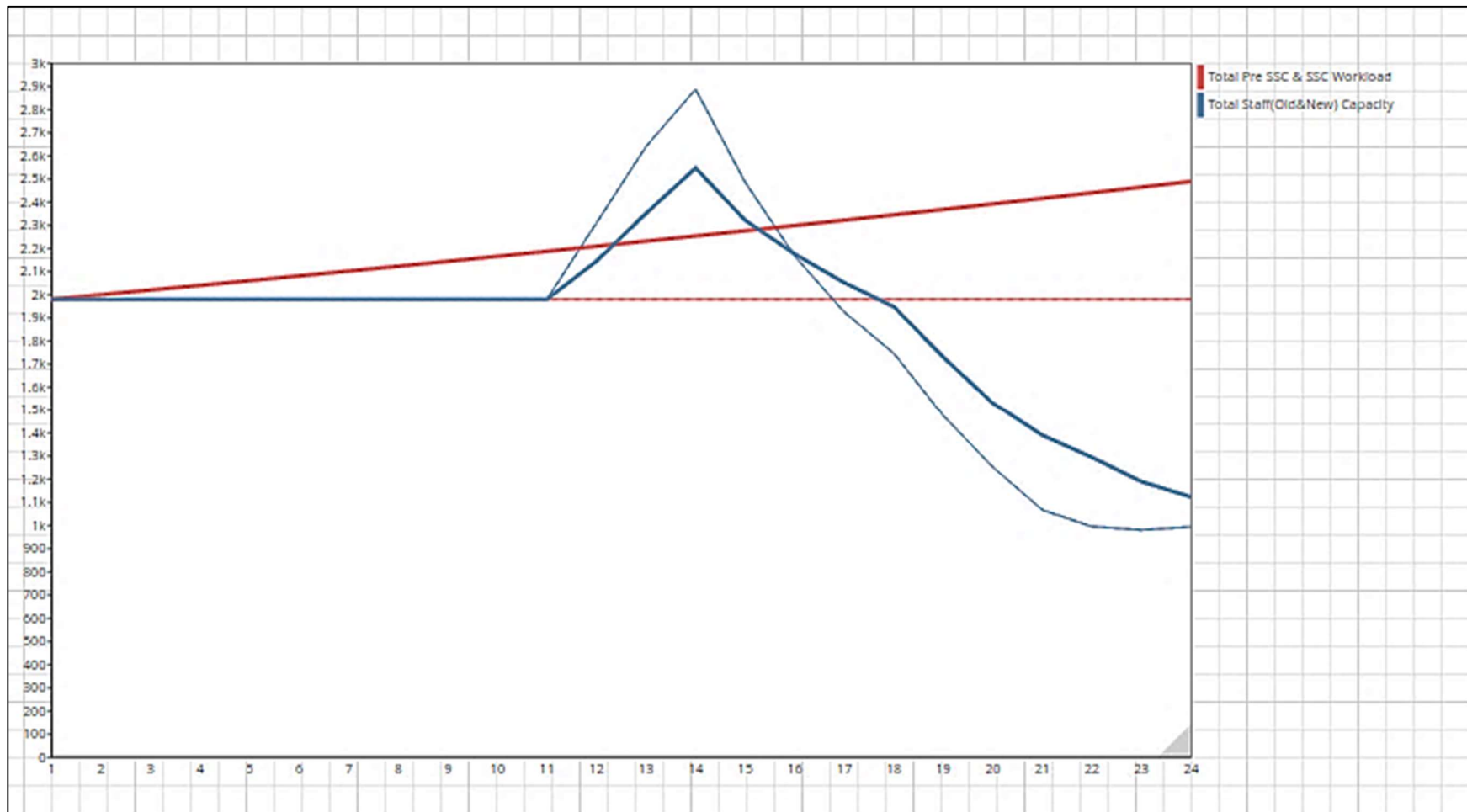
Figure 118 Impact on Workload (Total Pre SSC & Post SSC Workload, Total Staff, Old & New Capacity)

	Total Pre SSC & SSC Workload			Total Staff(Old&New) Capacity		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	1980.072	1980.072	1980.072	1980	1980	1980
2	1980.072	1980.072	1999.873	1980	1980	1980
3	1980.072	1980.072	2019.871	1980	1980	1980
4	1980.072	1980.072	2040.07	1980	1980	1980
5	1980.072	1980.072	2060.471	1980	1980	1980
6	1980.072	1980.072	2081.076	1980	1980	1980
7	1980.072	1980.072	2101.886	1980	1980	1980
8	1980.072	1980.072	2122.905	1980	1980	1980
9	1980.072	1980.072	2144.134	1980	1980	1980
10	1980.072	1980.072	2165.576	1980	1980	1980
11	1980.072	1980.072	2187.231	1980	1980	1980
12	1980.072	1980.072	2209.104	2310	2310	2145
13	1980.072	1980.072	2231.195	2640	2640	2351.25
14	1980.072	1980.072	2253.507	2887.5	2887.5	2547.188
15	1980.072	1980.072	2276.042	2486.172	2486.172	2321.873
16	1980.072	1980.072	2298.802	2166.64	2166.64	2175.624
17	1980.072	1980.072	2321.79	1924.593	1924.593	2051.78
18	1980.072	1980.072	2345.008	1746.777	1746.777	1947.887
19	1980.072	1980.072	2368.458	1474.678	1474.678	1729.53
20	1980.072	1980.072	2392.143	1251.522	1251.522	1529.878
21	1980.072	1980.072	2416.064	1066.996	1066.996	1389.753
22	1980.072	1980.072	2440.225	995.328	995.328	1293.815
23	1980.072	1980.072	2464.627	980.597	980.597	1189.208
24	1980.072	1980.072	2489.273	993.945	993.945	1122.861

Figure 119 Tabular Depiction of Impact on Workload (Total Pre SSC & Post SSC Workload, Total Staff, Old & New Capacity)

Impact on Customer Service Effect (Client/Other Staff, Support Quality, Work Errors)

As a consequence of simultaneously decreasing the '% of Leave rate old Staff' (redundancy rate); increasing the 'Total % of New Transactions Added' and increasing the 'Time to train SSC trainees'; the pressure on staff (comparison run compared to sketched) increases thereby resulting in employees more prone to work errors. The support for 'clients/other staff' reduces significantly and the potential impact of losing 'clients/other staff' increases. Although it is assumed that this will be covered by temporary or excess staff, a company with very little resources will find this situation problematic, as it may suddenly realise that it does not have enough resources to be able to employ excess staff etc. Figures 120 and 121 depict this.
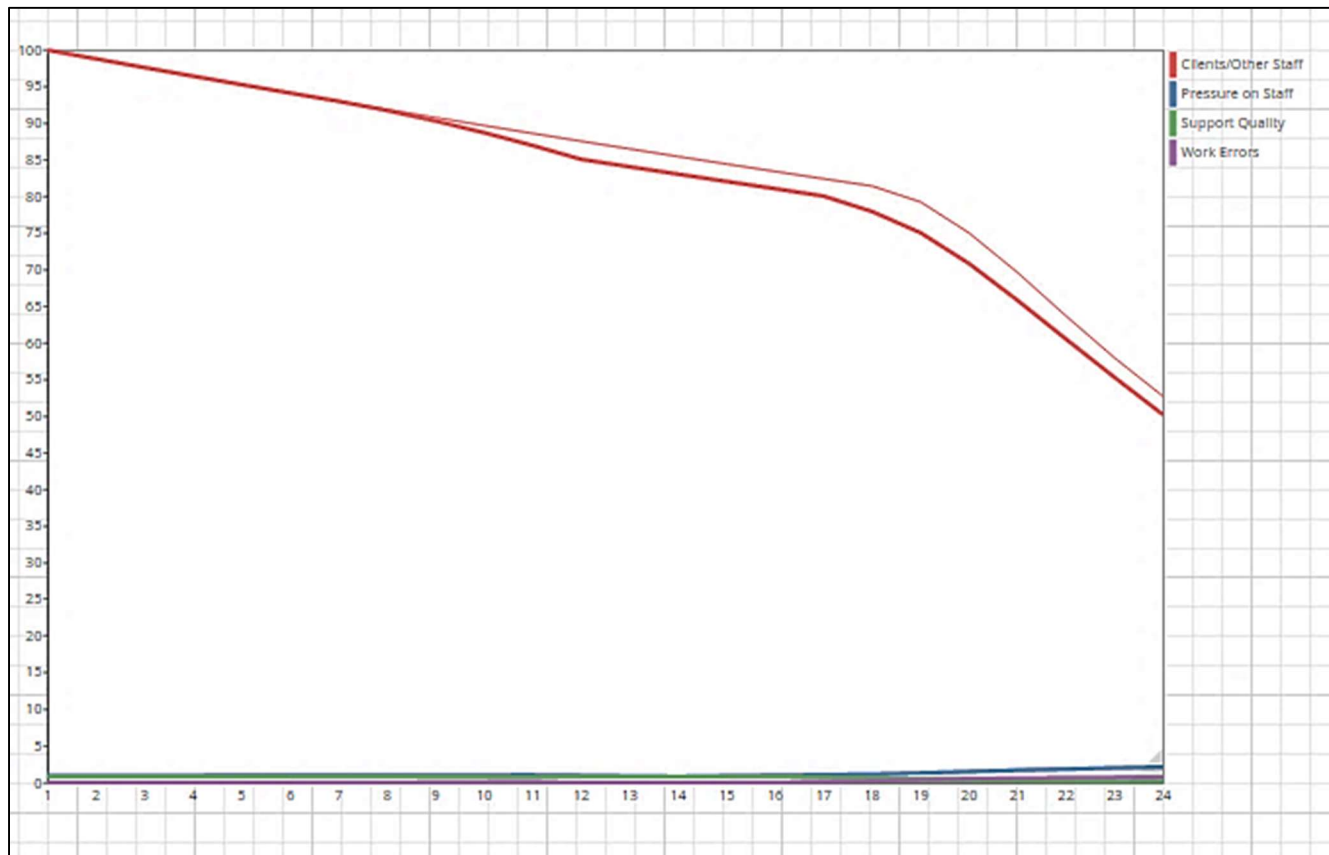
Figure 120 Impact on Customer Service Effect (Client/Other Staff, Support Quality, Work Errors)

	Clients/Other Staff			Pressure on Staff			Support Quality			Work Errors		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	-	100	100	-	1	1	-	0.9	0.9	-	0.1	0.1
2	-	98.8	98.8	-	1	1.01	-	0.9	0.9	-	0.1	0.1
3	-	97.614	97.614	-	1	1.02	-	0.9	0.9	-	0.1	0.1
4	-	96.443	96.443	-	1	1.03	-	0.9	0.9	-	0.1	0.1
5	-	95.286	95.286	-	1	1.041	-	0.9	0.9	-	0.1	0.1
6	-	94.142	94.142	-	1	1.051	-	0.9	0.9	-	0.1	0.1
7	-	93.013	93.013	-	1	1.062	-	0.9	0.887	-	0.1	0.113
8	-	91.896	91.756	-	1	1.072	-	0.9	0.87	-	0.1	0.13
9	-	90.794	90.323	-	1	1.083	-	0.9	0.853	-	0.1	0.147
10	-	89.704	88.727	-	1	1.094	-	0.9	0.836	-	0.1	0.164
11	-	88.628	86.981	-	1	1.105	-	0.9	0.819	-	0.1	0.181
12	-	87.564	85.096	-	0.857	1.03	-	0.9	0.9	-	0.1	0.1
13	-	86.513	84.075	-	0.75	0.949	-	0.9	0.9	-	0.1	0.1
14	-	85.475	83.066	-	0.686	0.885	-	0.9	0.9	-	0.1	0.1
15	-	84.45	82.07	-	0.796	0.98	-	0.9	0.9	-	0.1	0.1
16	-	83.436	81.085	-	0.914	1.057	-	0.9	0.896	-	0.1	0.104
17	-	82.435	80.07	-	1.029	1.132	-	0.9	0.781	-	0.1	0.219
18	-	81.446	77.965	-	1.134	1.204	-	0.778	0.69	-	0.222	0.31
19	-	79.278	75.065	-	1.343	1.369	-	0.555	0.533	-	0.445	0.467
20	-	75.042	70.86	-	1.582	1.564	-	0.399	0.409	-	0.601	0.591
21	-	69.634	65.835	-	1.856	1.738	-	0.29	0.331	-	0.71	0.669
22	-	63.704	60.549	-	1.989	1.886	-	0.253	0.281	-	0.747	0.719
23	-	57.992	55.325	-	2.019	2.072	-	0.245	0.233	-	0.755	0.767
24	-	52.739	50.232	-	1.992	2.217	-	0.252	0.203	-	0.748	0.797

Figure 121 Impact on Customer Service Effect (Client/Other Staff, Support Quality, Work Errors)

COMPARISON TO THEORY, HYPOTHESES (TWO TO THREE) AND POLICY ANALYSIS

Table 30 summarises the results of the reference model (data), the four (4) scenarios and how they impact on work capacity, 'SGA costs' and the number of personnel (Old Staff or Pre-Shared Services).

In general Table 30 shows that, the impact of the various scenarios outlined above results in an increase in total staff (temporary staff), as more temporary staff are required which were not envisaged in the initial SSC plan. In addition, there is an impact on the 'SGA costs', the work capacity available and the provision of service to the customer.

Table 30 SUMMARY OF BEHAVIOUR OF REFERENCE MODELS AND FOUR SCENARIOS (The Total Model)

Area	Variable Type	Impact on Staff (Old Staff, SSC Staff and Temporary Staff, Staff Deficiency Gap)	Impact on SGA Costs (Old Staff, Temporary Staff, SSC Staff, Total Staff)	Impact on Transactions (Total, Pre &SSC Transactions, Transaction Deficiency Gap)	Impact on Workload (Total Pre SSC & Post SSC Workload, Total Staff, Old & New Capacity)	Impact on Customer Service Effect (Client/Other Staff, Support Quality, Work Errors)
Reference Model	See discussions under the sub-scenarios					
Scenario One (1)	Decrease of '%of Leave rate old Staff' (redundancy rate)	Moderate Increase	Increase	No Impact or change	**No Impact** Workload **Mainly Increase** Staff Capacity Hours	**Decrease** (Pressure on Staff, Work Errors) **Increase** in Client/Other Staff, Support Quality
Scenario Two (2)	Increase the 'Total % of New Transactions Added'	Increase	Increase	Increase	**Mainly Increase** Workload **Mainly Increase** Staff Capacity Hours	**Increase** (Pressure on Staff, Work Errors) **Decrease** in Client/Other Staff, Support Quality
Scenario Three (3)	Increase Time to train SSC trainees	Moderate Increase	Moderate Increase	No Impact or change	**No Impact** Workload **Mainly Decrease** Staff Capacity Hours	**Increase** (Pressure on Staff, Work Errors) **Decrease** in Client/Other Staff, Support Quality
Scenario Four (4)	Simultaneously decreasing the '%of Leave rate old Staff' (redundancy rate); increasing the 'Total % of New Transactions Added' and increasing the 'Time to train SSC trainees'.	Increase	Increase	Increase	**Mainly Increase** Workload **Mainly Increase** Staff Capacity Hours	**Increase** (Pressure on Staff, Work Errors) **Decrease** in Client/Other Staff, Support Quality

6.4 Relationship to the Implementation Process

6.4.1 The Constructed Model and Its Relationship to the Theory (Literature Review)

With regards to the theory regarding critical success factors, by using sensitivity analysis (flexing), the modelling supports the notion that in implementing SSCs, effective change management is critical (e.g., Borman, 2008; Burns and Yeaton, 2008; Miskon et al., 2011). An SSC that is able to manage the employee transition process by having an effective change management process has a better chance of success.

With regards to Hypotheses 2 to 3 as espoused in the literature review chapter, the following recommendations are proposed:

Hypothesis 2:

The performance of a newly established SSC is strongly determined by the ability to retain its staff

The SD model demonstrates that the ability to maintain the right kind of staff is very critical to its success. From the summary results originating from the model as shown in Table 30, by varying various variables as shown in the various scenarios outlined earlier in this Chapter, the impact on the SSC staff in terms of qualified and trained staff varies. This in turn has varying impacts on the 'SGA costs', 'customer service effects', workload and transactional activities. Therefore, for policy makers it is very important to manage the ability to retain staff and this can be done by obtaining support from senior management and providing the right kind of environment. This supports the arguments advanced by several writers in the SSC literature (e.g., Burns and Yeaton, 2008; Becker, Niehaves and Krause, 2009; Miskon et al., 2011; PWC, 2011; Deloitte, 2017). In addition, policy makers should master the cultural and environmental issues in an SSC.

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Hypothesis 2a:

Staff capacity during the establishment of a new SSC is strongly dependent on the ability to manage workloads and keep turnover down to a minimum or low rate.

In this SD model, it has been demonstrated and established that staff capacity is dependent on managing workloads and keeping turnover to a minimum. In the various scenarios shown in this Chapter, it has been demonstrated that by varying the various key elements, staff capacity can be managed in a holistic way and thus, it is possible to manage the staff workloads and keep staff turnover to a minimum. The management of staff capacity needs to be flexible but not rigid (Miskon et al., 2011). In effect, it is up to the organisation to provide the right level of investment(s) to achieve this (e.g., Deloitte, 2011; Miskon et al., 2011).

Hypothesis 2b:

The inefficient management of staff turnover can lead to further increases in costs.

In the SD model, the various scenarios demonstrate that where the SSC staff is not at its optimum this can have an impact on the 'SGA costs', which is shown by the increase in the number of temporary staff. This therefore supports the arguments regarding the SSC failure factors in terms of not having the right level of investment(s), having rigid staff arrangements, not motivating employees and having lengthy implementation periods (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Bergeron, 2003; Bangemann, 2005; Deloitte, 2011; Miskon et al., 2011; PWC, 2011, PWC, 2012; Deloitte, 2017).

Hypothesis 3:

The inefficient management of transactional activities or errors created in the transactional activities can lead to increased costs for the organisation.

It is important to carefully manage the transactional activities of the SSC. As noted in Table 30 in scenarios two (2) and four (4), when the transactional activities or the number of transactions are varied, there are varying degrees of impact on the SSC 'SGA costs', the number of staff required, the pressure on staff, work errors and staff workloads. This supports the assertion that, it is important to know what activities to transition or share and being clear about what process or processes are being standardised (Fahy, Curry and Cacciaguidi-Fahy, 2002; Bergeron, 2003; Jansson and Joha, 2006; Lacity and Fox, 2008; Deloitte, 2011; Miskon et al., 2011; PWC, 2011). Furthermore, it is important to be able to manage the SSC project in a timely and efficient manner (Sterman, 1992; Burns and Yeaton, 2008; Deloitte, 2011).

The SD model, allows for an understanding of the feedback loop(s) that pertains and affects the different variables as demonstrated in this thesis.

For policy makers, the model demonstrates that understanding the effect and impact of transactional activities on the other SSC functions and variables will help limit the amount of errors etc., that are made.

Conclusion

The Traditional SSC design approach shows the 'costs' during the feasibility stage and it is not clear or transparent enough to be able to see some of the subtle factors such as why staff may leave for different reasons other than redundancy. Another area it does not depict

is the impact on the company, such as customers, when staff leave. At best this is not transparent enough as the aim is to show 'cost savings'.

In addition, the pressure on staff and how it impacts other functions of the business including customers is(are) not clearly depicted within current SSC models. What this SD model does, is to lay out the impact on other employees and customers. The constructed SD model also shows what the extra costs could be as a result of the in-efficient management of the SSC Transition process and the consequences it can have on the organisation. Therefore, policy makers need to understand that the effective management of the SSC staff transition process is very key. Policy intervention plans such as increasing the level of customer support or minimising the impact to customers can then be developed using this model. In effect, an effective backup plan is adopted.

7   Chapter Seven Conclusions and Further Recommendations

This Chapter describes and discusses how the finished work met the objectives (i.e. key findings and implications of this study). In addition, it provides recommendations and future work to undertake. The Chapter is organised follows:

7.1   How the finished work met the objectives.

7.2   Recommendations.

7.3   Future Work.

7.1 How the finished work met the objectives (Key findings and Implications of this study)

The key findings regarding this research are in three main areas. These are: Critical

Success Factors, Staff Management and Management of Transactional activities.

7.1.1 Critical Success Factors (Research Hypotheses 1 to 1b and Objective One)

Survey results in stages one and two showed that there was a cause-effect relationship

between / among the SSC critical success factors; and that these critical success factors

outlined in Table 31 need to be addressed and managed effectively.

The key success factors selected as key in the development of the initial Causal Loop

Diagram, which were: Well defined Organisational Goal and Vision; Effective Strategy / Plan;

Effective Infrastructure; Effective SSC Design and Build; Effective HR Execution Plan;

Effective Project Management and Execution; Costs (Tangible & Intangible); Benefits

(Tangible & Intangible) were confirmed by the survey results. These key success factors

were identical with the SSC key success factors identified in the literature review. Survey

participants confirmed these critical success factors and further confirmed that these factors

were interlinked. Furthermore, it was confirmed that the SSC critical factors are similar to

that of organisations.

From the survey results, the inter-linkages as shown in Figure 122 (Causal Loop Diagram)

confirms the significance of the selected variables and provides evidence as to why the SSC

architecture needs to understand these interlinkages, by for example, having a clear

communication plan, using people with the right skills and effectively managing staffing

resources (Effective HR).

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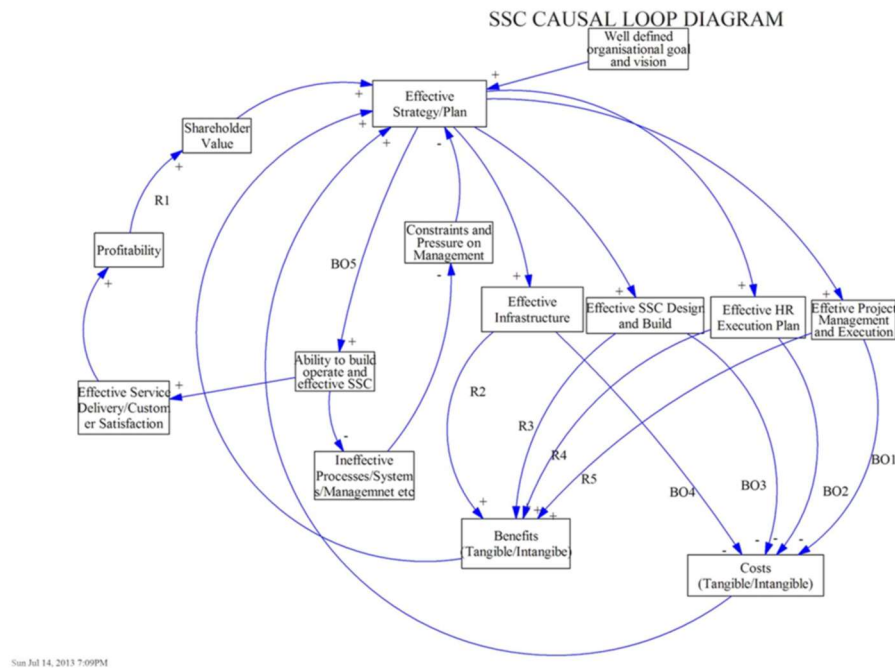
Figure 122 SSC Causal Loop Diagram

7.1.2 Staff Management and Management of Transactional Activities (Hypotheses Two to Three and Objectives two and three)

By using sensitivity analysis (flexing), the constructed SD model lays out the most important variables such as headcount reduction (costs) and this can be used as a guiding principle when embarking on an SSC Transition. An SSC that can manage the SSC Transition process needs to understand these critical success factors and apply them for the benefit of the SSC project.

With regards to Staff Management, the constructed SD model demonstrates that the ability to maintain the right kind of staff is very critical to the success of the SSC Transition. To avoid a faster loss of staff who are to train for example, new staff etc., staff must be communicated to in a timely manner. It is demonstrated that by varying the various key

elements, staff capacity can be managed in a holistic way and this can be achieved by for example, managing staff workloads and keeping staff turnover to a minimum. In the SD model, the various scenarios (sensitivity analysis) demonstrate that where the SSC staff is not at its optimum this can have an impact on the 'SGA costs', which is shown by the increase in temporary staff. The constructed SD model demonstrated and established that staff capacity is dependent on managing workloads and keeping staff turnover to a minimum.

With regards to transactional activity management, the constructed SD model, demonstrated and established that it is important to carefully manage the transactional activities of the SSC. This was also demonstrated in the scenarios for the constructed overall (total) model. With regards to the above scenarios, when the transactional activities or number of transactions are varied, there are varying degrees of impact on the SSC 'SGA costs', the number of Staff required and also on the pressure on staff, work errors, workloads etc. This implies that organisations should know what activities to transition or share and be clear about this upfront.

Furthermore, one major area overlooked or not given sufficient attention in the transition of the SSC, is the effect on the other business functions and customers. Although service level agreements are used to some extent, the immediate impact and the effect on external customers cannot be clearly identified. What this model does, is to provide a way to view how the impact on productivity and customers can result in loss of business (i.e. loss of customers and other key personnel.)

7.1.3 **Reasons / Motives of establishing the SSC and whether the benefits envisaged have been achieved (Objectives Four and Five)**

With regards to the objective of understanding the reasons / motives of why the SSC was established and whether the benefits envisaged have been achieved; from the survey results, the overall results were mixed and do not always support the current SSC Transformation / Implementation literature.

Respondents buttressed the fact that cost reduction (head count reduction) was a main motive for creating SSCs. This supports the assertion regarding the motives of establishing the SSC by writers such as (Fahy, Curry and Cacciaguidi-Fahy, 2002; Bergeron, 2003; Bangeman, 2005; Jansson and Joha, 2006; Walsh, McGregor-Lowndes and Newton, 2006; Burns and Yeaton, 2008; Deloitte, 2011; Miskon et al., 2011; PWC, 2011; Paagman et al., 2015 ;Tammel, 2017). In addition, it also supports the resource philosophy assertion by (Pfeffer and Salanic, 1978, 2003; Dunphy and Stace 1993).

The results were mixed with regards to understanding whether the benefits envisaged using the current SSC life-cycle phases / stages had been achieved. Overall, it is estimated from survey results that this took over forty-three (43) months from start to finish, which is not in line with the suggested literature. With regards to the SSC Phases as depicted in current SSC Transformation approaches, survey results showed the following (see also discussions in the previous chapter):

Phase I (Opportunity Assessment Stage): This phase was in line with the assertions made by (BearingPoint, 2007; Deloitte, 2011; PWC, 2011).

Management Review: This phase supports the assertion by PWC (2011).

Phase II (Design and Pilot Project): The results of this phase was mainly not in line with the arguments advanced by Deloitte (2011) and PWC (2011), who argued that the design and pilot project should normally take about six to eight (6 to 8) months.

Phase III (Implementations and Rollout): The results obtained is not in line with the theory. Clearly respondents believe that this stage is not the same as advanced by (BearingPoint, 2007; Deloitte, 2011; PWC, 2011). It is recommended to have a coherent plan in place (including having an effective change management and communication plan) to avoid these misunderstandings. Lengthy implementation periods have been characterised as one of the failure factors that can negatively affect the SSC implementation (Miskon et al., 2011). It is argued that this is what occurred with this SSC as staff had varying degrees of knowledge or interpretation regarding the length of the implementation plan.

Phase IV (Optimisation): The results obtained is mainly not in line with the arguments advanced by (Deloitte, 2011; PWC, 2011). A coherent plan, including effective change management and communication is again required to avoid these misunderstandings.

Table 31 below summarises the key findings of the research.

Table 31 KEY FINDINGS OF RESEARCH

Area	Research Area	Findings
Key criteria/variables in the design/build and implementation of a Shared Service Centre		
Selection of service delivery model	Understand risks and benefits including the value chain of the Organisation	
Critical Success Factors	Vision	Qualitative data in stages one and two suggests that this is a critical factor.
	Strategy Effective Communication	Qualitative data in stages one and two suggests that this is a critical factor.

Area	Research Area	Findings
	Effective Change Management	Simulated/Quantitative data implicitly supports this position.
	Senior Management Buy-in	Qualitative data in stages one and two suggests that this is a critical factor.
	Strong Project Management Skills	Qualitative data in stages one and two suggests that this is a critical factor.
	Organisation and HR (Human Resources)	Simulated/Quantitative data implicitly supports this position.
	Site Location	
SSC Phases/Stages	Feasibility Studies (Phase One)	Qualitative data supports this.
	Management Review	Qualitative data supports this.
	Design/Build/Pilot (Phase II)	Mixed Results from qualitative data. This is not in line with the arguments advanced by PWC (2011) who argued that the design and pilot project should normally take about 6-8(six to eight) months.
	Roll out and Implementation (Phase III)	Mixed Results from qualitative data. Qualitative data mainly does not support this.
	Optimise or continuous improvement (Phase IV)	Mixed Results from qualitative data. Qualitative data mainly does not support this.
Research Objectives		
Objective One	To identify the factors and variables that are critical to the design and implementation of the case study SSC and how the results compares to the current SSC literature.	Qualitative findings in stages one and two support this. See also Critical Success Factors above.

Area	Research Area	Findings
Objective Two	To establish whether SD has been used as a DSS tool in the implementation of the SSC under consideration in this research and, if so, if it was beneficial.	Qualitative findings showed that SD had not been used.
Objective Three	To design, build and develop a DSS tool based upon SD to be used in the implementation of the SSC.	SD model constructed in Stage III. Three main factors Staff, Transactions Management and SSC Critical Success Factors were used.
Objective Four	To identify and determine the reasons for establishing the SSC under consideration in this research (i.e. the case study) and to determine if any benefits were achieved and how those benefits compare with the current SSC literature.	Qualitative findings support the literature review.
Objective Five	To determine whether the benefits envisaged during the SSC life cycle stages (being opportunity identification, management review, design and build, pilot stage, implementation and post implementation) with respect to the SSC under consideration in this research, have been achieved and how those benefits compare with the current SSC literature.	Mixed results from qualitative data. (See also SSC Phases/Stages above).

Area	Research Area	Findings
Research Hypotheses		
Hypotheses 1a and 1b (Critical Success Factors)	Hypothesis 1a: SSCs are organisations and the reasons for success / failures of organisational change are applicable to SSCs. Hypothesis 1b: There are some key (critical success factors) associated with SSCs that influence the design / build and implementation of SSCs.	Qualitative findings suggest that this is the case.
Hypotheses 2, 2a and 2b (Staff Management)	Hypothesis 2: The performance of a newly established SSC is strongly determined by the ability to retain its staff. Hypothesis 2a: Staff capacity during the establishment of a new SSC is strongly dependent on the ability to manage workloads and keep turnover down to a minimum or low rate) and Hypothesis 2b: The inefficient management of staff turnover can lead to further increases in costs.	Quantitative findings suggest that this is the case. Qualitative findings implicitly suggest this.
Hypothesis 3 (Transaction Management)	The inefficient management of transactional activities or errors created in the transactional activities can lead to increased costs for the organisation	Quantitative findings suggest that this is the case. Qualitative findings implicitly suggest this.

7.2   Recommendations

7.2.1   Implication for policy development

The lessons for policy makers are that, it is important to understand the linkages and interconnections between / among the SSC variables to make informed decisions about the design and build of the SSC. In order to do this, policy makers need to understand the three (3) key criteria identified in this research, in designing, managing and implementing the SSC Transition Process. These key criteria are:

- **Critical Success Factors,** such as support from senior management, provision of adequate investment, managing the human resource function, effective project management need to be understood to have a better chance of success.

- **Selecting and understanding the correct Service delivery model,** is also very key and organisations will have much success if the correct service delivery model is used.

- Finally, **managing the SSC Transition, by effectively managing the transactional and staff activities is key.** This is demonstrated in the constructed SD model. Therefore, policy makers need to understand that the effective management of the SSC staff, SSC transactions and SSC transition is very important to the success of the SSC implementation. It is also important to be able to manage the SSC implementation project in a timely and efficient manner. For policy makers, the model demonstrates that understanding and managing the transactional activities will help limit the amount of errors etc., that are made.

7.2.2 Research Limitations

This research is limited by the fact that, it uses one organisation and therefore there is a need to expand the respondents to reach other organisations. However, since the Shared Service Transition phenomenon is atypical phenomenon, the fundamentals and methodology applied are quite similar. Furthermore, to counteract this limitation, the constructed SD model can be replicated for other SSC organisations with some adaptation where relevant for that specific organisation. In addition, the use of six or multiple respondents helps to strengthen the case study.

7.3 Future Work

Currently in the practitioner world (Deloitte, 2013; 2017), there is a movement from Shared Services to Global Business Services. This movement is quite young, but it is being touted as the next step or big thing from the Shared Service Concept. According to Deloitte (2013; 2017), 'for more than two decades, organisations' around the world have been using shared services and outsourcing to improve service delivery and reduce costs within defined parts of their businesses' According to Deloitte (2013), Global Business Services (GBS) aim to provide governance integration and best business practices across the whole enterprise to both shared services and outsourcing functions. However, moving to GBS, is much more than requesting co-operation amongst shared service centres. This involves a major change in how shared services and outsourcing are thought about or viewed by the business.

It is therefore recommended that future research work can be undertaken by including this concept, expanding the sample size and applying the constructed model to other organisations involved in the SSC Transition phase. This will further document the value of the application of SD to SSCs.

7.4 Conclusion

This Chapter has demonstrated how the finished work met the objectives. Furthermore, the key findings and implications of the study have been addressed, showing that SD is a valid methodology and the appropriate DSS tool to use. It is expected that the constructed SD model will enhance the current SSC transformation / transition / implementation process. Recommendations have also been provided on how to manage and implement the SSC Transition.

The research limitation is also addressed stating that the research process and findings can be expanded to other organisations embarking on an SSC. For future research work, it has

been suggested that with the advent of the new Global Business Services phenomenon as related to Shared Services, the constructed SD model can be used by incorporating this new phenomenon and expanding the sample size by adding additional SSC organisations. Finally, based on the research findings, it is concluded in this research that SD is a valid tool and methodology to use.

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Appendices

Appendix A- QUESTIONNAIRE

QUESTIONNAIRE

ABSTRACT

There is evidence that a lot of multi-nationals and other governmental companies have embarked on designing and building Shared Service Centres.

There are both costs and benefits associated with Shared Service Centres and organisations are better served to ensure that they employ the best and most practical methods to achieve their aims.

Various models have been used to enumerate the benefits and costs of Shared Service Centres. However, there is not enough research using System Dynamics modelling in designing and building Shared Service Centres.

There is a case to use a System Dynamics perspective as this is a less expensive way of designing and building a Shared Service Centre and will enhance the available methodologies for the design and build of SSCs. The below objectives are espoused.

- **OBJECTIVE 1:** To identify the factors and variables that are critical to the design and implementation of the case study SSC and how the results compares to the current SSC literature. (To understand the factors and variables that impact on the design/build of an SSC using current approaches).

- **OBJECTIVE 2:** To establish whether SD has been used as a DSS tool in the implementation of the SSC under consideration in this research and, if so, if it was beneficial. (To understand whether an SD model has been used in the design of the SSC and whether it was beneficial).

- **OBJECTIVE 3:** To design, build and develop a DSS tool based upon SD to be used in the implementation of the SSC. (To explore how an SD model can be

developed and used as an inexpensive but effective way of complementing current approaches).

- **OBJECTIVE 4:** To identify and determine the reasons for establishing the SSC under consideration in this research (i.e. the case study) and to determine if any benefits were achieved and how those benefits compare with the current SSC literature. (To understand the reasons/motives of why the SSC was established and whether the benefits envisaged have been achieved).

- **OBJECTIVE 5:** To determine whether the benefits envisaged during the SSC life cycle stages (being opportunity identification, management review, design and build, pilot stage, implementation and post implementation) with respect to the SSC under consideration in this research, have been achieved and how those benefits compare with the current SSC literature and finally (To understand whether the benefits envisaged using current approaches (SSC life-cycle phases/stages) have been achieved)

This research attempts to evaluate the design and building of Shared Service Centres' (financial) using a System Dynamics framework. In effect, how can a System Dynamics framework be used in the evaluation, design, build and operation of a Shared Service Centre?

Please take some time to complete this questionnaire and return to the researcher. The feedback will be used for analysis purposes. **All Information will be kept confidential**.

1. ORGANISATIONAL PROFILE

1. What is the name of your Organisation?

   □

2. Where is your Shared Service Located?

   □ Europe
   □ USA
   □ Middle East/Africa
   □ Asia/Australia

3. What is the type of Shared Service Center?[22]

   □ Regional
   □ National
   □ Global
   □ Other (Please Specify)

4. How many business units does the Shared Service Center support?

   □ 0-10
   □ 11-50
   □ 51-100
   □ 101 or more (Please state the number here)

5. Which geographical areas does the
   Shared Service Center support?
   (Select all applicable variables)

   □ Europe
   □ USA
   □ Middle East/Africa
   □ Asia/Australia
   □ Other (Please Specify)

6. Which areas are within the scope of your SSC? (Select all applicable variables)

   □ Finance
   □ Human Resources
   □ Sales and Marketing
   □ Information Technology
   □ Other (Please Specify)

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[22] See below for a description of the types of SSCs. SSC refers to Shared Service Centre

7. What is the annual turnover (USD) of your organisation (including the SSC)?
   □ 0-10
   □ 11-100
   □ 101-500
   □ 501 or more (Please Specify)

8. What is the total number of employees of your organisation (including the SSC)?
   □ 0-100
   □ 101-1,000
   □ 1,001-5,000
   □ 5,001-10,000
   □ 10,001 or more (Please Specify)

9. What project methodology was used in the design/build of your SSC?
   □ 6 Sigma
   □ Prince II
   □ System Dynamics
   □ Other (Please Specify)

10. Which of these areas are the critical success factors in the design and build of an SSC in your opinion? (Select all applicable variables)
   □ Strategy
   □ Support from Senior Executives
   □ Effective Project Execution
   □ Other (Please Specify)

11. What is the annual turnover (USD) of your SSC (only the SSC)?
   □ 0-10
   □ 11-100
   □ 101-500
   □ 501 or more (Please Specify)

12. What is the total number of employees of your SSC (only the SSC)?
   □ 0-100
   □ 101-1,000
   □ 1,001-5,000
   □ 5,001-10,000
   □ 10,001 or more (Please Specify)

13. How beneficial was the Project Methodology?

□ Very Beneficial

□ Beneficial

□ Not Beneficial

□ Other (Please Specify)

14. How much savings was achieved based upon the Project Methodology.

□ Less than 20%

□ 21% TO 50%

□ More than 50%

□ Other (Please Specify)

15. Please state whether any one or more of the below factors has had an impact on the costs of establishing the SSC.

□ Human Resources

□ Infrastructure

□ Project Management

□ Effective SSC Design and Build

□ All of the above

16. Please state whether any one or more of the below factors has had an impact on the benefits derived in the establishment of the SSC.

□ Human Resources

□ Infrastructure

□ Project Management

□ Effective SSC Design and Build

□ All of the above

17. Please state whether the initial SSC strategy design had an impact on one or more of the below factors in establishing the SSC.

□ Human Resources

□ Infrastructure

□ Project Management

□ Effective SSC Design and build

□ All of the above

18. Please state whether any one or more of the below factors has had an impact on the initial SSC strategy design in the establishment of the SSC.

□ Human Resources

□ Infrastructure

□ Project Management

□ Effective SSC Design and build

□ All of the above

19. Please state whether the initial SSC strategy design had an impact on one or more of the below factors in establishing the SSC.

- □ Costs
- □ Benefits
- □ Company Goals/Vision
- □ Constraints and Pressure on Management
- □ Effective organisation
- □ All of the above

20. Please state whether any one or more of the below factors has had an impact on the initial SSC strategy design in the establishment of the SSC.

- □ Costs
- □ Benefits
- □ Company Goals/Vision
- □ Constraints and Pressure on Management
- □ Effective organisation
- □ All of the above

21. Stages in the establishment of the SSC and the outcome achieved. Please see page 11 (page 439 in this thesis) below for a description of the phases.

SSC PHASE	DESCRIPTION	DURATION	PERCENTAGE OF DURATION ACHEIVED ON TIME	SAVINGS TARGET (MEASURED AGAINST CURRENT COSTS	PERCENTAGE OF SAVINGS ACHIEVED
PHASE 1	Opportunity assessment	Less than 3months 6 to 8 months 9 to 12 months More than 12 months	Less than 20 percent 21-50 percent 51 to 70% More than 71 percent	Less than 20 percent 21-50 percent 51 to 70% More than 71 percent	Less than 20 percent 21-50 percent 51 to 70% More than 71 percent
MANAGEMENT REVIEW	MANAGEMENT REVIEW	Less than 3months 6 to 8 months 9 to 12 months More than 12 months	Less than 20 percent 21-50 percent 51 to 70% More than 71 percent	Less than 20 percent 21-50 percent 51 to 70% More than 71 percent	Less than 20 percent 21-50 percent 51 to 70% More than 71 percent
PHASE 11	Design and pilot project	Less than 3months 6 to 8 months 9 to 12 months More than 12 months	Less than 20 percent 21-50 percent 51 to 70% More than 71 percent	Less than 20 percent 21-50 percent 51 to 70% More than 71 percent	Less than 20 percent 21-50 percent 51 to 70% More than 71 percent
PHASE 111	Implementation and Rollout	Less than 3months 6 to 8 months 9 to 12 months More than 12 months	Less than 20 percent 21-50 percent 51 to 70% More than 71 percent	Less than 20 percent 20-50 percent 50 to 70% More than 70 percent	Less than 20 percent 20-50 percent 50 to 70% More than 70 percent

PHASE 1V	Optimisation	Less than 3months	Less than 20 percent	Less than 20 percent	Less than 20 percent
		6 to 8 months	21-50 percent 51 to 70%	21-50 percent 51 to 70%	21-50 percent 51 to 70%
		9 to 12 months			
			More than 71 percent	More than 71 percent	More than 71 percent
		More than 12 months			

22. Motives for establishing the SSC and the outcomes obtained

AREA	OBJECTIVE MOTIVE	WAS THIS AN INITIAL OBJECTIVE/MOTIVE	WAS THE OBJECTIVE/MOTIVE ACHIEVED	WHAT PERCENTAGE OF THE TARGET OBJECTIVE/MOTIVE WAS ACHIEVED
POLITICAL	Involving a clear separation of responsibilities	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
	Performance and control management via service level agreements	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
	Improved decision making	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
	Other Please specify	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
ECONOMIC	Finance cost reduction	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
	Human Resources cost reduction	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
	IT cost reduction	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
	Procurement Cost reduction	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
	Other Please specify	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
Strategic and organizational motives	Clearly defined customer supplier relationships based upon service level agreements	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
	A standardisation of processes	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
	Quality assurance	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
	Consistency of information	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
	A concentration of the organisations main processes (Key core processes)	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
	A definition of acceptable quality standards	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
	Other Please specify	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
Technical motives	Quality IT back up	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
	Access to excellenT IT facilities	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more
	Other Please specify	□ Yes □ No	□ Yes □ No	□ less than 50 % □ 51% or more

23. Additional Question

Reviewing the SSC approach using the SD and mental models

Please take some time to review and comment on the attached diagram (System Dynamics). Comment on what you believe are the correct causal factors in the build and design of the SSC. Write on a separate sheet.

READING THE DIAGRAM

To read the diagram, please review the explanation of the diagram on the next page.

Each relationship (cause/effect) is denoted by an index. For example the index **BO1**

means that a well defined organisation/goals will lead to an effective organisational plan strategy
which will have a positive effect on the project management **(shown by the sign +).**

The positive effect of the project management will then have a positive effect on costs thereby reducing costs *(shown by the sign (-)*
as costs will go down) and costs reduction will have a positive impact on profitability**(shown by the sign S+ as profitability will rise);**
which will lead to a positive increase in shareholder value**(shown by the sign + as shareholder value will rise);** which will have a positive impact
on the organisation thereby enabling an effective organisation **(shown by the sign +);**
which will then have a positive impact on strategy **(effective strategy shown by the sign +).**

Using the same logic you can read through the list and comment on it. The logic is explained after the CLD diagram.

SSC CAUSAL LOOP DIAGRAM
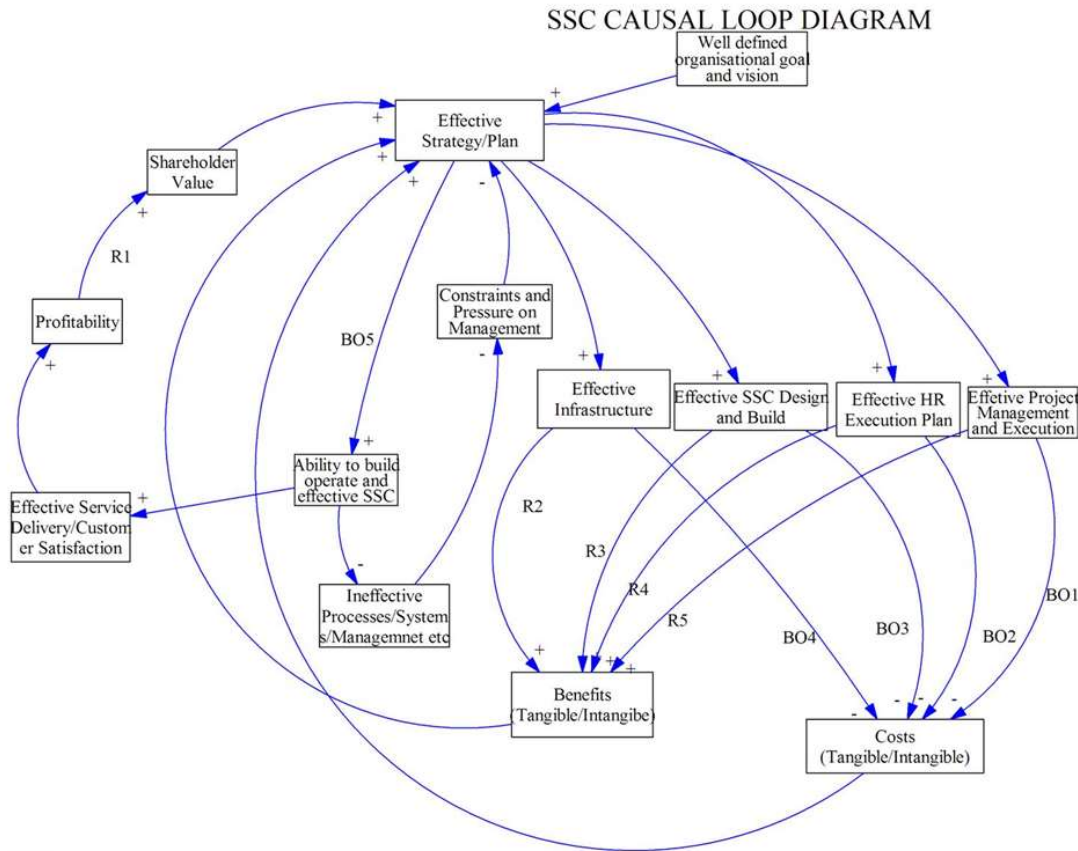
Sun Jul 14, 2013 7:09PM

EXPLANATION OF DIAGRAM

Balancing Loops-EXPLANATION
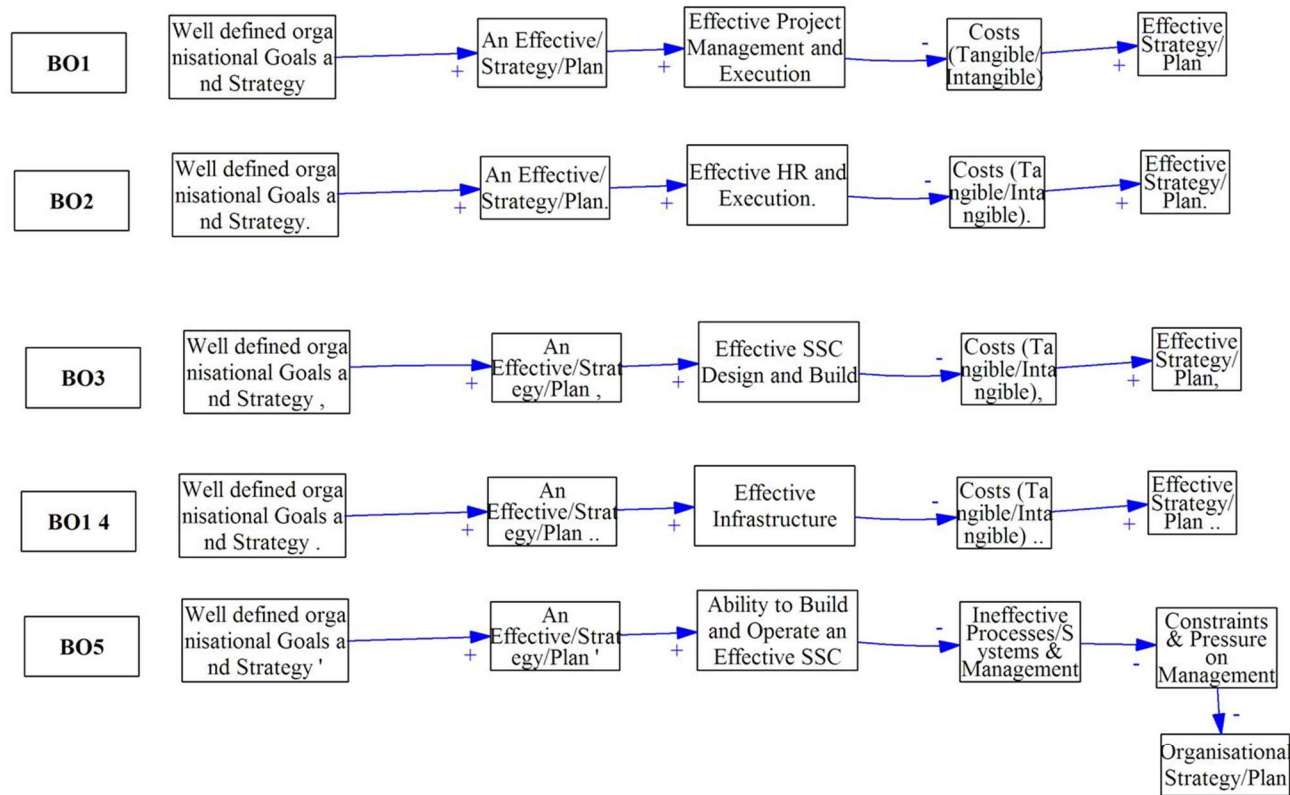
Reinforcing Loops-EXPLANATION

R2

| Well defined orga nisational Goals a nd Strategy | → | An Effective/ Strategy/Plan | → | Effective Project Management and Execution | + → | Benefits (Tangible/ Intangible) | + → | Effective Strategy/ Plan |

R3

| Well defined orga nisational Goals a nd Strategy. | → | An Effective/ Strategy/Plan. | → | Effective HR and Execution. | + → | Benefits (Tangible/I ntangible). | + → | Effective Strategy/ Plan. |

R4

| Well defined orga nisational Goals a nd Strategy , | → | An Effective/Strat egy/Plan , | → | Effective SSC Design and Build | + → | Benefits (Tangible/I ntangible), | + → | Effective Strategy/ Plan, |

R5

| Well defined orga nisational Goals a nd Strategy . | → | An Effective/Strat egy/Plan .. | → | Effective Infrastructure | + → | Benefits (Tangible/ Intangible) .. | + → | Effective Strategy/ Plan .. |

R1

| Well defined orga nisational Goals a nd Strategy ' | → | An Effective/Strat egy/Plan ' | → | Ability to Build and Operate an Effective SSC | + → | Effective Ser vice Delivery | + → | Profitability |

Effective Or ganistation

Shareholder Value +

Mon Jul 29, 2013 7:42PM

Additional Comment(s)

PLEASE PROVIDE THE INFORMATION BELOW (OPTIONAL)

Name		Phone No	
Position/Title		E-mail	
		Town/City, County	
Address		Postcode	
Country			

Thank you for taking the time to complete this survey.

SUPPLEMENTARY INFORMATION

A. SSC TYPES

Regional : These types of Shared Service Centres by their nature may serve only one region. For example Northern Europe or Europe.

National: These types of Shared Service Centres will normally operate in country and

Global: These types of Shared Service Centres according to PricewaterhouseCoopers (PWC) offers a comprehensive service to business units across the world.

B. STAGES/PHASES OF AN SSC

The Opportunity assessment Phase actually defines the main base line for which the activities will be undertaken. These include defining the business case etc.

Management review allows management to review and provide authorisation, project funding, etc.

For the Design and pilot project, this is the stage where detailed analysis, such as operating procedures, required staff levels; service level agreements etc are carried out.

Implementation and Rollout phase is the phase where the entire plan is rolled out to the organisation. This phase according to PWC (Austria) is determined in phase 1.

The optimisation phase is the phase that involves the continuous improvement of the shared services, technologies and re-engineering of the processes.

Appendix B- Case Protocol

A case study protocol was developed to facilitate the research process (Yin, 2009; Farquhar, 2012). This is discussed below.

Background and Rationale

There is evidence that a lot of multi-nationals and other governmental companies have embarked on designing and building shared services centres.

There are both costs and benefits associated with Shared Service Centres and organisations are better served to ensure that they employ the best and most practical models to achieve their aims.

Various models have been used to enumerate the benefits and costs of Shared Service Centres. However, there has not been enough research using System Dynamics modelling in designing and building Shared Service Centres.

There is a case to use System Dynamics as a DSS tool as this is a less expensive way of designing and building a shared service centre and will enhance the available methodologies for the design and build of SSCs.

Conceptual Framework

The Conceptual Framework for this research has two strands.

See discussions under Conceptual Framework in Chapter Four**.**

Research Aim

The main aim of this research is to explore how an SD[23]model can be developed as a DSS tool and used as an inexpensive but effective way of complementing current approaches in the evaluation of an SSC proposal.

The decision to create an SSC is an expensive one and therefore it is argued that there are benefits in using an SD model as a complement to current approaches. The SD model is additionally an inexpensive way of analysing the impact of the SSC architecture before the organisation commits expensive resources to the SSC project.

This aim is accomplished by analysing the main reasons for setting up the SSC and the benefits / disadvantages derived after the set-up of the SSC.

An SD (CLD/Stock Flow) model for SSCs is then constructed and the benefits and disadvantages are analysed.

Objectives

The specific objectives of this research are:

a)   To identify the factors and variables that are critical to the design and implementation of the case study SSC and how the results compares to the current SSC literature. See Questions 10, 15, 16, 17, 18, 19 and 20 of the questionnaire in Appendix A.

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[23] SD implies system dynamics, and both are used interchangeably in this proposal.

b)   To establish whether SD has been used as a DSS tool in the implementation of the SSC under consideration in this research and, if so, if it was beneficial. See Questions 9, 13 and 14 of the questionnaire in Appendix A.

c)   To design, build and develop a DSS tool based upon SD to be used in the implementation of the SSC. See Question 23 of the questionnaire in Appendix A.

d)   To identify and determine the reasons for establishing the SSC under consideration in this research (i.e. the case study) and to determine if any benefits were achieved and how those benefits compare with the current SSC literature. See Question 22 of the questionnaire in Appendix A.

e)   To determine whether the benefits envisaged during the SSC life cycle stages (being opportunity identification, management review, design and build, pilot stage, implementation and post implementation) with respect to the SSC under consideration in this research, have been achieved and how those benefits compare with the current SSC literature and finally See Question 21 of the questionnaire in Appendix A.

f)   To add to the literature regarding the management of SSCs and the use of SD as a DSS.

Study Setting and Research Question

Background to the Establishment of the SSC

In order to streamline services in the Northern Europe region, the company embarked on a consolidation of activities of its regional offices to the UK.

Among the reasons given were to save costs, streamline the management of financial and customer services and to be responsive to the needs of the customers served.

An SSC project was undertaken to relocate these services. The original implementation occurred from October 2007 to March 2008. Table 32 below shows the SSC design/build approach used for this organisation.

Table32 SSC Design/Phases for the organisation

SSC Phase	Description	Duration	Comments
Phase I	Opportunity assessment	Jan-2007 to 10-Apr-2007	The opportunity was identified and submitted to a management review committee for review and approval on the 10 Apr-2007. During this period a business case (See management review/business case below) was also established.
Management Review	Management Review (Business Case)	10-Apr-2007 to 01-June-2007	The business case was made during this period and this was reviewed by management. Approval was granted to commence with the project on the 01-June-2007.
Phase II	Design &Pilot Phase	01-June-2007 to 01-Oct-2007	During this stage, all the activities that were in scope were mapped out, number of headcounts etc., required and the project timeline and implementation was established. Packages were also designed for employees leaving the company. It must be noted that no existing employee remained after the transition.

SSC Phase	Description	Duration	Comments
Phase III	Implementation and Rollout	01-Oct-2007-31-03-2008	This was the period that the implementation and rollout began and ended. Employees were sent to Scandinavia from the UK for work-shadowing activities. They travelled weekly (Monday to Friday). In the first 2-3 months of the implementation, approximately half of the existing staff left the company which was not anticipated and therefore created a significant challenge for the implementation team. Plans had to be changed at short notice and the project leader was required to perform some of the work shadowing activities. Furthermore, to complicate matters, not all the staff recruitment was in place. Areas like banking software for new recruits took time to obtain and thus provided significant challenges.
Phase IV	Optimisation	01-04-2008 to 03-06-2008	This was the stabilisation phase when the activities were finally in the UK.

Research Question

From the earlier discussions in Chapter Two, it is clear that numerous approaches have been used to enumerate the costs and benefits of Shared Service Centres (Fahy, Curry and Cacciaguidi-Fahy, 2002; BearingPoint, 2007; PWC, 2011). However, there has not been enough research in evaluating Shared Service Centres (SSC) using a Simulation (specifically Systems Dynamics) [SD] Modelling; (Janssen and Joha, 2006). This research proposes the use of System Dynamics as a DSS and also as a less expensive but credible way of evaluating the shared service centre transformation process, prior to designing and building them and to enhance the project management methodology for SSCs (Sterman, 1992).

The research question's focus is to find out (explore), whether it is advantageous to use an SD model as a DSS to evaluate an SSC proposal / implementation to complement current approaches. In effect, how can a DSS tool based upon an SD approach be constructed for Shared Service Centres that can complement current approaches (Shared Service Implementation Process)? *It is expected that this research will help throw more light on the SSC approach adopted by organisations.*

Study design

A mixed method (exploratory sequential) methodology is used in this research.

There are three (3) stages of this study. Stages I and II (one and two) involved the use of questionnaires completed by selected individuals from the selected organisation (Qualitative Strand). Stage III (three) involves developing a System Dynamics model (Simulation) for the SSC Transition.

Figure 123 below depicts the study design.

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Methodological Approach of this Research

Figure 123 Methodological Approach of this Research

RESEARCH TECHNIQUES PROCEDURE

Stage 1 (Pilot Study/Expert Opinion)

a) Examine and review the current literature regarding the design and building of SSCs and also System Dynamics. The aim is to help operationalise the research question / objectives. In addition, it will help to select / validate the most important candidates for the Causal Loop Diagram (CLD) and select the correct questions to be asked.

b) Construct a questionnaire based upon the literature review. Furthermore, construct a Causal Loop Diagram (CLD) model based upon the current literature (my mental models). The aim is to validate the current existing shared service and SD models or techniques discussed in the existing literature.

c) Conduct a pilot study by obtaining feedback regarding the questionnaire from a number of managers at the organisation (via face to face/telephone/email interaction) who have been involved in the design and building of SSCs (expert opinion).

d) Analyse the results received from the survey (expert opinion) against the literature review and draw conclusions both for the individual respondents and the organisation.

Stage II (Two)

a) Refine/Construct if appropriate a new Causal Loop Diagram (CLD) and questionnaire based upon feedback received from the pilot study (Stage I).

b) Expand the constructed questionnaire based upon the literature review to include other stakeholders at the organisation via face to face/telephone/email meetings. The stakeholders used for this stage were service recipients, service supplier and service provider.

c) Analyse, the results obtained from the perspective of the stakeholders against the literature review and draw conclusions both for the individual respondents and the organisation.

Stage III (Three)

a)   Refine/Construct if appropriate a new Causal Loop Diagram (CLD) and questionnaire based upon feedback received from the pilot survey.

b)   Create an SD model (Stock and Flow) for the Shared Service Centre Transition (Use the refined Causal Loop Diagram as part of this process).

Questionnaire Design

See discussions under questionnaire design in Appendix A and Table 32.

Field Methods

Stage I

Undertake a pilot study within the financial institution (organisation).

Send Questionnaire (See Appendix A) with follow up questions if appropriate to three (3) managers who are experts and involved with the design and implementation of SSCs. This is expected to be done in February-April 2013.

Stage II

Send Questionnaires with follow up questions if appropriate, to three (3) individuals who are stakeholders in the SSC project. This is expected to be done after the pilot study has validated the questionnaire. Aim to do this in 2014 and 2015. Send questionnaires by email and also deliver manually if appropriate.

Develop the questionnaires based upon the researcher's mental models and the relevant literature regarding SSCs and SD (Yin, 2009). Structure the questionnaire to reflect the objectives/questions of the research that has been espoused.

Questionnaire/ (Survey)

Purpose

It is planned to conduct a questionnaire/survey interview with experts and stakeholders in the field of Shared Service Centres. The purpose of this is to collect information relating to the following objectives

OBJECTIVE 1: To identify the factors and variables that are critical to the design and implementation of the case study SSC and how the results compares to the current SSC literature.

OBJECTIVE 2: To establish whether SD has been used as a DSS tool in the implementation of the SSC under consideration in this research and, if so, if it was beneficial.

OBJECTIVE 3: To design, build and develop a DSS tool based upon SD to be used in the implementation of the SSC.

OBJECTIVE 4: To identify and determine the reasons for establishing the SSC under consideration in this research (i.e. the case study) and to determine if any benefits were

achieved and how those benefits compare with the current SSC literature.

OBJECTIVE 5: To determine whether the benefits envisaged during the SSC life cycle stages (being opportunity identification, management review, design and build, pilot stage, implementation and post implementation) with respect to the SSC under consideration in this research, have been achieved and how those benefits compare with the current SSC literature and finally

OBJECTIVE 6: To add to the literature regarding the management of SSCs and the use of SD as a DSS.

This approach is taken due to the following reasons: Some of the respondents were geographically spread, so the questionnaire provided a better approach.

In addition, to ensure a consistent response given the technical nature of the SSC area, it made sense to have a uniform questionnaire to address this. Where appropriate, follow up questions are asked of respondents.

Participants

The participants are three (3) people with expert opinions from the SSC industry and three (3) people who are stakeholders in the SSC function. The results received from the respondents are used to form an overall view for the organisation.

The criteria for Participant Inclusion

Expert Opinion

    a) The participant should have been involved at a senior level with the design/build and implementation of an SSC.

    b) They must have at least 10 years' experience in their working lives.

c) Respondents must work or must have worked for the organisation used in this research.

Stakeholder opinion

a) The participant should have been involved as either an employee, manager (supplier of the service) or service user in the design / build and implementation of an SSC.

b) Respondents must work or must have worked for the organisation used in this research.

c) Respondents must work or must have been involved in the design / build / implementation of the current SSC under discussion.

Sample size

According to Yin (2009) case study research involves single and multiple case studies. Figure 124 below adapted from Yin (2009, p. 46) shows the types of case studies.
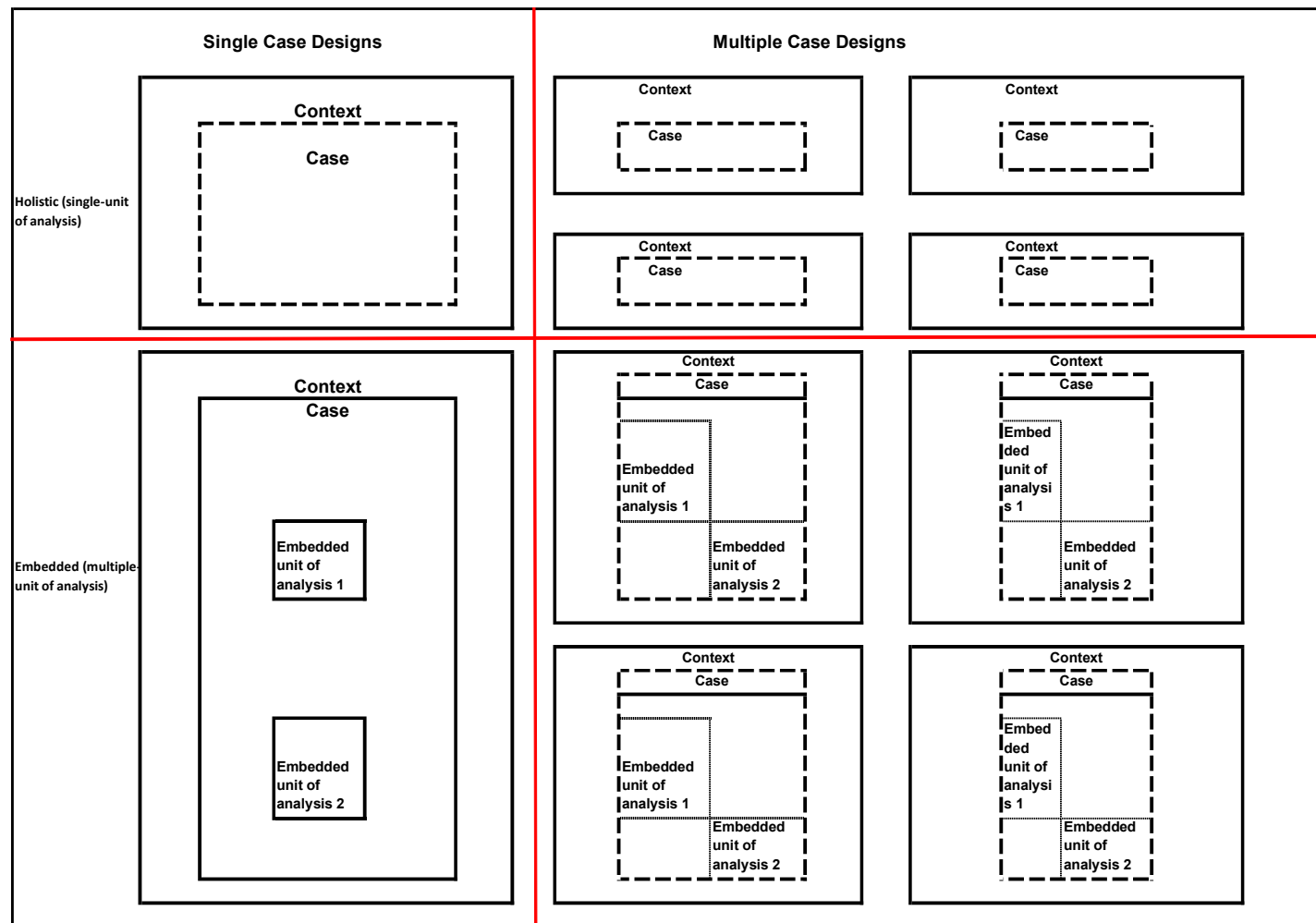
Figure 124 Case Study types

Source: Yin (2009, p.46)

Sample Selection

The sample selection is based upon case study sampling and then a combination of criterion random sampling, critical-case sampling, typical case sampling and opportunistic sampling are used. Criterion sampling is used for participant inclusion (Patton, 1990; Mertens, 2015)*.*

Permission and invitation

Permission was sought from the University of Bedfordshire and also the organisation sponsored the research work.

Consent process

Participants were informed in the questionnaire about the reason for the questionnaire and that the information received from the questionnaire will be confidential. Furthermore, to buttress this point, participant signed or emailed the completed questionnaire confirming this position (See also questionnaire design in Appendix A).

Organising the interview

The questionnaire was submitted to the respondents at the office of the institution (physically) or via email. See Appendix A above regarding the questionnaire.

Introduction to the interview

At the beginning of the questionnaire survey, the purpose for the survey was explained. The issue of confidentiality was also explained. The below statements illustrate this.

'*Please take some time to complete this questionnaire and return to:*

The feedback will be used for analysis purposes. All Information will be kept confidential'.

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'ABSTRACT

There is evidence that a lot of multi-nationals and other governmental companies have embarked on designing and building Shared Services Centres.

There are both costs and benefits associated with Shared Service Centres and organisations are better served to ensure that they employ the best and most appropriate methods to achieve their aims.

Various models have been used to enumerate the benefits and costs of Shared Service Centres. However, there is not enough research using System Dynamics modelling in designing and building Shared Service Centres.

There is a case to use System Dynamics as a DSS tool in designing and building Shared Service Centres. This will enhance the available methodologies for the design and build of SSCs.

Data Management and Analysis

Data is kept on a USB drive, and backups have been made on a computer desktop. The hardcopy of the responses from the survey was also kept in a locked drawer. Data will be analysed using the SPSS software and excel spreadsheets. The descriptive characteristics of the responses will be written using excel and word software.

Development of theoretical hypotheses and narratives

The literature review will be used to develop the theoretical constructs / hypotheses. The findings will be measured against the literature review and the theoretical hypotheses. It will also be related to the original conceptual framework and adjustments may be done if necessary. The research question will be revisited based upon the results and narratives received.

Ethics

See Table 16 (Ethical Considerations) in Chapter Three (3).

Quality assurance

Quality Assurance in this research will be done by the researcher reviewing and directly validating the responses by having face to face / telephone conference discussions with one or more of the respondents to check their understanding. This was done with for example, the Business Analyst (Respondent One) and Accounting Manager (Respondent Two)

Timelines

See discussions for Stages I & II (One and Two) under 'Field Methods' on pages 448 and 449 above.

Questionnaire-design

The theoretical framework discussed in the literature review has heavily influenced the role of the case study research design including the questionnaire (Yin, 2009). Churchill and Iacobucci (2010) define the process needed in designing a Questionnaire. This is illustrated in Table 33 below.

Table33 Steps in Developing the Research Questionnaire

Steps in Developing a Questionnaire (Churchill and Iacobucci (2010)	Comments	This Research (Questionnaire Design)
Step 1. Specify What Information will be sought	Have a clear understanding of the Research question and issue at hand	This research seeks to obtain information regarding the design/build of a Shared Service Centre, the factors influencing this and use of System Dynamics as a tool in establishing the SSC. This is reflected in the Research Question and Objectives.
Step 2. Determine the Type of Questionnaire and Method of Administration	It is important to understand the method of administration (mail, telephone, personal interview, manually handing questionnaire to respondents) against the cost of administration.	In this research a combination of email and manually handing over the questionnaire to respondents, face to face and some telephone interactions were used.
Step 3. Determine Content of Individual Question	Ensure that questions are designed to support the research. Ensure for example, that questions asked are of importance to the research and relates to the time period of the research	The questions (questionnaire) are structured to be able to address the specific objectives outlined in the research. Each specific question was related to the objectives espoused in the research. In addition, there was a space for additional comments.
Step 4. Determine Form of Response to Each Question	Ensure that the form of questions is relevant for the information that is needed. The questions, can be either 'dichotomous, multi-chotomous or open ended'.	The form of response to questions were mainly multi-choice and some open ended (comments that were requested) although there were a few dichotomous questions.
Step 5. Wording of Each Question	It is important to use words that can be easily understood (simple words while avoiding generalisations and leading questions)	The wordings used in this questionnaire were very simple, and respondents had no issue answering the questions. Where there was a misunderstanding, the researcher explained the questions.
Step 6. Sequence of Questions	One can use the funnel approach or start by asking general questions	The funnel approach was used in this questionnaire. The first 8 questions were general questions (See Questionnaire).
Step 7. Physical Characteristics of Questions	Ensure that the questionnaire looks professional	This is the case with this questionnaire.
Step 8. Re-examine Steps 1-7 and revise if Necessary	Review questionnaire to ensure that the questions are for example not confusing and ambiguous.	The questionnaire was reviewed by the researcher and also reviewed by the Supervisor. The researcher also made a presentation to fellow students as part of the research training.
Step 9. PRE_TEST the Survey, Revise Where Needed	Test the survey on potential respondents and revise if any.	The questionnaire was reviewed by the researcher and also reviewed by the Supervisor. The researcher also made a presentation to fellow students as part of the research training.

Source: Adapted from Churchill and Iacobucci (2010, p.205)

LINKING THE QUESTIONNAIRE (DATA) TO THE OBJECTIVES (PROPOSITIONS/HYPOTHESES) (See Appendix A for the full survey questionnaire.)

The questionnaire is structured to be able to address the specific objectives/questions espoused in the research. This is discussed below

1. **OBJECTIVE 1:** To identify the factors and variables that are critical to the design and implementation of the case study SSC and how the results compares to the current SSC literature. Questions 10, 15, 16, 17, 18, 19 and 20 reflected this objective in the questionnaire (See Appendix A).

The following factors were used based upon variables identified earlier in the literature review. The below are the main factors that influence the design and build of an SSC:

- Critical Success factors: Organisational Strategy, Support from Senior executives and Effective Project Execution.

- Human Resources, Good Infrastructure and Project Management cost of an SSC.

- The SSC strategy design/build and its impact on Infrastructure, Human Resources, Project Management, Costs/Benefits, Effective SSC design and Build and vice versa

Table 34 below shows how the questionnaire was structured to reflect these factors.

Table34-Factors Influencing the Design and Build of the SSC

Area/Aims and Objective	Question	Factors
Critical Success Factors	Que 10. Which of these areas are the critical success factors in the design and build of an SSC in your opinion? (Select all applicable variables)	Other-Strategy, Support from Senior Execs and Project Execution
		other-Strategy, Effective Project Execution
		Total
Impact of factors on cost of SSC	Que 15. Please state whether any one or more of the below factors has had an impact on the costs of establishing the SSC. (HR, Infrastructure, Project Management, Effective SSC Design and Build, All of the above)	Human Resources
		Other-Infrastructure and Project Management
		other-Project Management, Effective SSC Design
		Total

Area/Aims and Objective	Question	Factors
Impact of factors on design of SSC	Que16. Please state whether any one or more of the below factors has had an impact on the benefits derived in the establishment of the SSC. (HR, Infrastructure, Project Management, Effective SSC Design and Build, All of the above)	Infrastructure
		All of the above
		Other-Infrastructure, Effective SSC Design
		Total
Impact of strategy design on variables/factors	Que 17: Please state whether the initial SSC strategy design had an impact on one or more of the below factors in establishing the SSC. (HR, Infrastructure, Project Management, Effective SSC Design and Build, All of the above)	Other_ Infrastructure, Project Management and Effective SSC Design
		other-Human Resources, Infrastructure, Project Management
		other-HR and Infrastructure
		Total
Impact of variables on strategy design	18. Please state whether any one or more of the below factors has had an impact on the initial SSC strategy design in the establishment of the SSC. (HR, Infrastructure, Project Management, Effective SSC Design and Build, All of the above)	Infrastructure
		Human Resources, Infrastructure and Effective SSC Design and Build
		Other-HR and Infrastructure
		Total
Impact of strategy design on other variables/factors	19. Please state whether the initial SSC strategy design had an impact on one or more of the below factors in establishing the SSC. (Costs, Benefits, Company Goals/Vision, Effective Organisation, All of the above)	All of the above
		Costs, Effective Organisation, Benefits
		Other-Costs, Company Goals and Vision, Effective Organisation
		Total
Impact of other variables/factors on strategy design	Que 20. Please state whether any one or more of the below factors has had an impact on the initial SSC strategy design in the establishment of the SSC. (Costs, Benefits, Company Goals/Vision, Effective Organisation, All of the above)	All of the above
		other-costs, company vision and effective organisation
		Total

2. **OBJECTIVE 2:** To establish whether SD has been used as a DSS tool in the

implementation of the SSC under consideration in this research and, if so, if it was

beneficial. Questions 9, 13 and14 reflected this. See Questions, 9, 13 and 14 in the questionnaire in Appendix A.

3. **OBJECTIVE 3:** To design, build and develop a DSS tool based upon SD to be used in the implementation of the SSC. See Question 23 in the questionnaire in Appendix A.

CAUSAL LOOP DIAGRAMS (CLD)

The dynamic characteristics of the system are defined through the qualitative modelling process using causal loop diagrams which applies logical descriptions of cause and effect. A preliminary Causal Loop Diagram (CLD) was constructed from the relevant literature. Furthermore, the questionnaire was used to help document the initial understanding of the cause and effect relationships. The software Vensim was used to build the initial CLD.[24] See the questionnaire in Appendix A for the CLD.

4. **OBJECTIVE 4** To identify and determine the reasons for establishing the SSC under consideration in this research (i.e. the case study) and to determine if any benefits were achieved and how those benefits compare with the current SSC literature. See Question 22 in the questionnaire in Appendix A.

The following reasons/motives were established as the basis for the establishment of an SSC. These are Political, Strategic/Organisational, Economic and Technical. See Question 22 in the questionnaire in Appendix A.

OBJECTIVE 5 To determine whether the benefits envisaged during the SSC life cycle

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[24] A (+) means there is a positive relationship and a (-) means a negative relationship. Please see Appendix A for an interpretation of the causal loop logic and the flows.

stages (being opportunity identification, management review, design and build, pilot stage, implementation and post implementation) with respect to the SSC under consideration in this research, have been achieved and how those benefits compare with the current SSC literature. See Question 21 in the questionnaire in Appendix A.

The aim was to establish the SSC duration and whether the benefits envisaged in using current approaches had been achieved.

General Characteristics of the Organisation (Additional Objectives)

This objective was to capture the data for the General Characteristics of the organisation (See Questions 1 to 12 in the questionnaire in Appendix A).

Appendix C- Summary of Alternative Research Methodologies

Table 35 Summary of Alternative Research Methodologies

Methodology	Definition	Used in this Research	Reasons
Case Study	It is used for providing a holistic approach to studying a contemporary phenomenon (the case) in a particular/natural context/setting using a number of methods either quantitative or qualitative or both.	Yes	Case Study research is used in this research due to the fact that there is a scarcity of empirical studies relating to SSCs and SD models (Janssen and Joha, 2006). There is also a need to investigate the nature and background of why the company embarked on the SSC and whether they used an SD model in their initial design and whether they are achieving the benefits as designed. Case study research is relevant in this situation as one will be dealing with a complex and broad phenomenon and the current existing knowledge is insufficient and does not allow the posing of potential unstructured/casual questions (Collis and Hussey 2009; Yin, 2009). There is also a requirement to have access to in depth potential confidential/sensitive data and organisational personnel. Both quantitative and qualitative data collection methods are used.
Simulation (System Dynamics)	Harrison et al. (2007, p.1233) argues that 'as with any formal model, the development of a simulation model constitutes an exercise in theory development. Constructing a simulation model involves identifying the underlying processes thought to play key roles for the behaviour of an actor (or organizational system) and formalizing them as mathematical equations or sets of computational rules.'	Yes	Simulation is used in this research for the following reasons: As stated elsewhere in this thesis, this research is essentially to describe the complex feedback loops that exists within the shared service transformation. This is a representation of reality in a complex world. Based upon the literature review ascribed, there are considerable drawbacks with the use of hypothesis testing to represent a complex real-world situation. The model represents a continuous flow and therefore a simulation (system dynamics) approach is important to use. The system under consideration (Shared Service Centres) has complex interactions and requires input from multiple disciplines such as accounting, statistics, System Dynamics etc. Therefore Simulation (SD) is the best tool to use.
Ethnography	Ethnography is a research approach or methodology borrowed from anthropology (This is the	No	This qualitative research strategy was not deemed appropriate for this research. The study being undertaken was not specifically for the study of people and their norms, societies or customs. Although this research study involved people (staff), the aim was to study the SSC as a phenomenon and this research approach would have been insufficient for what is required.

Methodology	Definition	Used in this Research	Reasons
	study of people and their societies and customs).		
Hermeneutics	Hermeneutics is a research approach or methodology that focuses on interpreting and understanding text in the context of the underlying historical and social factors.	No	This qualitative research strategy was not deemed appropriate for this research. This is because the study being undertaken was not specifically for analysing texts.
Participative enquiry	Participative enquiry is a research approach or methodology the aim of which is to involve the participants to the fullest extent possible in the research studies	No	This qualitative research strategy was not deemed appropriate for this research. This is because participants were not required to collect data and direct the progress of the research. This would have made the research process more cumbersome, complex and time consuming. The kind of questions posed and the depth of knowledge required by respondents ruled out the use of this approach.
Action research	Action research as a methodology aims to find an effective way to bring about change in a conscious manner in a partly controlled environment	No	This qualitative research strategy was not deemed appropriate for this research. This is because the aim of the research was not to enter into a situation, then attempt to bring change and monitor the results. The aim of the study was to provide a contribution to knowledge and develop an SD model that can be used to analyse SSCs.
Grounded theory methodology	Grounded theory methodology uses a systematic approach to develop and derive inductive theory about a phenomenon. Data analysis starts with coding in hierarchical format.	No	This qualitative research strategy was not deemed appropriate for this research. This is because the aim of the research was to provide a contribution to knowledge and develop an SD model that can be used to analyse SSCs. Using this approach would have involved the collection of data that may be inappropriate or excessive and this may also dilute the focus of this research. Where appropriate the relevant information data is used in this research, but it would have been extra time consuming if every perceived line of inquiry is pursued.

Source: Adapted from Collis and Hussey (2009) and Mertens (2015)

Appendix D- Alternative Data Collection Approaches (Qualitative)

Table 36 Alternative Data Collection Approaches (Qualitative)

Method	Overall Purpose	Advantages	Challenges	Used in the Research (Yes/No)	Reason
Questionnaires, Surveys,	When you need to quickly and/or easily get lots of information from people in a non-threatening way	Can complete anonymously Inexpensive to administer Easy to compare and analyse Administer to many people Can get lots of data Many sample questionnaires already exist	Might not get careful feedback Wording can bias client's responses Are impersonal In surveys, may need sampling expert Doesn't get full story	Yes	In order to provide uniformity with the questions posed and also to be able to have uniform results that can be easily compared and analysed, it was determined by this researcher that this was one of the most optimal ways to undertake the data collection approach.
Interviews	When you want to fully understand someone's impressions or experiences, or learn about their answers to questionnaires	Get full range and depth of information Develop relationship with client Can be flexible with client	Can take much time Can be hard to analyse and compare Can be costly Interviewer can bias client responses	Yes, but used as a follow up to questionn aire response	This data collection technique was partially used in combination with other data collection techniques described in this section. This was mainly used as a follow up to survey question(s) when the researcher was seeking further clarification or the validation of certain data. This was done for example, with the Finance Director and the Business Analyst who validated some of the data.
Document or artefact review	When you want an impression of how a program operates without interrupting the program. Comes from a review of applications, finances, memos, minutes, etc.	Get comprehensive and historical information Doesn't interrupt program or client's routine in program Information already exits Few biases about information	Often takes much time Info may be incomplete Need to be quite clear about what is looked for Not flexible to get data; data restricted to what already exists	Yes	In order, to meet the goals of this research, it was important to obtain prior information regarding the organisation as this was to help especially in the System Dynamics modelling process.
Observation	To gather accurate information about how a program actually operates, particularly about processes	View operations of a program as they are actually occurring	Can be difficult to interpret seen behaviour Can be complex to categorize observation	No	The research question and what was to be studied did not require any form of observation of a process in real time or live situation.

Method	Overall Purpose	Advantages	Challenges	Used in the Research (Yes/No)	Reason
		Can adapt to events as they occur	Can influence behaviours of programme participants Can be expensive		
Focus groups	To explore a topic in depth through group discussion (e.g. about reactions to an experience or suggestion, understanding common complaints, etc.); useful in evaluation and marketing	Quickly and reliably get common impressions Can be efficient way to get much range and depth of information in short time Can convey key information about programs	Can be hard to analyse responses Need good facilitator for safety and disclosure Difficult to schedule a large number of people together	No	Respondents' experiences with the SSC topic were varied and the researcher did not want all the respondents in one location. This was to allow each respondent the opportunity to answer the questionnaire based upon their own experiences without being influenced by other respondents who may have a different experience but may be more dominant.
Case Studies	To fully understand or depict a client's experiences in a programme and to conduct comprehensive examination through cross-comparison of cases	Fully depicts client's experience in programme input, process, and results Powerful means to portray programme to outsiders	Usually quite time-consuming to collect, organize, and describe Represents depth of information rather than breadth	Yes	It was the main data collection tool used in combination with other data collection techniques described in this section. This was used due to the fact that in order to meet the goals of this research, it was important to obtain the views of experts in the field and stakeholders. Case Study was the unit of choice as the approach in this research was to analyse and explain the SSC phenomenon in depth and to also gain access to sensitive information.

Source: Adapted from McNamara (2008, cited in Mertens, 2015, p. 363)

Appendix E- SELECTED Research Results

Table 37 SD Model Used and Whether It Was Beneficial RESULTS

OBJECTIVE- To understand whether an SD model has been used in the design of the SSC and whether it was beneficial. (Que 9, 13, 14)

QUESTION	6 RESPONDENTS		RESPONDENT ONE	RESPONDENT TWO	RESPONDENT THREE	RESPONDENT FOUR	RESPONDENT FIVE	RESPONDENT SIX	THREE RESPONDENTS PHASE ONE		THREE RESPONDENTS PHASE TWO	
QUE_9_PROJECT_METHODOLOGY_USED		Valid Percent								Valid Percent		Valid Percent
	6Sigma	100.0	6Sigma	6Sigma	6Sigma	6Sigma	6Sigma	6Sigma	6Sigma	100.0	6Sigma	100.0
QUE13_HOW_BENEFICIAL_WAS_PROJECT_METHODOLOGY		Percent								Percent		Percent
	Very Beneficial	33.3	Very Beneficial	Beneficial	Very Beneficial	Beneficial	Not Beneficial	Beneficial	Very Beneficial	66.7	Beneficial	66.7
	Beneficial	50.0							Beneficial	33.3	Not Beneficial	33.3
	Not Beneficial	16.7							Total	100.0	Total	100.0
	Total	100.0										
QUE_14_PROJECT_METHODOLOGY SAVINGS		Valid Percent								Valid Percent		Valid Percent
	Less than 20%	33.3	20% -50%	20% -50%	20% -50%	Less than 20%	Less than 20%	20% -50%	20% -50%	100.0	Less than 20%	66.7
	20% -50%	66.7									20% -50%	33.3
	Total	100.0									Total	100.0

Source: Authors own compilation of research results from research questionnaire developed by the author for this thesis

Table 38 SSC PHASE ONE RESULTS

PHASE	Question	ALL SIX RESPONDENTS		RESPONDENT ONE	RESPONDENT TWO	RESPONDENT THREE	RESPONDENT FOUR	RESPONDENT FIVE	RESPONDENT SIX	PHASE I -PILOT STUDY (Respondents 1-3)		PHASE II -Stakeholders (Respondents 4-6)	
OBJECTIVE: To understand whether the benefits envisaged using the current SSC life-cycle phases/stages have been achieved. (Que 21).													
PHASE I (ONE)	Q21_PHASE1_OPPORTUNITY_ASSESSMENT_DURATION	Valid Percent: Less than 3 months; 6-8 months; Not_Applicable; Total	50.0; 33.3; 16.7; 100.0	6-8 months	Less than 3 months	6-8 months	Less than 3 months	Not_Applicable	Less than 3 months	Valid Percent: Less than 3 months; 6-8 months; Total	33.3; 66.7; 100.0	Less than 3 months; Not_Applicable; Total	66.7; 33.3; 100.0
	Q21_PHASE1_OPPORTUNITY_ASSESSMENT_DURATION_PERCENT_ACHIEVED	Valid Percent: 51%-70%; 71% OR MORE; Not Applicable; Total	33.3; 50.0; 16.7; 100.0	71% OR MORE	51%-70%	71% OR MORE	71% OR MORE	Not Applicable	51%-70%	Percent: 51%-70%; 71% OR MORE; Total	33.3; 66.7; 100.0	Percent: 51%-70%; 71% OR MORE; Not Applicable; Total	33.3; 33.3; 33.3; 100.0
	Q21_PHASE1_OPPORTUNITY_ASSESSMENT_SAVINGS_TARGET_AGAINST_COSTS	Valid Percent: LESS THAN 20%; 21%-50%; 51%-70%; Not applicable; Total	16.7; 50.0; 16.7; 16.7; 100.0	51%-70%	LESS THAN 20%	21%-50%	21%-50%	Not applicable	21%-50%	Percent: LESS THAN 20%; 21%-50%; 51%-70%; Total	33.3; 33.3; 33.3; 100.0	Percent: 21%-50%; Not applicable; Total	66.7; 33.3; 100.0
	Q21_PHASE1_OPPORTUNITY_ASSESSMENT_SAVINGS_TARGET_ACHIEVED	Valid Percent: LESS THAN 20%; 21%-50%; 51%-70%; not applicable; Total	16.7; 50.0; 16.7; 16.7; 100.0	51%-70%	LESS THAN 20%	21%-50%	21%-50%	not applicable	21%-50%	Valid Percent: LESS THAN 20%; 21%-50%; 51%-70%; Total	33.3; 33.3; 33.3; 100.0	Percent: 21%-50%; not applicable; Total	66.7; 33.3; 100.0

Source: Authors own compilation of research results from research questionnaire developed by the author for this thesis

Table 39 SSC MANAGEMENT REVIEW RESULTS

OBJECTIVE: To understand whether the benefits envisaged using the current SSC life-cycle phases/stages have been achieved. (Que 21).

PHASE	Question	ALL SIX RESPONDENTS	Valid Percent	RESPONDENT ONE	RESPONDENT TWO	RESPONDENT THREE	RESPONDENT FOUR	RESPONDENT FIVE	RESPONDENT SIX	PHASE I -PILOT STUDY (Respondents 1-3)	Valid Percent	PHASE II -Stakeholders (Respondents 4-6)	Percent
MANAGEMENT REVIEW	Q21_MANAGEMENT_REVIEW_DURATION	Less than 3months	66.7	6-8months	Less than 3months	Less than 3months	Less than 3months	Not Applicable	Less than 3months	Less than 3months	66.7	Less than 3months	66.7
		6-8months	16.7							6-8months	33.3	Not Applicable	33.3
		Not Applicable	16.7							Total	100.0	Total	100.0
		Total	100.0										
	Q21_MANAGEMENT_REVIEW_DURATION_PERCENT_ACHIEVED	21%-50%	16.7	71% OR MORE	21%-50%	71% OR MORE	71% OR MORE	Not Applicable	71% OR MORE	21%-50%	33.3	71% OR MORE	66.7
		71% OR MORE	66.7							71% OR MORE	66.7	Not Applicable	33.3
		Not Applicable	16.7							Total	100.0	Total	100.0
		Total	100.0										
	Q21_MANAGEMENT_REVIEW_SAVINGS_TARGET_AGAINST_COSTS	LESS THAN 20%	16.7	51%-70%	LESS THAN 20%	21%-50%	21%-50%	Not applicable	51%-70%	LESS THAN 20%	33.3	21%-50%	33.3
		21%-50%	33.3							21%-50%	33.3	51%-70%	33.3
		51%-70%	33.3							51%-70%	33.3	Not applicable	33.3
		Not applicable	16.7							Total	100.0	Total	100.0
		Total	100.0										
	Q21_MANAGEMENT_REVIEW_PERCENT_ACHIEVED	LESS THAN 20%	16.7	51%-70%	LESS THAN 20%	21% - 50%	21% - 50%	Not Applicable	21% - 50%	LESS THAN 20%	33.3	21% - 50%	66.7
		21% - 50%	50.0							21% - 50%	33.3	Not Applicable	33.3
		51%-70%	16.7							51%-70%	33.3	Total	100.0
		Not Applicable	16.7							Total	100.0		
		Total	100.0										

Source: Authors own compilation of research results from research questionnaire developed by the author for this thesis

Table 40 SSC PHASE TWO RESULTS

		OBJECTIVE: To understand whether the benefits envisaged using the current SSC life-cycle phases/stages have been achieved. (Que 21).										
PHASE	Question	ALL SIX RESPONDENTS		RESPONDENT ONE	RESPONDENT TWO	RESPONDENT THREE	RESPONDENT FOUR	RESPONDENT FIVE	RESPONDENT SIX	PHASE I -PILOT STUDY (Respondents 1-3)		PHASE II -Stakeholders (Respondents 4-6)	
PHASE II (TWO)	Q21_PHASE11_DESIGN_AND_PILOT_DURATION		Valid Percent	6-8 MONTHS	MORE THAN 12 MONTHS	9-12 MONTHS	LESS THAN 3 MONTHS	6-8 MONTHS	LESS THAN 3 MONTHS		Valid Percent		Percent
		LESS THAN 3 MONTHS	33.3							6-8 MONTHS	33.3	LESS THAN 3 MONTHS	66.7
		6-8 MONTHS	33.3							9-12 MONTHS	33.3	6-8 MONTHS	33.3
		9-12 MONTHS	16.7							MORE THAN 12 MONTHS	33.3	Total	100.0
		MORE THAN 12 MONTHS	16.7							Total	100.0		
		Total	100.0										
	Q21_PHASE11_DESIGN_AND_PILOT_DURATION_PERCENT_ACHIEVED		Valid Percent	71% OR MORE	21%-50%	71% OR MORE	71% OR MORE	Not Applicable	71% OR MORE		Valid Percent		Percent
		21%-50%	16.7							21%-50%	33.3	71% OR MORE	66.7
		71% OR MORE	66.7							71% OR MORE	66.7	Not Applicable	33.3
		Not Applicable	16.7							Total	100.0	Total	100.0
		Total	100.0										
	Q21_PHASE11_DESIGN_AND_PILOT_SAVINGS_TARGET_AGAINST_COSTS		Valid Percent	51%-70%	21% TO 50%	21% TO 50%	21% TO 50%	Not Applicable	51%-70%		Valid Percent		Percent
		21% TO 50%	50.0							21% TO 50%	66.7	21% TO 50%	33.3
		51%-70%	33.3							51%-70%	33.3	51%-70%	33.3
		Not Applicable	16.7							Total	100.0	Not Applicable	33.3
		Total	100.0									Total	100.0
	Q21_PHASE11_DESIGN_AND_PILOT_SAVINGS_TARGET_ACHIEVED		Valid Percent	51%-70%	21%-50%	21%-50%	21%-50%	Not Applicable	21%-50%		Valid Percent		Percent
		21%-50%	66.7							21%-50%	66.7	21%-50%	66.7
		51%-70%	16.7							51%-70%	33.3	Not Applicable	33.3
		Not Applicable	16.7							Total	100.0	Total	100.0
		Total	100.0										

Source: Authors own compilation of research results from research questionnaire developed by the author for this thesis

Table 41 SSC PHASE THREE RESULTS

PHASE	Question	ALL SIX RESPONDENTS		RESPONDENT ONE	RESPONDENT TWO	RESPONDENT THREE	RESPONDENT FOUR	RESPONDENT FIVE	RESPONDENT SIX	PHASE I -PILOT STUDY (Respondents 1-3)		PHASE II -Stakeholders (Respondents 4-6)	
OBJECTIVE: To understand whether the benefits envisaged using the current SSC life-cycle phases/stages have been achieved. (Que 21).													
PHASE III (THREE)	Q21_PHASE111_IMPLEMENT_ROLLOUT_DURATION		Valid Percent	9-12MONTHS	MORE THAN 12 MONTHS	LESS THAN 3MONTHS	6-8MONTHS	LESS THAN 3MONTHS	6-8MONTHS		Valid Percent		Percent
		LESS THAN 3MONTHS	33.3							LESS THAN 3MONTHS	33.3	LESS THAN 3MONTHS	33.3
		6-8MONTHS	33.3							9-12MONTHS	33.3	6-8MONTHS	66.7
		9-12MONTHS	16.7							MORE THAN 12 MONTHS	33.3	Total	100.0
		MORE THAN 12 MONTHS	16.7							Total	100.0		
		Total	100.0										
	Q21_PHASE111_IMPLEMENT_ROLLOUT_DURATION_PERCENT_ACHIEVED		Valid Percent	51%-70%	51%-70%	71% OR MORE	71% OR MORE	Not Applicable	51%-70%		Valid Percent		Percent
		51%-70%	50.0							51%-70%	66.7	51%-70%	33.3
		71% OR MORE	33.3							71% OR MORE	33.3	71% OR MORE	33.3
		Not Applicable	16.7							Total	100.0	Not Applicable	33.3
		Total	100.0									Total	100.0
	Q21_PHASE111_IMPLEMENT_ROLLOUT_SAVINGS_TARGET_AGAINST_COSTS		Valid Percent	51%-70%	21%-50%	21%-50%	21%-50%	LESS THAN 20%	51%-70%		Valid Percent		Percent
		LESS THAN 20%	16.7							21%-50%	66.7	LESS THAN 20%	33.3
		21%-50%	50.0							51%-70%	33.3	21%-50%	33.3
		51%-70%	33.3							Total	100.0	51%-70%	33.3
		Total	100.0									Total	100.0
	Q21_PHASE111_IMPLEMENT_ROLLOUT_SAVINGS_TARGET_ACHIEVED		Valid Percent	51%-70%	51%-70%	21%-50%	21%-50%	LESS THAN 20%	51%-70%		Percent		Percent
		LESS THAN 20%	16.7							21%-50%	33.3	LESS THAN 20%	33.3
		21%-50%	33.3							51%-70%	66.7	21%-50%	33.3
		51%-70%	50.0							Total	100.0	51%-70%	33.3
		Total	100.0									Total	100.0

Source: Authors own compilation of research results from research questionnaire developed by the author for this thesis

Table 42 SSC PHASE FOUR (OPTIMISATION) RESULTS

	OBJECTIVE: To understand whether the benefits envisaged using the current SSC life-cycle phases/stages have been achieved. (Que 21).										
PHASE	**Question**	**ALL SIX RESPONDENTS** (Valid Percent)		**RESPONDENT ONE**	**RESPONDENT TWO**	**RESPONDENT THREE**	**RESPONDENT FOUR**	**RESPONDENT FIVE**	**RESPONDENT SIX**	**PHASE I - PILOT STUDY** (Respondents 1-3) (Valid Percent)	**PHASE II - Stakeholders** (Respondents 4-6) (Percent)
PHASE IV (FOUR)	Q21_PHASE1V_OPTIMISATION_DURATION	6-8MONTHS — 66.7 / MORE THAN 12MONTHS — 33.3 / Total — 100.0		6-8MONTHS	MORE THAN 12MONTHS	6-8MONTHS	6-8MONTHS	MORE THAN 12MONTHS	6-8MONTHS	6-8MONTHS — 66.7 / MORE THAN 12MONTHS — 33.3 / Total — 100.0	6-8MONTHS — 66.7 / MORE THAN 12MONTHS — 33.3 / Total — 100.0
	Q21_PHASE1V_OPTIMISATION_DURATION	LESS THAN 20% — 16.7 / 21%-50% — 16.7 / 51%-70% — 50.0 / 71% OR MORE — 16.7 / Total — 100.0		21%-50%	51%-70%	71% OR MORE	51%-70%	LESS THAN 20%	51%-70%	21%-50% — 33.3 / 51%-70% — 33.3 / 71% OR MORE — 33.3 / Total — 100.0 / 21%-50% — 100.0	LESS THAN 20% — 33.3 / 51%-70% — 66.7 / Total — 100.0
	Q21_PHASE1V_OPTIMISATION_SAVINGS_TARGET_AGAINST_COSTS	LESS THAN 20% — 16.7 / 21%-50% — 66.7 / 51%-70% — 16.7 / Total — 100.0		21%-50%	21%-50%	21%-50%	21%-50%	LESS THAN 20%	51%-70%		LESS THAN 20% — 33.3 / 21%-50% — 33.3 / 51%-70% — 33.3 / Total — 100.0
	Q21_PHASE1V_OPTIMISATION_SAVINGS_TARGET_ACHIEVED	LESS THAN 20% — 16.7 / 21%-50% — 50.0 / 51%-70% — 33.3 / Total — 100.0		21%-50%	51%-70%	21%-50%	21%-50%	LESS THAN 20%	51%-70%	21%-50% — 66.7 / 51%-70% — 33.3 / Total — 100.0 (Valid Percent)	LESS THAN 20% — 33.3 / 21%-50% — 33.3 / 51%-70% — 33.3 / Total — 100.0

Source: Authors own compilation of research results from research questionnaire developed by the author for this thesis

Appendix F- ASSUMPTIONS OF THE MAJOR PARADIGMS

Table 43 ASSUMPTIONS OF THE MAJOR PARADIGMS

Philosophical assumptions	Positivism	Interpretivism	Participatory	Pragmatism	This Research- Justification (Worldview)- Multiple Paradigms approach)
Ontological assumption (What is the nature of reality)	Reality is objective and singular, separate from the researcher	Reality is objective and multiple, seen by the participants	Political Reality (e.g., findings are negotiated with participants)	Singular and multiple realities (e.g., researchers test hypothesis and provide multiple perspectives)	The research was designed both from the viewpoints of the participants (Stages One and Two and from an objective perspective (System Dynamics Model). However, the researcher used the mixed methods approach to determine the philosophical assumptions
Epistemological assumption (what constitutes valid knowledge)	Researcher is independent of that being researched	Researcher interacts with that being researched	Collaboration (e.g., researchers actively involve participants as collaborators)	Practicality (e.g., researchers collect data by 'what works' to address research question)	Practicality- Data is collected based upon what works best. Initial qualitative data is collected in stages I & II that informs the construction of the Simulation Model
Axiological assumptions (the role of values)	Research is value free and unbiased	Researcher acknowledges that research is value laden and biases are present	Negotiated (e.g., researchers negotiate their biases with participants	Multiple stances (e.g., researchers include both biased and unbiased stances)	The researcher adopts various stances. For example, the researcher used information from Stakeholders and experts which then provided an umbrella for analysing the research work

Philosophical assumptions	Positivism	Interpretivism	Participatory	Pragmatism	This Research-Justification (Worldview)-Multiple Paradigms approach)
Rhetorical assumption (the language of research)	Researcher writes in a formal style and uses the passive voice, accepted quantitative words and set definitions	Researcher writes in an informal style and uses the personal voice, accepted qualitative terms and limited definitions of variables	Advocacy and change (e.g., researchers use language that will help bring about change and advocate for participants)	Formal or informal (e.g., researchers may employ both formal and informal styles of writing).	The style of writing is both formal and informal as the researcher sometimes writes in a descriptive and critical approach
Methodological assumption (the process of research)	Process is deductive (e.g., researchers test an a priori theory)	Process is inductive (e.g., researchers start with participants views and build up to patterns, theories and generalisations)	Participatory (e.g., researchers involve participants in all stages of the research and engage in cyclical reviews of results)	Combining (e.g., researchers collect both quantitative and qualitative data and mix them).	The researcher collected both quantitative and qualitative data in the research in the respective stages and mixed them

Source: Adapted from Collis and Hussey (2009 p.58) and Creswell and Clark (2011, p.42)

Appendix G- BUILDING OF STOCK AND FLOW MODEL FROM REFINED CLD
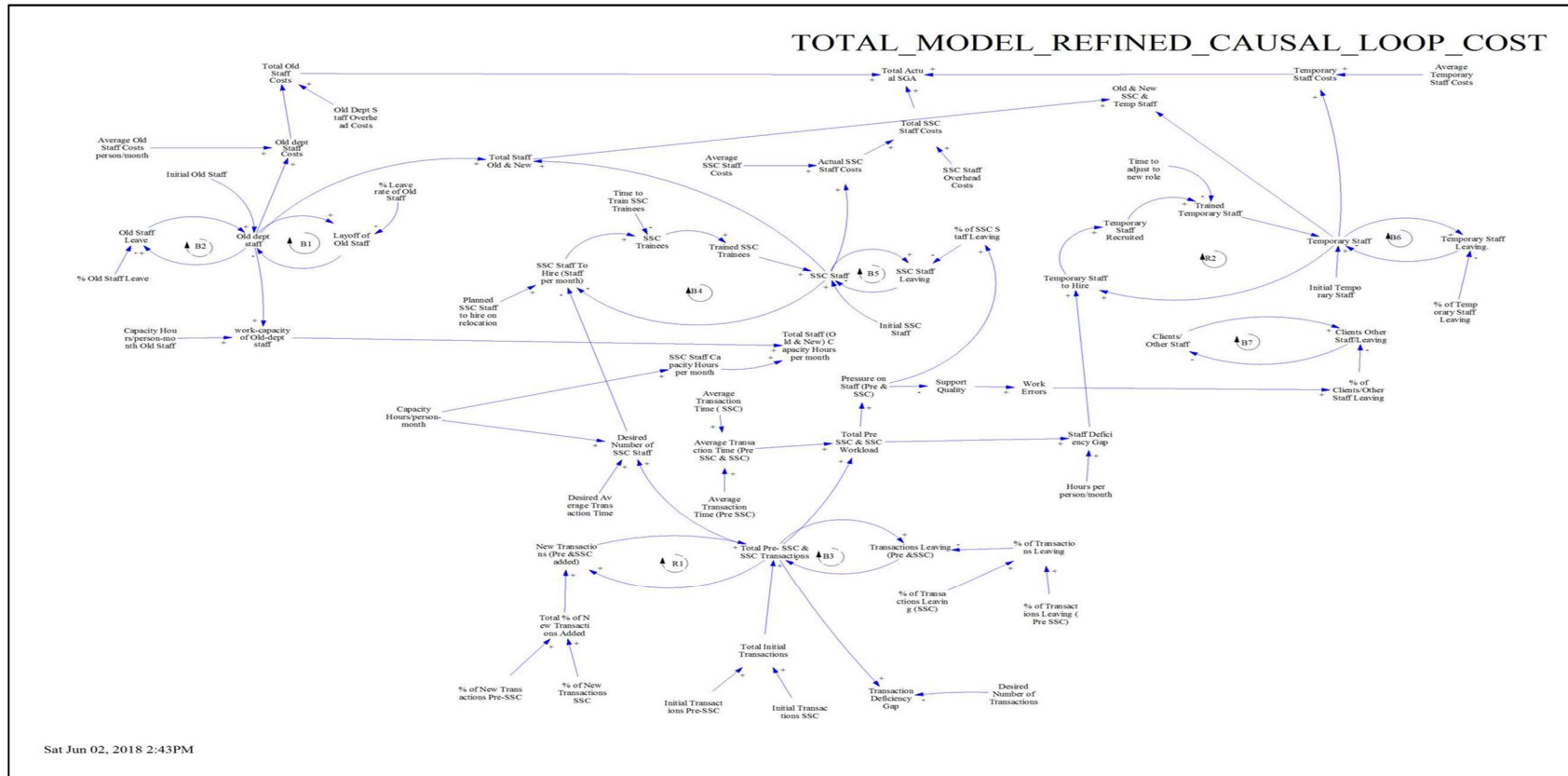
Figure 125 BUILDING OF STOCK AND FLOW MODEL FROM REFINED CLD

Appendix H- Workload / (Work Capacity) Pre & Post SSC

This shows the workload that is required or available. Figure 126 below shows the approach used in developing this.
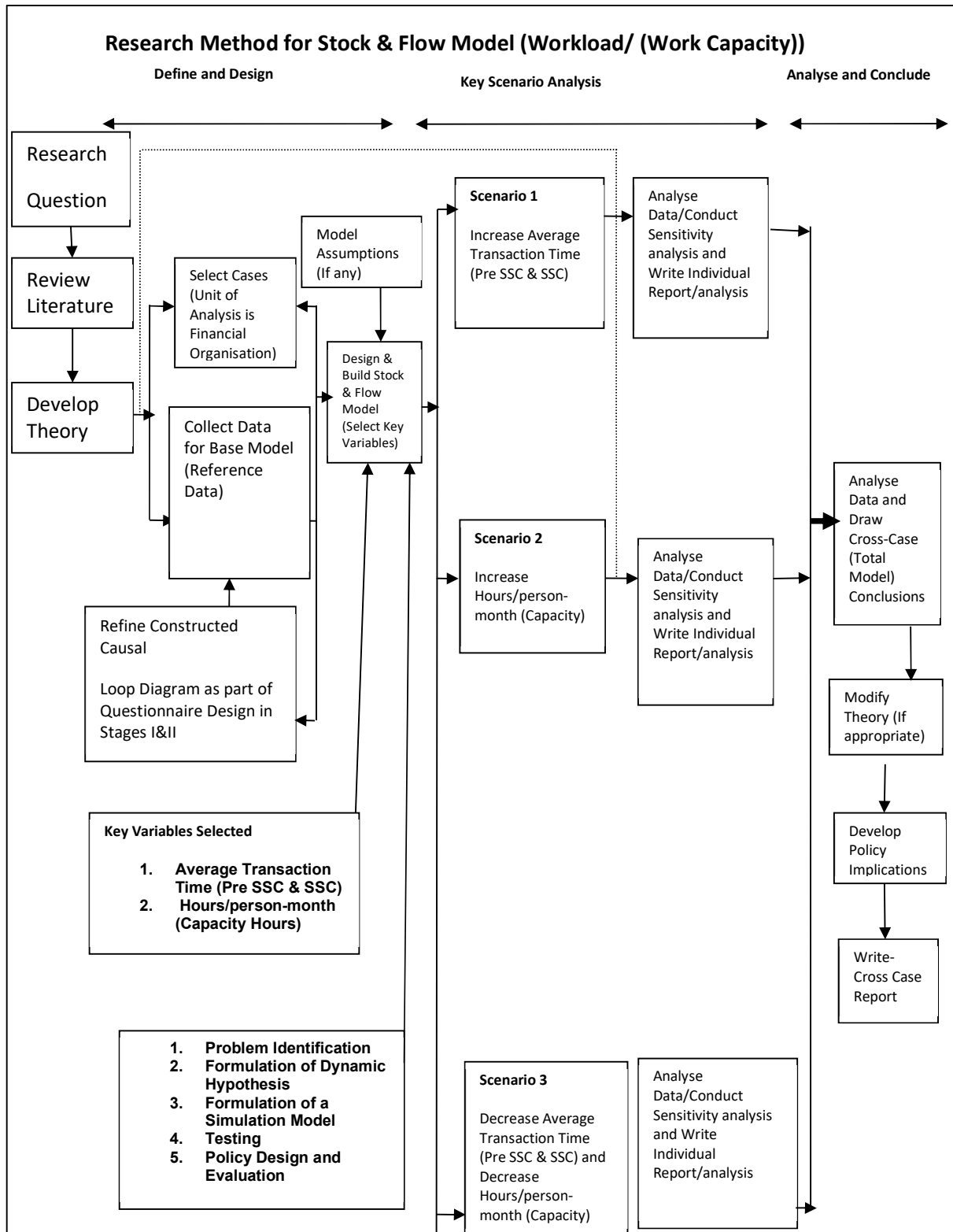
Figure 126 Research Method for Stock & Flow Model (Workload/ (Work Capacity)

Key (Main) Variables

The below are the main variables used in this part of the model.

Average Transaction Time (Pre SSC & SSC)

This is the average time that it takes to complete a transaction.

Hours/person-month

This is the estimated number of hours an employee can work in a month.

Staff Deficiency Gap

This is the difference between 'Total Pre SSC & SSC Workload' and the 'Total Staff (Old&New) Capacity' which gives the workload deficiency. When divided by the 'Hours per person/month' you get the number of temporary staff needed.

The model is shown in Figure 127 below.
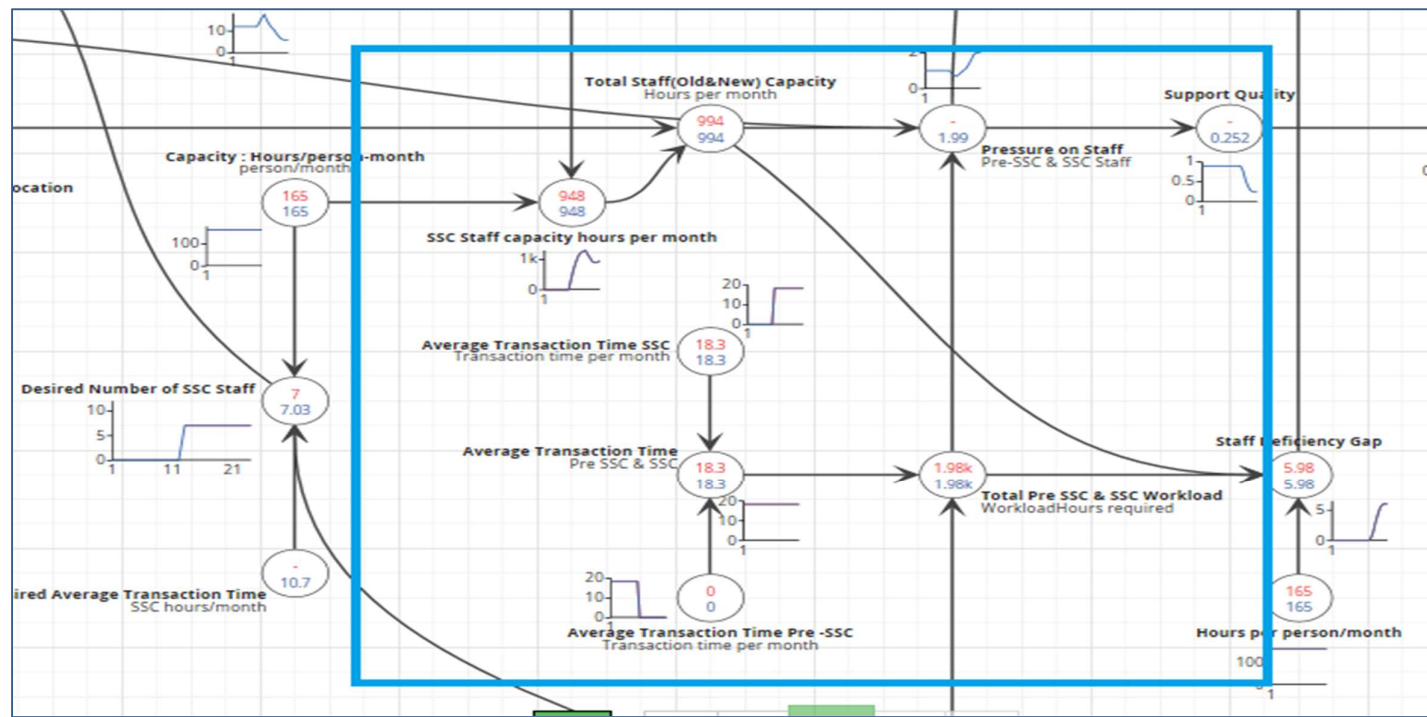
Figure 127 Workload/ (Work Capacity)

Model Assumptions

'Hours/person-month': This is set to 165 hours per person per month.

'Average Transaction Time (Pre SSC & SSC)': The transaction time is 18.3 minutes per transaction.

SCENARIO SPECIFICATION

A sensitivity analysis is undertaken based upon the three (3) scenarios outlined in Figure 126. The aim of this was to use sensitivity analysis to investigate how the three scenarios impacted on the: 'SSC Staff capacity hours per month', 'Total Pre SSC & SSC Workload', and 'Staff Deficiency Gap'.

EQUATIONS OF THE MODEL

Equation 29 Capacity: Hours/person-month

Capacity: Hours/person-month= 165

Equation 30 Average Transaction Time (Pre SSC & SSC)

Average Transaction Time (Pre SSC & SSC) = if 'time' >=1 and 'time' < 13 then 'Average Transaction Time Pre -SSC' else 'Average Transaction Time SSC'

Equation 31 Staff Deficiency Gap

Staff Deficiency Gap =if (('Total Pre SSC & SSC Workload'-('Total Staff(Old&New) Capacity'))/'Hours per person/month') <0 then 0 else (('Total Pre SSC & SSC Workload'-'Total Staff(Old&New) Capacity'))/'Hours per person/month'

Data Analysis and Policy Formulation

The scenario specifications and the main base models are analysed against the literature review, the reference / base data, the hypotheses and policy intervention tools are then developed.

Appendix I- Survey Results and discussions from Stage I (One), 3 expert opinions and Stage II (Two), 3 stakeholders

I. Stage I (One) Respondents

a. Business Analyst / Manager (Respondent One)

Regarding objective one of the research, respondent one identified the following:

Critical Success factors: Respondent one identified the following as the critical success factors that influenced the design of the SSC; these are: Other-Strategy, Support from Senior Executives and Effective Project Execution. Organisational Strategy was not identified as a critical success factor.

Impact of factors on cost of SSC: For the factors that impact on the cost of an SSC, respondent one identified Other-Infrastructure and Project Management. Human resources and Good Infrastructure were not identified.

Impact of factors on design of SSC: Respondent one identified Infrastructure, Other-Infrastructure and Effective SSC Design as factors that influenced the design of the SSC. In addition, respondent one identified that the SSC Strategy Design / Build has an impact on Infrastructure, Project Management, Effective SSC Design and Build and vice versa. Human Resources was not identified.

It is concluded that most of the responses of respondent one supports the variables identified that impact on the design and build of an SSC (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Grant, 2005; BearingPoint, 2007; Deloitte, 2011, Miskon et al., 2011; PWC, 2011; Tammel, 2017). However, respondent one's failure to identify Human Resources as a main factor, is contrary to the literature about SSCs.

Regarding objective two of the research, respondent one identified the following:

Respondent one had never used a System Dynamics (SD) model in the SSC design. The

main tool used was a 6Sigma project methodology. This goes to buttress the point that there is a scarcity of data relating to SSCs as espoused by Janssen and Joha (2006); and that SD has not been used in the design of the SSC. Furthermore, respondent one claimed that the use of 6Sigma was very beneficial.

Regarding objective three of the research, the below were the verbatim comments from respondent one. According to respondent one:

> Although the reduction in costs comes from an effective SSC, this is a longer-term benefit. In the short term, the establishment of the SSC can cause increased costs due to changes in the infrastructure. A further benefit of an effective SSC is employee satisfaction which leads to a positive impact on profitability, shareholder value, etc.

The above comments by respondent one largely agreed with the variables selected in the CLD. This supports the theory that it is important to understand the linkages between the variables and the system as a whole (e.g., Porter, 1985; Sterman, 2000; Sherwood, 2002). In addition, 'costs' was mentioned as a major variable that had an impact.

Regarding objective four of the research, the following reasons / motives were established by respondent one as the basis for the establishment of an SSC: these were political, strategic, organisational, and economic motives. Information Technology (IT) was not a factor / motive in the establishment of the SSC. For the economic motive, according to respondent one there were no savings achieved on Human Resources although this was an initial motive.

Furthermore, the savings achieved for economic, political, strategic and organisational goals were somewhat mixed although respondent one agreed that some level of savings had been

achieved. This is in accordance with the findings regarding the motives for establishing SSCs (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Janssen and Joha, 2006; Deloitte, 2011; Miskon et al., 2011; PWC, 2011).

Regarding objective five of the research (i.e. phases of the SSC design), the following were the responses of respondent one:

Phase I (Opportunity Assessment Stage): Respondent one claimed that this phase lasted 6-8 (six to eight) months; 71 percent or more of the duration was achieved on time and 51 percent to 70 percent of the planned savings were achieved.

Management Review: According to respondent one this phase lasted six to eight (6-8) months; 71 percent or more of the duration was achieved on time and 51 percent to 70 percent of the planned savings were achieved.

Phase II (Design and Pilot Project): Respondent one claimed that this phase lasted 6-8 (six to eight) months. This duration is very significant and quite long from an SSC design perspective. In addition, according to respondent one, 71 percent or more of the duration was achieved on time and 51 percent to 70 percent of the planned savings were achieved.

Phase III (Implementation and Rollout): For this phase respondent one claims that this phase lasted nine to twelve (9 to 12) months. In contrast, the actual implementation and rollout period lasted about six to eight (6-8) months.

Phase IV (Optimisation): Respondent one claimed that this phase lasted six to eight (6-8) months; 21 percent to 50 percent of the duration was achieved on time and 21 percent to 50 percent of the planned savings were achieved.

It is important to note that from respondent one's perspective, applying all the time taken in the various phases will put the time duration of the SSC from start to finish to over forty-three (43) months which is approximately over 3.6 years. This would be extremely long. It may be that respondent one was also talking about the issues that were encountered when

the SSC was established, and this can take quite a while to resolve or respondent one was referring to the whole transition process happening within twelve (12) months or more. At any rate, this is opposite to what the SSC literature tells us (e.g., Deloitte, 2011; PWC, 2011). In the verbatim comment, respondent one mentioned 'cost reduction' as a major criterion for the establishment of the SSC. However, respondent one believes 'cost savings' is a longer-term benefit, as in the short term the costs will go up. It is then important to review the cost structure (SGA) of the business.

CONCLUSION- RESPONDENT ONE

Overall, respondent one's responses regarding, the motives for establishing the SSC, factors influencing the design and implementation of the SSC, 'cost savings' etc, corresponds to the literature regarding the motives for establishing SSCs (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Janssen and Joha, 2006; Deloitte, 2011; Miskon et al., 2011; PWC, 2011; Paagman et al, 2015; Tammel, 2017). However, with regards to the timelines for establishing the SSC, this is very much at variance with the SSC literature (e.g., Deloitte, 2011; PWC, 2011).

b. Accounting Manager (Respondent Two)

Regarding objective one of the research, respondent two identified the following as factors that influenced the design of the SSC:

Critical Success factors: According to respondent two, Other-Strategy, Effective Project Execution are the main critical success factors. However, respondent two did not identify Support from Senior Executives which is at variance with the current SSC literature.

Impact of factors on cost of SSC: Project Management and Effective SSC Design were identified as some of the main factors. However, Infrastructure was not identified.

Impact of factors on design of SSC: Respondent two identified Infrastructure and Effective SSC Design as the factors that will impact on the design of the SSC. This was consistent with the factors identified in the questionnaire and in the literature review.

Impact of strategy design on variables / factors: Respondent two identified Human Resources, Infrastructure and Project Management as impacting this. However, Strategy was not identified as a factor.

Impact of variables on strategy design: According to respondent two, Human Resources, Infrastructure and Effective SSC Design had an impact on the initial SSC Strategy Design in the establishment of the SSC.

Impact of strategy design on other variables / factors: The initial SSC Strategy Design had an impact on one or more of the factors in establishing the SSC such as Costs, Effective Organisation, and Benefits.

Impact of other variables / factors on strategy design: SSC Costs, Company Vision and Effective Organisation had an impact on the initial SSC Strategy Design in the establishment of the SSC.

The above mainly supports the variables that impact on the design and build of SSCs (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Grant, 2005; BearingPoint, 2007; Deloitte, 2011;

PWC , 2011; Paagman et al., 2015).

Regarding objective two of the research, respondent two confirmed that they had never used an SD model in the SSC design. The main tool used was a 6Sigma project methodology. As with respondent one, this goes to buttress the point that there is a scarcity of data relating to SSCs as espoused by Janssen and Joha (2006); and that SD has been scarcely used in the design of the SSC. Furthermore, respondent two said that 6 Sigma was beneficial as a project methodology.

Regarding objective three of the research, respondent two mainly agreed with the variables selected in the CLD. This helped in redesigning the CLD in the next phase of the research.

Regarding objective three of the research the below were the verbatim comments for respondent two. According to respondent two:

> I believe that effective management plus plan leads to a clear vision plus end state. If well controlled plus defined could lead to good infrastructure/design/people costs plus a successful project. Depending on the project there should be benefits which could be Sales, People, Effectiveness, Process or Costs. For the project to be a success it would need to meet your vision plus strategy. Other advantages and disadvantages may naturally occur on this project. The end state must be an improvement in the areas defined at the start

The above comments by respondent two largely agreed with the variables selected in the CLD. This is similar to respondent one and this largely supports the theory that it is important to understand the linkages between the variables and the system as a whole (e.g., Porter, 1985; Sterman, 2000; Sherwood, 2002).

Regarding objective four of the research, just like respondent one, respondent two identified the following reasons / motives as the basis for the establishment of an SSC: these were political, strategic / organisational, and economic motives. Information Technology (IT) was not a factor / motive in the establishment of the SSC. Furthermore, for respondent two, most of the savings were achieved for the economic, political, strategic and organisational goals.

In terms of achieving the initial motives, it appears most of the motives were achieved. Similar to respondent one, respondent two emphasised that 'costs' was an essential factor. This is in accordance with the findings regarding the motives for establishing SSCs (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Janssen and Joha, 2006; Deloitte, 2011; PWC, 2011; Richter and Brühl, 2017; Tammel, 2017).

Regarding objective five of the research (i.e. phases of the SSC design), the following were the responses of respondent two:

Phase 1 (Opportunity Assessment Stage): According to respondent two, this phase lasted less than three (3) months; 51 percent to 70 percent of the duration was achieved on time and less than 20 percent of the planned savings were achieved.

Management Review: Respondent two claimed that this phase lasted less than three (3) months; 21 percent to 50 percent of the duration was achieved on time and less than 20 percent of the planned savings were achieved.

Phase II (Design and Pilot Project): Respondent two claimed that this phase lasted more than twelve (12) months; 21 percent to 50 percent of the duration was achieved on time and 21 percent to 50 percent of the planned savings were achieved.

Phase III (Implementation and Rollout): Respondent two claimed that this phase lasted more than twelve (12) months; 51 percent to 70 percent of the duration was achieved on time and 51 percent to 70 percent of the planned savings were achieved on time.

Phase IV (Optimisation): Respondent two claimed that this phase lasted more than 12

(twelve) months; 51 percent to 70 percent of the duration was achieved on time and 51 percent to 70 percent of the planned savings were achieved.

What is clear is that taken together, all the time duration would have been over forty-one (41) months, which is at variance with what the literature review says regarding the establishment of the SSC (e.g., Deloitte, 2011; PWC, 2011). It is noted that this variance is similar to the response from respondent one.

In the verbatim comment, respondent two like respondent one, mentioned 'cost reduction' as a main criterion. However, respondent two believes that an effective management and clear vision if well controlled can lead to cost savings in the longer-term. Similar to respondent one, it stands to reason that, it is important to review the cost structure (SGA) of the business.

CONCLUSION-RESPONDENT TWO

Overall, respondent two's responses regarding, the motives for establishing the SSC, factors influencing the design and implementation of the SSC just like respondent one corresponds mainly to the literature regarding the motives for establishing SSCs (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Janssen and Joha, 2006; Deloitte, 2011; PWC, 2011). However, with regards to the timelines for establishing the SSC, this is at variance with the SSC model.

c. Project Manager (Respondent Three)

Regarding the research objective one, respondent three identified the following as factors that influenced the design of the SSC:

Critical Success factors: According to respondent three, Other-Strategy, Effective Project Execution and Support from Senior Executives are the main critical success factors. However, unlike respondent two, but similar to respondent one, respondent three identified Support from Senior Executives.

Impact of factors on cost of SSC: Respondent three did identify Human Resources as the main factor. Project Management, Effective SSC Design and Good Infrastructure were not identified. This is mainly at variance with the responses of respondents one and two.

Impact of factors on design of SSC: Respondent three identified Infrastructure as the main factor that will impact the design of the SSC. Human Resources, Infrastructure, Project Management and Effective SSC Design and Build, were not identified. This is inconsistent with the factors identified in the questionnaire and also in the literature review.

Impact of strategy design on variables / factors: Respondent three identified Human Resources and Infrastructure as impacting this. However, Strategy Design did not impact the Effective SSC Design.

Impact of variables on strategy design: According to respondent three, Human Resources and Infrastructure had an impact on the initial SSC Strategy Design in the establishment of the SSC. However, unlike respondent two, Effective SSC Design and Build was not a factor.

Impact of strategy design on other variables/factors: The initial SSC Strategy Design had an impact on one or more of the factors in establishing the SSC such as Costs, Company Vision, Effective Organisation, and Benefits. This is similar to the responses of respondents one and two.

Impact of other variables/factors on strategy design: SSC Costs, Company Vision and Effective Organisation had an impact on the initial SSC Strategy Design in the establishment of the SSC. This is similar to respondents one and two.

The above responses from respondent three is mixed and therefore it partially supports the variables that impact on the design and build of SSCs (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Grant, 2005; BearingPoint, 2007; Miskon et al., 2011; PWC, 2011).

Regarding objective two of the research, respondent three just like the previous respondents confirmed that they had never used an SD model in the SSC design. The main tool used was a 6Sigma project methodology. As with respondents one and two, this goes to buttress the point that there is a scarcity of data relating to SSCs as espoused by Janssen and Joha (2006); and that SD has not been used in the design of the SSC. Furthermore, as with respondents one and two, respondent three said that 6Sigma was beneficial as a project methodology.

Regarding objective three of the research, similar to respondents one and two, respondent three mainly agreed with the variables selected in the CLD. This again supports the theory that it is important to understand the linkages between the variables and the (e.g., Porter, 1985; Sterman, 2000; Sherwood, 2002). Furthermore, respondent three also mentioned 'costs' as a major variable of impact.

Regarding objective three of the research, respondent three had the below verbatim comments:

Whilst I appreciate the diagram is constructed at a very high level I do not agree with the cause and effect conclusions that are being drawn. I agree that the starting point for the model is Vision. A well-defined, clearly identifiable vision enables the development of a strategy aimed at achieving the vision. However, the conclusion the 'Effective Infrastructure' and 'ability to build and operate an effective SSC' are effects of an 'Effective Strategy' cannot be correct. Having a strategy in itself does nothing. It is the process of translating a strategy into tactics, actions and measurable goals that delivers results. On this basis I believe there should be an interim step (between strategy and effects) for the Balancing Loops B1 through B4.

Regarding objective four of the research, similar to respondents one and two, respondent three identified the following initial reasons / motives as the basis for the establishment of an SSC; these are: political; strategic / organisational and economic motives. Information Technology (IT) was not a factor / motive in the establishment of the SSC.

Furthermore, for respondent three, most of the savings were achieved for economic, political, strategic and organisational goals.

In terms of achieving the initial motives, it appears most of the motives were achieved. This is in accordance with findings regarding the motives for establishing SSCs (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Janssen and Joha, 2006; Deloitte, 2011; PWC, 2011).

Regarding objective five of the research (i.e. phases of the SSC design), the following were the responses of respondent three:

Phase 1 (Opportunity Assessment Stage): According to respondent three, this phase lasted six to eight (6 to 8) months (less than 3 months for respondent two). More than 71 percent (51 percent to 70 percent for respondent two) of the duration was achieved on time

and 21 percent to 50 percent (less than 20 percent for respondent two) of the planned savings were achieved.

Management Review: Respondent three claimed that this phase lasted less than 3 (three) months (similar to respondent two). More than 71 percent (21 percent to 50 percent for respondent two) of the duration was achieved on time and less than 21 percent to 50 percent (less than 20 percent for respondent two) of the planned savings were achieved.

Phase II (Design and Pilot Project): Respondent three claimed that this phase lasted nine to twelve (9-12) months (more than 12 months for respondent two). More than 71 percent of the duration was achieved on time and 21 percent to 50 percent of the planned savings were achieved.

Phase III (Implementation and Rollout): Respondent three claimed that this phase lasted less than three (3) months (more than 12 months for respondent two). More than 71 percent (51 percent to 70 percent for respondents one and two) of the duration was achieved on time and 21 percent to 50 percent (51 percent to 70 percent for respondents one and two) of the planned savings were achieved on time. In terms of the duration this is different to the responses of respondents one and two.

Phase IV (Optimisation): Respondent three claimed that this phase lasted six to eight (6 to 8) months (more than 12 months for respondent two). More than 71 percent (51 percent to 70 percent for respondent two) of the duration was achieved on time and 21 percent to 50 percent (51 percent to 70 percent for respondent two) of the planned savings were achieved.

Respondent three's responses are mixed when compared to the literature review regarding the establishment of SSCs. In respondent three's response, most of the cost targets were somewhat achieved. Similar to respondent one, it stands to reason that, it is important to review the cost structure (SGA) of the business.

CONCLUSION-RESPONDENT THREE

Overall, respondent three's responses regarding, the motives for establishing the SSC, factors influencing the design and implementation of the SSC are similar to respondents one and two and mainly corresponds to most of the literature regarding the motives for establishing SSCs (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Janssen and Joha, 2006; Deloitte, 2011; PWC, 2011).

However, it is important to note that some of the responses are mixed as compared to the literature (PWC, 2011) regarding the establishment of the SSC as for example, Phase II (design and pilot stage) takes 9-12 months to complete.

II. Survey Results from Stage II (Two) respondents

d. ACCOUNTANT (RESPONDENT FOUR)

With regards to objective one of the research, respondent four identified the following as factors that influenced the design of the SSC:

Critical Success factors: According to respondent four, Other-Strategy, Effective Project Execution and Support from Senior executives are the main critical success factors. This is similar to respondents one and three.

Impact of factors on cost of SSC: Respondent four identified all the listed factors such as Project Management; Effective SSC Design and Good Infrastructure as some of the main factors unlike respondents one, two and three who identified some of the factors.

Impact of factors on design of SSC: Respondent four unlike respondents two and three identified all the variables listed such as Human Resources, Infrastructure, Project Management and Effective SSC Design and Build as the main factors that impact on the design of the SSC. This is consistent with the factors identified in the questionnaire and also in the literature review.

Impact of strategy design on variables / factors: Respondent four unlike respondents one, two and three identified all the variables listed such as Human Resources, Infrastructure and Project Management as impacting this.

Impact of variables on strategy design: According to respondent four, all the variables such as Human Resources, Effective SSC Design and Build and Infrastructure had an impact on the initial SSC strategy design in the establishment of the SSC. This is different to that of respondents one, two and three, who identified only some of the factors as impacting the SSC Strategy Design.

Impact of strategy design on other variables / factors: Respondent four unlike respondents two and three identified all the variables listed such as Costs, Effective Organisation, and Benefits.

Impact of other variables / factors on strategy design: In this area, respondent four's response is similar to that of respondents one and two. SSC Costs, Company Vision and Effective Organisation have had an impact on the initial SSC Strategy Design in the establishment of the SSC.

From the responses of respondent four, it stands to reason that these responses do mainly support the variables identified that impact on the design and build of SSCs (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Grant, 2005; BearingPoint, 2007; Deloitte, 2011; Miskon et al., 2011; PWC, 2011).

Regarding objective three of the research, respondent four just like all the other respondents confirmed that they had never used an SD model in the SSC design. The main tool used was a 6Sigma project methodology. As with respondents one, two and three, this goes to buttress the point that there is a scarcity of data relating to SSCs as advanced by Janssen and Joha (2006); and that SD has not been used in the design of the SSC. Furthermore, similar to respondents one, two and three, respondent four said that 6 Sigma was beneficial as a project methodology.

Regarding objective three of the research, respondent four had the below verbatim comments:

> In the build and design of the SSC it is important to have a well-defined organisational goals and vision which should lead to an effective strategy and that will lead to effective HR plan and execution, effective project management and execution, Effective SSC design and build, effective infrastructure and the ability to build and operate an effective SSC. All of these will lead to a reduction in tangible and intangible costs,

adding to an effective strategy plan (completed loop). If not designed properly, however will lead to ineffective, processes, systems and project management, putting additional constraints and pressure on management and making a negative impact on the organisational strategy/plan. Also, well-defined organisational goal and vision lead to an effective strategy/plan that will lead to ability to build and operate an effective SSC, effective project management and execution, effective HR plan and execution, effective SSC design and build and effective Infrastructure. It will in turn lead to an increase in Effective Service delivery/customer satisfaction and other benefits resulting in increase in profitability and effective organisational plan/strategy leading to increase shareholder value and effective organisation.

It appears that respondent four largely agreed with the variables selected in the CLD. This is similar to respondents one and two and this largely supports the theory that it is important to understand the linkages between the variables and the system as a whole (e.g., Porter, 1985; Sterman, 2000; Sherwood, 2002).

Regarding objective four of the research, similar to respondents one, two and three, respondent four identified the following initial reasons / motives as the basis for the establishment of an SSC: these are political, strategic, organisational, and economic motives. Information Technology (IT) was identified as a factor / motive in the establishment of the SSC as opposed to respondents one, two and three.

Furthermore, for respondent four, savings were achieved for economic, political, strategic and organisational goals.

In terms of achieving the initial motives it appears most of the motives were achieved. Similar to respondents one, two and three, respondent four emphasised 'costs' as an essential factor. This is in accordance with the findings regarding the motives for establishing the SSC

(e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Janssen and Joha, 2006; Deloitte, 2011; Miskon. et al., 2011; PWC, 2011).

Regarding objective five of the research, respondent four was of the following view:

Phase 1 (Opportunity Assessment Stage): According to respondent four, this phase lasted less than three (3) months (compared to less than 3 months for respondent two and 6-8 months for respondents one and three). More than 71 percent (51 percent to 70 percent for respondent two and more than 71 percent for respondents one and three) of the duration was achieved on time. In addition, 21 percent to 50 percent (less than 20 percent for respondent two and 51 percent to 70 percent for respondent one) of the planned savings were achieved which is similar to the response from respondent three.

Management Review: Respondent four just like respondents two and three claimed that this phase lasted less than three (3) months (6-8 months for respondent one). More than 71 percent (similar to respondents one and three and 21 percent to 50 percent for respondent two) of the duration was achieved on time and 21 percent to 50 percent (less than 20 percent for respondent two, 51 percent to 70 percent for respondent one) of the planned savings were achieved which is similar to respondent three.

Phase II (Design and Pilot Project): Respondent four claimed that this phase lasted less than three (3) months (more than 12 months for respondent two, 6-8 months for respondent one, and 9-12 months for respondent three). More than 71 percent of the duration was achieved on time (similar to respondents one and three) and 21 percent to 50 percent of the planned savings were achieved.

Phase III (Implementation and Rollout): Respondent four claimed that this phase lasted six to eight (6 to 8) months (more than 12 months for respondent two and less than 3 months for respondent three). More than 71 percent (51 percent to 70 percent for respondents one and two) of the duration was achieved on time and 21 percent to 50 percent of the planned

savings were achieved on time, similar to respondent three (51 percent to 70 percent for respondents one and two).

Phase IV (Optimisation): Respondent four like respondents one and three claimed that this phase lasted six to eight (6 to 8) months (more than 12 months for respondent two). With regards to duration achieved, 51 percent to 70 percent (more than 71 percent for respondent three and 21 percent to 50 percent for respondent one) of the duration was achieved on time which is similar to respondent two. Furthermore, 21 percent to 50 percent of the planned savings were achieved (which is similar to respondents one and three). Respondent four was part of the team in the work shadowing group, so will be referring to the work that was performed. Respondent four's responses just like respondent three's response are mixed when compared to the literature review regarding the establishment of the SSC. In respondent four's response, most of the 'cost targets' were somewhat achieved. Therefore, similar to the response of respondents one, two and three, it is important to review the cost structure (SGA) of the business.

CONCLUSION- RESPONDENT FOUR

Overall, respondent four's responses regarding the motives for establishing the SSC, factors influencing the design and implementation of the SSC and 'cost savings' etc., corresponds mainly to the literature relating to the motives for establishing SSCs (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Janssen and Joha, 2006; Deloitte, 2011; PWC, 2011). However, it is important to note that some of the responses are mixed as compared to the literature regarding the establishment of the SSC (SSC stages).

e. Managing Director and Customer Support Services Manager (Respondent Five)

With regards to objective one of the research, respondent five identified the following as factors that influenced the design of the SSC:

Critical Success factors: Respondent five identified Other-Strategy, Effective Project Execution which is similar to respondent two.

Impact of factors on cost of SSC: Respondent five identified Other-infrastructure, Project Management and Effective SSC Design as the main factors. This is different to respondent four who identified all the factors listed in the questionnaire and also different to respondent three who did identify Human Resources as the main factor.

Impact of factors on design of SSC: Respondent five like respondents one and four, but unlike respondents two and three identified all the variables listed such as Human Resources, Infrastructure, Project Management and Effective SSC Design and Build as the main factors that impact on the design of the SSC. This is consistent with the factors identified in the questionnaire and also in the literature review.

Impact of strategy design on variables / factors: Respondent five like respondent four but unlike respondents one, two and three identified all the variables listed such as Human Resources, Infrastructure and Project Management as impacting this.

Impact of variables on strategy design: Respondent five like respondent four, asserted that all the variables such as Human Resources, Effective SSC Design and Build and

Infrastructure had an impact on the initial SSC strategy design in the establishment of the SSC.

Impact of strategy design on other variables / factors: Respondent five's response is similar to that of respondents one and four. All factors listed were identified. The initial SSC strategy design had an impact on one or more of the factors in establishing the SSC such as Costs, Effective Organisation, and Benefits.

Impact of other variables / factors on strategy design: Respondent five's response is similar to most of the other respondents (one, two and four). SSC Costs, Company Vision and Effective Organisation have had an impact on the initial SSC Strategy Design in the establishment of the SSC.

From the responses of respondent five, it stands to reason that these responses do mainly support the variables that impact on the design and build of an SSC (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Grant, 2005; BearingPoint, 2007; Miskon et al., 2011; PWC, 2011).

With regards to objective two of the research, respondent five just like all the other respondents confirmed that they had never used an SD model in the SSC design. The main tool used was a 6Sigma project methodology. As with all the other respondents this goes to buttress the point that there is a scarcity of data relating to SSCs as espoused by Janssen and Joha (2006); and that SD has not been used in the design of the SSC.

Furthermore, unlike the other respondents, respondent five said that 6 Sigma was not beneficial as a project methodology. This is significant from a project management perspective and also from a client user perspective. This in effect, will impact the project delivery and acceptance.

This supports the findings that the underestimation of the demands and requirements of large complex projects such as an SSC can have unintended consequences, on employee morale, customer relations etc., (e.g., Sterman, 1992; UK National Audit Office, 2008; 2011).

With regards to objective three of the research, as with all the other respondents, respondent five mainly agreed with the variables selected in the CLD. In addition, respondent five also mentioned 'cost reduction' as a main reason for establishing the SSC.

Furthermore, respondent five had the following verbatim comments:

> The main purpose of establishing the SSC was to reduce cost and to concentrate the main processes with the SSC. The project management was mainly focusing on the costs and delivering the SSC within the deadline. This caused that all other relevant factors were ignored. The execution was forced through and it had a serious impact on employees, infrastructure and internal processes in a negative way. 6 years later (today) the SSC is still struggling with the internal processes and is lacking to understand the business in the Nordic countries. The implementation of the SSC failed to include aspects such as benefits and risks or at least the project management did not review them in depth. This caused limited cost reductions and a big delay in delivering the benefits expected. In total the strategic plan was not effective, and goals were not well specified. This led to additional costs relating to the physical moving of local offices. Inefficient transfer of knowledge and a lot of experienced people left the company and with their knowledge of local business and processes were lost.

It appears that respondent five largely agreed with the variables selected in the CLD. However, from respondent five's perspective the project had limited success and there were some major issues with the implementation. Respondent five's response partially supports

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the theory that it is important to understand the linkages between the variables and the system as a whole (e.g., Porter, 1985; Sterman, 2000; Sherwood, 2002). However, a further in-depth analysis needs to be undertaken as some of the issues raised were similar to the issues identified in the literature by the fact that organisations have experienced financial losses due to badly designed SSC models (e.g., UK National Audit Office, 2008; 2011; Morgan, 2011).

This is reflected for example in respondent's five verbatim comment of:

> In total the strategic plan was not effective, and goals were not well specified. This led to additional costs relating to the physical moving of local offices. Inefficient transfer of knowledge and a lot of experienced people left the company and with their knowledge of local business and processes were lost

Furthermore, as identified earlier in the literature review, the payback time for an SSC can be as long as four to six years and it is important that organisations are very clear about their strategy and potential costs before they embark on the project (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002). Respondent five's comments below support this point:

> 6 years later (today) the SSC is still struggling with the internal processes and is lacking to understand the business in the Nordic countries. The implementation of the SSC failed to include aspects such as benefits and risks or at least the project management did not review them in depth. This caused limited cost reductions and a big delay in delivering the benefits expected
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> .

As identified in the literature review chapter, the underestimation of the demands and requirements of large complex projects such as an SSC can have unintended consequences

on employee morale, customer relations etc., (e.g., Sterman, 1992; UK National Audit Office, 2008; 2011).

Respondent five's comments:

> The project management was mainly focusing on the costs and delivering the SSC within the deadline. This caused that all other relevant factors were ignored. The execution was forced through and it had a serious impact on employees, infrastructure and internal processes in a negative way. Inefficient transfer of knowledge and a lot of experienced people left the company and with their knowledge of local business and processes were lost

What is observed, is a lack of consultation with affected employees who left the business and were affected in a negative way although this was not meant to be the main goal of the SSC establishment. It is clear that, an alternative approach needs to be used to analyse this type of impact and SD will be useful in this regard.

With regards to objective four, unlike all the other respondents, respondent five identified some of the following initial reasons / motives as the basis for the establishment of the SSC. These are economic and strategic / organisational motives. According to respondent five, Political and Information Technology (IT) were not factors / motives in the establishment of the SSC. Furthermore, for respondent five some savings were achieved for economic, strategic and organisational goals. As respondent five is the user, it is important to further analyse from the user perspective.

Political Motives: Respondent five said there was no political motive involved in the establishment of the SSC. The Political motives variables of (i) Involving a clear separation of responsibilities; (ii) Performance and control management via Service Level Agreements and (iii) Improved decision making were not a motive for establishing the SSC. In the verbatim comments of respondent five, no Service Level Agreements were agreed with the

in-country personnel before the SSC functions were taken away.

From the view point of respondent five, it appears the SSC was not discussed with the relevant stakeholders but was implemented in an autocratic way with little input from the users' perspective. Therefore, it is reasonable to believe that as a consequence there were no Service Level Agreements. This is important for decision making purposes, because the functions that were left behind in-country were the core functions of the business.

It has been argued that it is important to get the buy-in of senior management and also the users that it will affect. Without this happening, this will hamper the development of the SSC. This is a critical success factor in the establishment of the SSC (Fahy, Curry and Cacciaguidi-Fahy, 2002; Burns and Yeaton, 2008; Deloitte, 2011; Miskon et al., 2011).

It appears from the viewpoint of respondent five that, this is what occurred. Since, the SSC was established with little input from the user, it appears that this also affected the motivation of the staff who performed the core functions. This led to the deterioration in customer satisfaction and service levels. From respondent five's perspective, a lot of experienced people resigned taking with them the knowledge that they had acquired which went to the detriment of the business. Furthermore, respondent five claimed that the implementation was done in a rush and thus, the implementers did not have time to understand and learn the functions of this region before the functions were moved. Based upon the fact that a lot of people left the organisation, it can be argued that respondent five was correct. However, there were also other business reasons to explain this.

From an economic motive perspective, respondent five only saw the exercise as a reduction in Finance and Human Resource Costs and not in terms of any of the other motives. According to Respondent five, these two (2) motives were achieved but the target savings achieved were less than 51 percent. The other variables of IT cost reduction and

Procurement Cost reduction were not motives.

From respondent five's response, the aim of the establishment of the SSC was only to reduce headcount and Sales, General and Administrative Expenses (Finance Cost). The lesson for SSC implementers is that it is important to explain carefully to those affected and also to the wider organisation on a need to know basis what they are exactly trying to do. Failure to do this will result in miscommunication and unintended consequences.

Regarding the Strategic and Organisational goal variables of Clearly Defined customer / supplier relationships based upon Service Level Agreements, standardisation of processes, Quality Assurance, Consistency of information, a concentration of the organisations main processes and a definition of acceptable Quality Standards (Key Core Processes); respondent five identified only standardisation of processes as an initial motive. It is very clear that the response from the user's perspective is clearly different to the project implementers' perspective. Most likely, the main motives of establishing SSCs will include these goals, but this means there is a large gap between the user and the project management / establishment of the SSC. Furthermore, respondent five claimed that this initial motive was not achieved. The lesson for SSCs is that communication is very key. The target audience to whom to communicate is clearly important and this means that a communication plan also needs to be in place in establishing an SSC.

From a Technical motives' perspective, the initial motives of Quality IT backup and access to IT facilities were not a motive. This is consistent with most of the answers given by the other respondents. However, although IT was not a main motive, it is a very necessary part of the infrastructure. Quality IT will ensure that when the activities are relocated, the functions are performed creditably, and this should be part of the infrastructure establishment of the SSC.

In summary, in terms of achieving the initial motives it appears most of the motives were not achieved. Like respondents one, two, three and four, respondent five emphasised that 'cost reduction' was an essential factor. However, it must be noted that from the user's perspective, the overall findings are mainly at variance with the literature regarding the motives for establishing SSCs (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Janssen and Joha, 2006; Burns and Yeaton, 2008; Deloitte, 2011; Miskon et al., 2011; PWC, 2011). The user did not agree to most of the motives except for cost reductions.

The implication for policy makers is that, if the SSC is not communicated and done in a transparent manner this will have a serious impact on the business. In this case, experienced personnel in other core functions left the business and this had an impact on the business. This can be modelled using System Dynamics either via a CLD or Stock and Flow Diagram.

For objective five respondent five identified the following:

Phase 1 (Opportunity Assessment Stage): According to respondent five, this phase never occurred or was not applicable to respondent five. This is a very large gap to bridge. Respondent five is the main user but was not informed about it. It is important that the user is continually updated so as to obtain buy-in and ensure that there is a successful implementation. This is at variance with all the other respondents who were aware of this stage.

Management Review: Respondent five answered this as Not Applicable or No. From the view point of respondent five, this did not occur. There is a policy failure here in terms of communication and information. As respondent five was the user or part of a group of users it was important that they were informed in a timely manner. Failure to do this will have a negative impact on the SSC establishment.

Phase II (Design and Pilot Project): Respondent five claimed that this phase lasted for about six to eight (6 to 8) months as opposed to respondent four who claimed that this phase lasted less than three (3) months (more than 12 months for respondent two; 9-12 months for respondent three). With regards to savings and duration, respondent five answered this as Not Applicable or No.

Phase III (Implementation and Rollout): Respondent five's response is similar to respondent three who claimed that this phase lasted less than three (3) months (more than 12 months for respondent two). The duration was not applicable for respondent five. Furthermore, less than 20 percent of the planned savings were achieved compared to 21 percent to 50 percent for respondents three and four and 51 percent to 70 percent for respondents one and two.

Phase IV (Optimisation): Respondent five claimed that this phase lasted more than twelve (12) months, which is again different to respondents one, three and four, who claimed that this phase lasted six to eight (6 to 8) months (more than 12 months for respondent two). Less than 20 percent of the duration was achieved on time compared to more than 71 percent for respondent three and 51 percent to 70 percent for respondents two and four. Less than 20 percent of the planned savings were achieved. It appears that respondent five's answers are mainly not in line or mirror very little what the literature review says regarding the establishment of SSCs (e.g., PWC, 2011).

In respondent's five's response, most of the 'cost targets' were mainly not achieved. It stands to reason just like all the other respondents that it is then important to understand the cost structure (SGA) of the business.

CONCLUSION-RESPONDENT FIVE

Overall, respondent five's responses regarding the motives for establishing the SSC, factors influencing the design and implementation of the SSC, 'cost savings' etc., unlike respondents one, two, three and four does not mainly correspond to the literature regarding

the motives for establishing SSCs (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Janssen

and Joha, 2006; Deloitte, 2011; PWC, 2011).

f.   Finance Director (Respondent Six)

With regards to objective one of the research, respondent six identified the following as factors that influenced the design of the SSC:

Critical Success factors: Respondent six identified Other-Strategy and Effective Project Execution. This is similar to respondent five.

Impact of factors on cost of SSC: Respondent six identified all the factors listed such as Other-infrastructure, Project Management and an Effective SSC Design as the main factors. This is similar to respondent four's answer.

Impact of factors on design of SSC: Respondent six identified all the variables listed such as Human Resources, Infrastructure, Project Management and Effective SSC Design and Build as the main factors that impact the design of the SSC. This is consistent with the factors identified in the questionnaire and in the literature review.

Impact of strategy design on variables/factors: Respondent six like respondents four and five identified all the variables listed such as Human Resources, Infrastructure and Project Management as impacting this.

Impact of variables on strategy design: Respondent six like respondent one asserted that Infrastructure had an impact on the initial SSC Strategy Design in the establishment of the SSC.

Impact of strategy design on other variables / factors: Respondent six's response is similar to that of respondents one, four and five. The initial SSC strategy design had an

impact on one or more of the factors in establishing the SSC such as Costs, Effective Organisation, and Benefits. All listed factors were identified by respondent six.

Impact of other variables / factors on strategy design: Respondent six's response is similar to most of the other respondents except for respondent three. SSC Costs, Company Vision and Effective Organisation have had an impact on the initial SSC Strategy Design in the establishment of the SSC.

From the responses of respondent six, it stands to reason that these responses do mainly support the variables identified that impact on the design and build of SSCs (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; PWC, 2011; BearingPoint, 2007; Miskon et al., 2004; Grant, 2005).

With regards to objective two of the research, respondent six just like all the other respondents confirmed that they had never used an SD model in the SSC design. The main tool used was a 6Sigma project methodology. As with all the other respondents, this goes to buttress the point that there is a scarcity of data relating to SSCs as espoused by Janssen and Joha (2006); and that SD has not been used in the design of the SSC. Furthermore, like all the other respondents except for respondent five, respondent six said that 6 Sigma was beneficial as a project methodology.

With regards to objective three of the research, similar to the other respondents, respondent six mainly agreed with the variables selected in the CLD. This supports the theory that it is important to understand the linkages between the variables and the system as a whole (e.g., Porter, 1985; Sterman, 2000; Sherwood, 2002). Furthermore, respondent six also mentioned 'costs' as a major variable of impact. This helped in redesigning the CLD in the next phase of the research.

In terms of verbatim comments respondent six had *no verbatim comments.*

With regards to objective four, respondent six identified most of the following initial reasons / motives as the basis for the establishment of an SSC. These are economic, strategic / organisational motives and political motives. Furthermore, unlike most of the other respondents, respondent six identified Information Technology (IT) as a factor / motive in the establishment of the SSC.

Since respondent six is the director of the SSC project, most of the initial motives were relevant as respondent six would have had more access to information that the other respondents may not have had. Respondent six would have had information relating to all the various SSC motives and SSC stages, including the design and build.

In terms of political motives, respondent six said that there was a political motive involved in the establishment of the SSC. The Political motives variables of involving a clear separation of responsibilities; and improved decision making were the motives for establishing the SSC.

Political and Control Management via Service Level Agreements (SLA) was not an initial motive although respondent six said that the SLA was an initial motive and a strategic factor. Despite this, this is still significant as this is similar to respondent five's verbatim comments that there were no Service Level Agreements that was agreed with the in-country personnel before the SSC functions were taken away. This will then support the view point of respondent five that the SSC was not discussed with the relevant stakeholders but was implemented in an autocratic way with little input from the users' perspective. Therefore, it is reasonable to believe that there were no Service Level Agreements in place. This again is important for decision making purposes, because the functions that were left behind in-country were the core functions of the business. It has been argued that it is important to get the buy-in of senior management and also the users that it will affect. Without this happening this will hamper the development of the SSC. This is a critical success factor in the

establishment of the SSC (Fahy, Curry and Cacciaguidi-Fahy, 2002; Burns and Yeaton, 2008; Deloitte, 2011; PWC 2011).

With regards to economic motives; respondent six only saw the exercise as a cost reduction in the areas of Finance, Information Technology, and Human Resource and not in terms of any of the other motives. According to respondent six, these economic motives were mainly achieved. The other variable of Procurement Cost reduction was not a motive.

Respondent six's answer supports respondent five's assertion that the main aim of the establishment of the SSC was to reduce headcount and Sales General and Administrative Expenses (Finance Cost), albeit Information Technology was also included. As stated earlier, the lesson for SSC implementers is that it is important to explain carefully to those affected and also to the wider organisation on a need to know basis on what they are exactly trying to do. Failure to do this may result in miscommunication and other unintended consequences arising.

For the Strategic and Organisational goals variables of Clearly Defined customer / supplier relationships based upon Service Level Agreements, A standardisation of processes, Quality Assurance, Consistency of information, A concentration of the organisations main processes and A definition of acceptable Quality Standards (Key Core Processes); respondent six identified every variable as an initial motive. Respondent six's perspective is clearly similar to the other respondents but different to respondent five's perspective. Most likely, the main motives of establishing SSCs will include these goals, but this means there is a large gap between the user and the project management / establishment of the SSC.

Furthermore, unlike respondent five, respondent six claimed that all the initial motives were achieved. The lesson for SSCs is that communication is very key. The target audience to communicate to is clearly important and this means that a communication plan also needs

to be in place in establishing an SSC.

For technical motives, the initial motives of Quality IT backup and access to IT facilities were factors in the establishment of the SSC. This is inconsistent with most of the answers given by the other respondents. As stated earlier, respondent six would have had access to extra information that the other respondents may not have been aware of. IT is a very necessary part of the infrastructure. Quality IT will ensure that when the activities are relocated, the functions are performed creditably, and this should be part of the infrastructure in the establishment of the SSC.

In summary, in terms of achieving the initial motives it appears most of the motives were achieved. Like all the other respondents, respondent six emphasised that 'cost reduction' was an essential factor. This is in accordance with findings identified in the SSC literature regarding the motives (costs) for establishing SSCs (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Janssen and Joha, 2006; Deloitte, 2011; PWC, 2011). The implication for policy makers is that, communication is key in the establishment of the SSC. If the SSC is not communicated and done in a transparent manner this will have serious effects on the business. This can be modelled by using System Dynamics tools such as a CLD or simulation (Stocks and Flows).

With regards to objective five, respondent six identified the below:

Phase 1 (Opportunity Assessment Stage). According to respondent six, this lasted less than three (3) months, 51 percent to 70 percent of the duration was achieved and 21 percent to 50 percent of the planned savings were achieved.

Management Review: Respondent six answered that this lasted less than three (3) months, 71 percent or more of the duration was achieved and 21 percent to 50 percent of the planned savings were achieved.

Phase II (Design and Pilot Project): Respondent six answered that this lasted less than three (3) months. This is in line with respondent four but different to respondent five who claimed that this lasted for about six to eight (6 to 8) months (more than 12 months for respondent two, and 9 to 12 months for respondent three). More than 71 percent of the duration was achieved on time and 21 percent to 50 percent of the planned savings were achieved. This will be in line with the literature review from PWC (2011).

Phase III (Implementation and Rollout): Respondent six's response, like respondent four was that this lasted between six to eight (6 to 8) months as opposed to both respondents three and five who claimed that this phase lasted less than three (3) months and more than twelve (12) months for respondent two. Between 51 percent to 70 percent of the duration was achieved on time, which is similar to respondents one and two. Between 51 percent to 70 percent of the planned savings were achieved on time, which is similar to respondents one and two.

Phase IV (Optimisation): Respondent six, like respondents one, three and four claimed that this lasted six to eight (6 to 8) months as opposed to more than twelve (12) months for respondent two. According to respondent six, 51 percent to 70 percent of the duration was achieved on time which is similar to respondents two and four as compared to more than 71 percent for respondent three. Furthermore, for respondent six, 51 percent to 70 percent of the planned savings were achieved which is similar to respondent two (21 percent to 50 percent for respondents one, three and four).

COST SAVINGS ANALYSIS

In respondent six's response, most of the 'cost targets' were achieved. Therefore, it is important to review the cost structure (SGA) of the business. This is similar to the responses from the other respondents.

CONCLUSION

Overall, respondent six's responses regarding the motives for establishing the SSC, factors influencing the design and implementation of the SSC, 'cost savings' etc., just like respondents one, two, three and four, mainly corresponds to the literature regarding the motives for establishing SSCs (e.g., Fahy, Curry and Cacciaguidi-Fahy, 2002; Janssen and Joha, 2006; Deloitte, 2011; PWC, 2011).

Appendix J ABDUCTION OF THE MODEL

> ➢ **PRE-SHARED SERVICE STAFF**

- **Scenario One (1) -Increase of '% of Leave rate old Staff' (redundancy rate) and no change in other factors**

Scenario 1 -Increase of '%of Leave rate old Staff' (redundancy rate) and no change in other factors		
	Current	Simulated or Change
% Leave rate old staff	20%	50%

IMPACT ON Work Capacity

By increasing the redundancy rate, the work capacity available reduces drastically from month 15. In effect, as employees are made redundant at a quicker pace, there are not enough employees to perform the work. Therefore, there is not enough work capacity. Figures 128 and 129 below depict this.
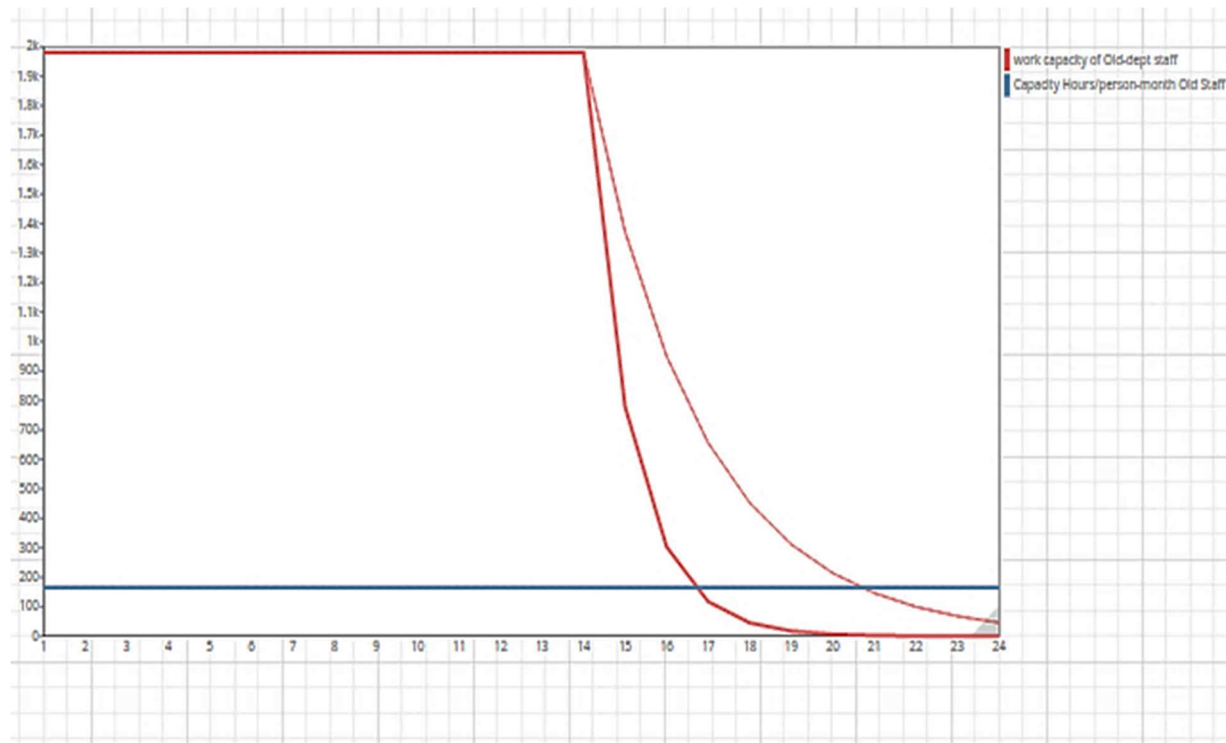
Figure 128 IMPACT ON Work Capacity

| | work capacity of Old-dept staff | | |
	Sketched	Simulated	Comparison Run
1	1980	1980	1980
2	1980	1980	1980
3	1980	1980	1980
4	1980	1980	1980
5	1980	1980	1980
6	1980	1980	1980
7	1980	1980	1980
8	1980	1980	1980
9	1980	1980	1980
10	1980	1980	1980
11	1980	1980	1980
12	1980	1980	1980
13	1980	1980	1980
14	1980	1980	1980
15	1372.422	1372.422	778.422
16	949.765	949.765	303.223
17	656.156	656.156	117.339
18	452.558	452.558	45.259
19	311.661	311.661	17.435
20	213.978	213.978	6.68
21	146.399	146.399	2.544
22	99.763	99.763	0.963
23	67.849	67.849	0.363
24	46.124	46.124	0.137

Figure 129 Tabular depiction of the IMPACT ON Work Capacity

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IMPACT ON Old staff (current staff and initial old staff)

By increasing the redundancy rate the impact on the staff is drastic. By months 15 and 16, most of the staff would have left the company. This in effect will create problems for the transtion. Figures 130 and 131 below depict this.
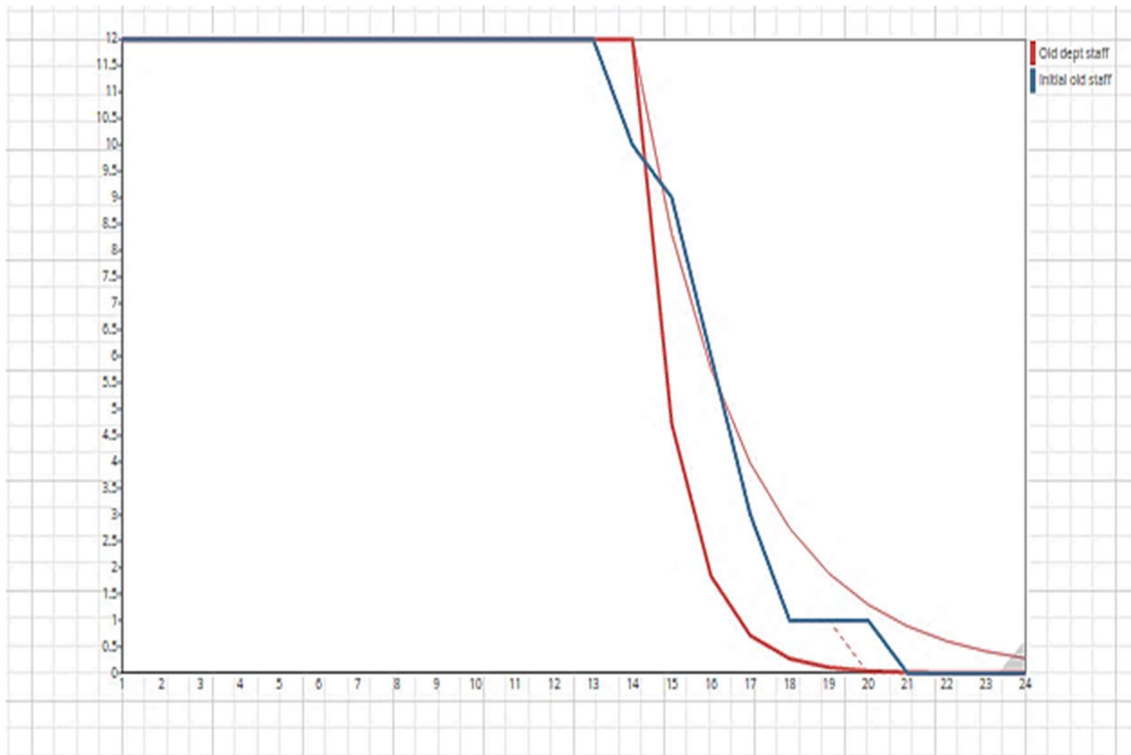
Figure 130 IMPACT ON Old staff (current staff and initial old staff)

	Old dept staff			Initial old staff		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	12	12	12	12	12	12
2	12	12	12	12	12	12
3	12	12	12	12	12	12
4	12	12	12	12	12	12
5	12	12	12	12	12	12
6	12	12	12	12	12	12
7	12	12	12	12	12	12
8	12	12	12	12	12	12
9	12	12	12	12	12	12
10	12	12	12	12	12	12
11	12	12	12	12	12	12
12	12	12	12	12	12	12
13	12	12	12	12	12	12
14	10	12	12	10	10	10
15	9	8.318	4.718	9	9	9
16	6	5.756	1.838	6	6	6
17	3	3.977	0.711	3	3	3
18	1	2.743	0.274	1	1	1
19	1	1.889	0.106	1	1	1
20	0	1.297	0.04	1	1	1
21	0	0.887	0.015	0	0	0
22	0	0.605	0.006	-	0	0
23	0	0.411	0.002	-	0	0
24	0	0.28	0.001	-	0	0

Figure 131   Tabular depiction of 'IMPACT ON Old staff (current staff and initial old staff)'

IMPACT ON Old staff costs (SGA)

The impact is seen in the 'Old dept staff cost'. In months 15 and 16 the 'staff costs' (comparison run) is unusually high compared to the 'actual costs' (sketched) and the simulated run. This also has an effect on the total staff costs. However, after this month the effect on costs reduces except for the overhead costs. Figures 132 and 133 below depict this.
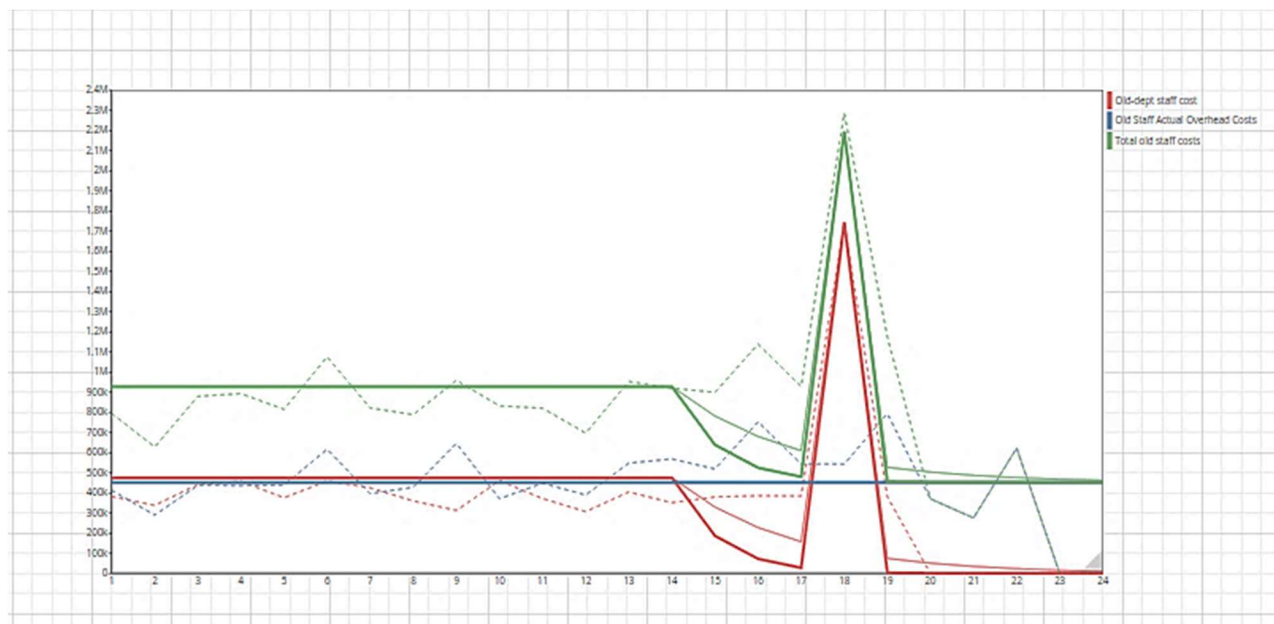
Figure 132 IMPACT ON Old staff costs (SGA)

	Total old staff costs			Old Staff Actual Overhead Costs			Old-dept staff cost		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	795098	927870	927870	412796	452250	452250	382301	475620	475620
2	628685	927870	927870	290200	452250	452250	338486	475620	475620
3	879731	927870	927870	437373	452250	452250	442357	475620	475620
4	893446	927870	927870	436066	452250	452250	457380	475620	475620
5	815313	927870	927870	439015	452250	452250	376298	475620	475620
6	1075910	927870	927870	616878	452250	452250	459032	475620	475620
7	821928	927870	927870	396505	452250	452250	425424	475620	475620
8	788949	927870	927870	428568	452250	452250	360381	475620	475620
9	959368	927870	927870	646221	452250	452250	313147	475620	475620
10	832424	927870	927870	371388	452250	452250	461036	475620	475620
11	820783	927870	927870	448377	452250	452250	372407	475620	475620
12	697256	927870	927870	389982	452250	452250	307273	475620	475620
13	953269	927870	927870	548351	452250	452250	404918	475620	475620
14	920675	927870	927870	569061	452250	452250	351515	475620	475620
15	899562	781922.487	639236.487	519073	452250	452250	380489	329672.487	186986.487
16	1139047	680395.117	525087.867	752906	452250	452250	386141	228145.117	72837.867
17	928746	609866.586	480436.364	544128	452250	452250	384619	157616.586	28186.364
18	2286057	2195020	2195020	543287	452250	452250	1742770	1742770	1742770
19	1175116	527114.716	456438.01	794225	452250	452250	380891	74864.716	4188.01
20	370869	503650.081	453854.688	370869	452250	452250	0	51400.081	1604.688
21	275843	487416.84	452861.215	275843	452250	452250	0	35166.84	611.215
22	622886	476214.182	452481.227	622886	452250	452250	0	23964.182	231.227
23	0	468548.192	452337.315	0	452250	452250	0	16298.192	87.315
24	0	463329.633	452283.006	0	452250	452250	0	11079.633	33.006

Figure 133 Tabular depiction of 'IMPACT ON Old staff costs (SGA)'

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➢ **SSC STAFF**

● **Scenario Three (3)**

Scenario Three (3) involves the simultaneous decrease in the 'time to train SSC trainees' and a decrease in the '% of SSC Staff Leaving'.

Scenario 3: Decrease Time to train SSC trainees and Decrease % of SSC Staff Leaving		
	Current	Simulated or Change
Time to train SSC trainees	2	1
Decrease % of SSC Staff Leaving	0% -12%	5%

IMPACT ON SSC STAFF

From Figures 134 and 135, it can be observed that the simultaneous decrease in the 'time to train SSC trainees' and decrease in the '% of SSC Staff Leaving', has an impact on the number of SSC Staff. This is shown by the fact that at month 24 the actual number of SSC Staff were 7 (Sketched) and the change (comparison run) was 6.8 compared to a simulated run of 5.7. What this implies is that this scenario is nearer the actual number of SSC staff during the transition period.

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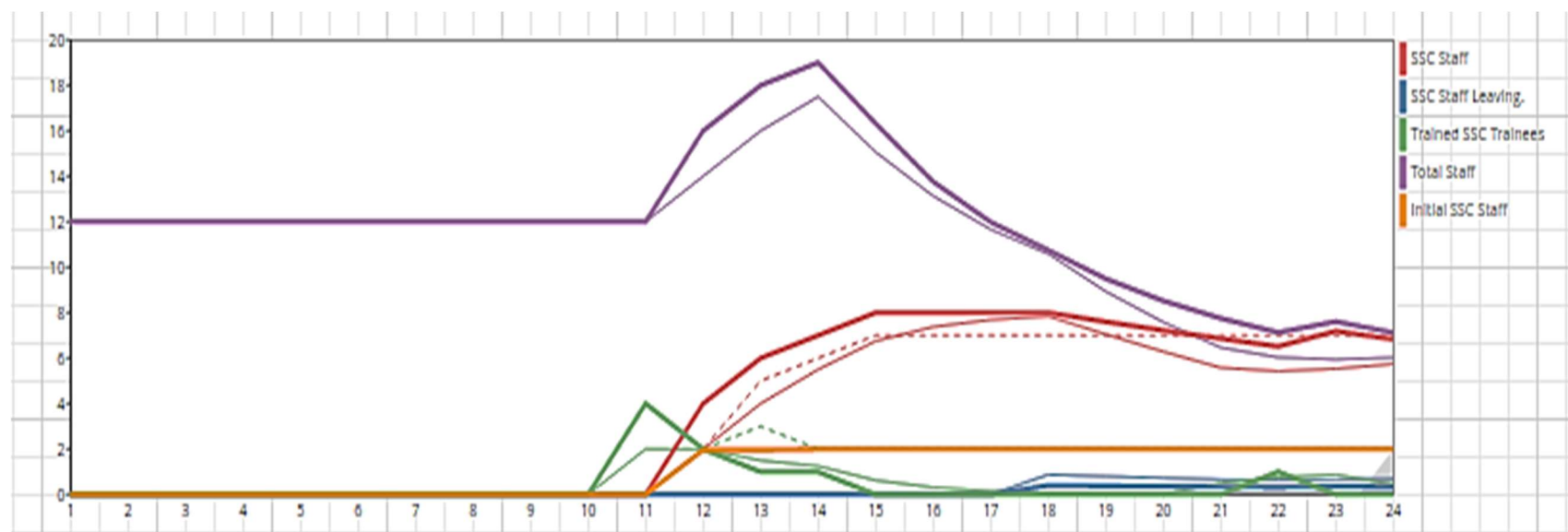
Figure 134 IMPACT ON SSC STAFF

	SSC Staff			SSC Staff Leaving.			Total Staff			Trained SSC Trainees			Initial SSC Staff		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	-	0	0	-	0	0	-	12	12	-	0	0	-	0	0
2	-	0	0	-	0	0	-	12	12	-	0	0	-	0	0
3	-	0	0	-	0	0	-	12	12	-	0	0	-	0	0
4	-	0	0	-	0	0	-	12	12	-	0	0	-	0	0
5	-	0	0	-	0	0	-	12	12	-	0	0	-	0	0
6	-	0	0	-	0	0	-	12	12	-	0	0	-	0	0
7	-	0	0	-	0	0	-	12	12	-	0	0	-	0	0
8	-	0	0	-	0	0	-	12	12	-	0	0	-	0	0
9	-	0	0	-	0	0	-	12	12	-	0	0	-	0	0
10	-	0	0	-	0	0	-	12	12	-	0	0	0	0	0
11	-	0	0	-	0	0	-	12	12	-	2	4	0	0	0
12	2	2	4	-	0	0	-	14	16	2	2	2	1.96	1.96	1.96
13	5	4	6	-	0	0	-	16	18	3	1.5	1	1.96	1.96	1.96
14	6	5.5	7	-	0	0	-	17.5	19	2	1.25	1	2	2	2
15	7	6.75	8	-	0	0	-	15.068	16.324	-	0.625	0	2	2	2
16	7	7.375	8	-	0	0	-	13.131	13.766	-	0.313	0	2	2	2
17	7	7.688	8	-	0	0	-	11.664	11.986	-	0.156	0	2	2	2
18	7	7.844	8	-	0.873	0.4	-	10.587	10.75	-	0.078	0	2	2	2
19	7	7.049	7.6	-	0.8	0.38	-	8.937	9.494	-	0.039	0	2	2	2
20	7	6.288	7.22	-	0.728	0.361	-	7.585	8.522	-	0.02	0	2	2	2
21	7	5.579	6.859	-	0.661	0.343	-	6.467	7.752	-	0.51	0	2	2	2
22	7	5.428	6.516	-	0.651	0.326	-	6.032	7.127	-	0.755	1	2	2	2
23	7	5.532	7.19	-	0.665	0.36	-	5.943	7.608	-	0.877	0	2	2	2
24	7	5.744	6.831	-	0.689	0.342	-	6.024	7.117	-	0.439	0	2	2	2

Figure 135 Tabular Depiction of the 'IMPACT ON SSC STAFF'

IMPACT ON SGA Costs

By simultaneously decreasing the 'time to train SSC trainees' and 'increasing the '% of SSC Staff Leaving', the effect of this is to slightly reduce the 'SGA costs'. Figures 136 and 137 below depict this.
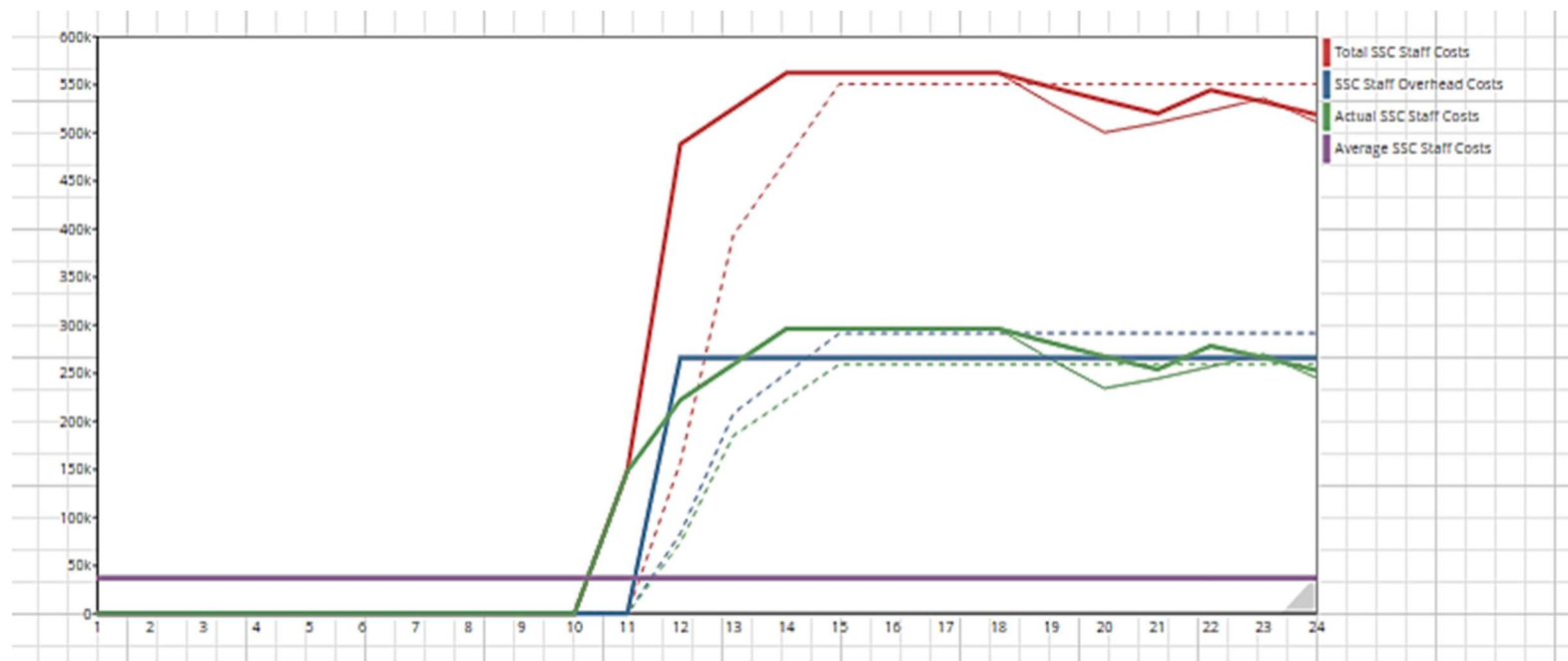
Figure 136 IMPACT ON SGA Costs

	Total SSC Staff Costs			SSC Staff Overhead Costs			Actual SSC Staff Costs			Average SSC Staff Costs		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	0	0	0	0	0	0	0	0	0	-	37029	37029
2	0	0	0	0	0	0	0	0	0	-	37029	37029
3	0	0	0	0	0	0	0	0	0	-	37029	37029
4	0	0	0	0	0	0	0	0	0	-	37029	37029
5	0	0	0	0	0	0	0	0	0	-	37029	37029
6	0	0	0	0	0	0	0	0	0	-	37029	37029
7	0	0	0	0	0	0	0	0	0	-	37029	37029
8	0	0	0	0	0	0	0	0	0	-	37029	37029
9	0	0	0	0	0	0	0	0	0	-	37029	37029
10	0	0	0	0	0	0	0	0	0	-	37029	37029
11	0	148116	148116	0	0	0	0	148116	148116	-	37029	37029
12	157371	488139	488139	83314	265965	265965	74057	222174	222174	-	37029	37029
13	393429	525168	525168	208286	265965	265965	185143	259203	259203	-	37029	37029
14	472114	562197	562197	249943	265965	265965	222171	296232	296232	-	37029	37029
15	550800	562197	562197	291600	265965	265965	259200	296232	296232	-	37029	37029
16	550800	562197	562197	291600	265965	265965	259200	296232	296232	-	37029	37029
17	550800	562197	562197	291600	265965	265965	259200	296232	296232	-	37029	37029
18	550800	562197	562197	291600	265965	265965	259200	296232	296232	-	37029	37029
19	550800	529860.004	547385.4	291600	265965	265965	259200	263895.004	281420.4	-	37029	37029
20	550800	500255.278	533314.38	291600	265965	265965	259200	234290.278	267349.38	-	37029	37029
21	550800	510316	519946.911	291600	265965	265965	259200	244351	253981.911	-	37029	37029
22	550800	522851.179	544276.815	291600	265965	265965	259200	256886.179	278311.815	-	37029	37029
23	550800	535783.82	532212.675	291600	265965	265965	259200	269818.82	266247.675	-	37029	37029
24	550800	511163.915	518900.291	291600	265965	265965	259200	245198.915	252935.291	-	37029	37029

Figure 137 Tabular Depiction of IMPACT ON SGA Costs

➢ **Workload/ (Work Capacity) Pre & Post SSC**

• **Scenario One (1): Increase Average Transaction Time**

Scenario 1: Increase Average Transaction Time		
	Current	Simulated or Change
Average Transaction Time	18.334	22

Scenario One (1) involves increasing the average transaction time.

Impact on Staff Deficiency Gap

By increasing the 'Average Transaction Time', the 'staff deficiency gap' increases from 5.98 (sketched) to 8.48 (comparison run). This means that there are more staff required as the time taken to complete the transactions are getting longer. Figures 138 and 139 below depict this.
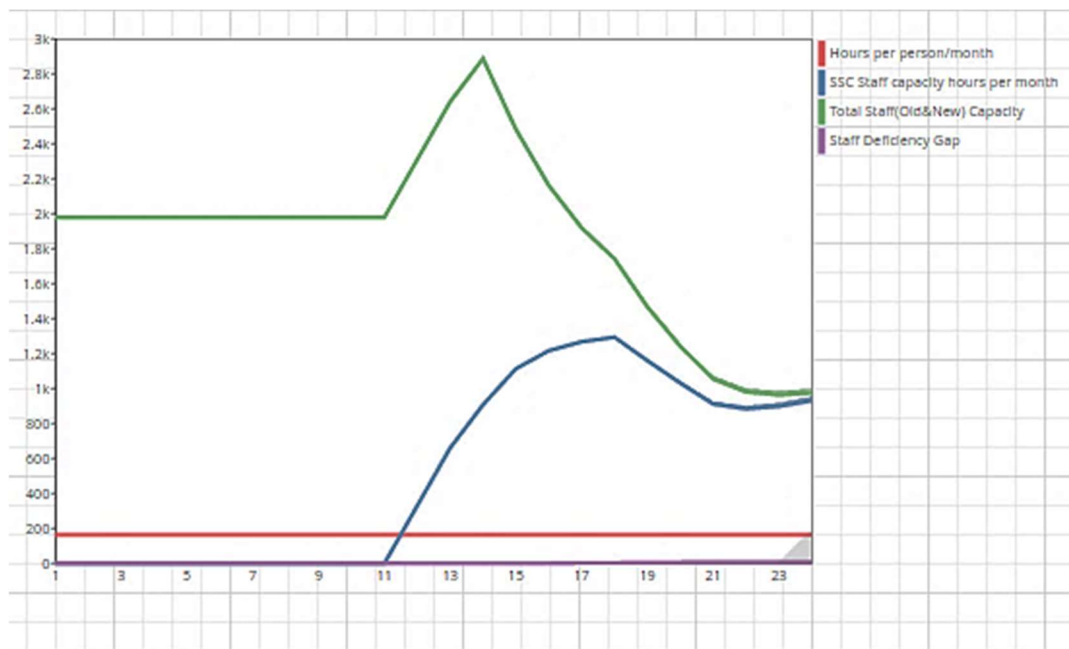
Figure 138 Impact on Staff Deficiency Gap

#	Total Staff(Old&New) Capacity			SSC Staff capacity hours per month			Hours per person/month			Staff Deficiency Gap		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	1980	1980	1980	0	0	0	165	165	165	0	0	2.4
2	1980	1980	1980	0	0	0	165	165	165	0	0	2.4
3	1980	1980	1980	0	0	0	165	165	165	0	0	2.4
4	1980	1980	1980	0	0	0	165	165	165	0	0	2.4
5	1980	1980	1980	0	0	0	165	165	165	0	0	2.4
6	1980	1980	1980	0	0	0	165	165	165	0	0	2.4
7	1980	1980	1980	0	0	0	165	165	165	0	0	2.4
8	1980	1980	1980	0	0	0	165	165	165	0	0	2.4
9	1980	1980	1980	0	0	0	165	165	165	0	0	2.4
10	1980	1980	1980	0	0	0	165	165	165	0	0	2.4
11	1980	1980	1980	0	0	0	165	165	165	0	0	2.4
12	2310	2310	2310	330	330	330	165	165	165	0	0	0.4
13	2640	2640	2640	660	660	660	165	165	165	0	0	0
14	2887.5	2887.5	2887.5	907.5	907.5	907.5	165	165	165	0	0	0
15	2486.172	2486.172	2483.457	1113.75	1113.75	1113.75	165	165	165	0	0	0
16	2166.64	2166.64	2162.566	1216.875	1216.875	1216.875	165	165	165	0	0	1.294
17	1924.593	1924.593	1920.031	1268.438	1268.438	1268.438	165	165	165	0.336	0.336	2.763
18	1746.777	1746.777	1742.271	1294.219	1294.219	1294.219	165	165	165	1.414	1.414	3.841
19	1474.678	1474.678	1467.564	1163.017	1163.017	1160.038	165	165	165	3.063	3.063	5.506
20	1251.522	1251.522	1241.988	1037.544	1037.544	1031.698	165	165	165	4.415	4.415	6.873
21	1066.996	1066.996	1055.194	920.597	920.597	912.014	165	165	165	5.534	5.534	8.005
22	995.328	995.328	981.39	895.565	895.565	884.388	165	165	165	5.968	5.968	8.452
23	980.597	980.597	964.646	912.748	912.748	899.093	165	165	165	6.057	6.057	8.554
24	993.945	993.945	976.089	947.82	947.82	931.816	165	165	165	5.977	5.977	8.484

Figure 139 Tabular Depiction of 'Impact on Staff Deficiency Gap'

Impact on 'Workload i.e. Total Staff Capacity, Work Capacity of Old Staff and SSC Staff Capacity Hours per Month'.

By increasing the 'Average Transaction Time', by month 24 the 'Total Pre-SSC &SSC Workload' is increased from 1980 to 2376 and the 'SSC Staff capacity hours' is also reduced slightly from 947 (sketched) to 931 (comparison), whereas the work capacity of the old staff is slightly reduced from 46 (sketched) to 44 (comparison run). This then leads to a slight reduction in the total 'Staff (Old & New) Capacity' from 993 (sketched) to 976 (comparison run). This reflects the 'staff deficiency gap', in that there is not enough staff to do the work. Hence, the reduction in the staff capacity hours whereas the workload hours available is about 2376. Figures 140 and 141 below depict this.
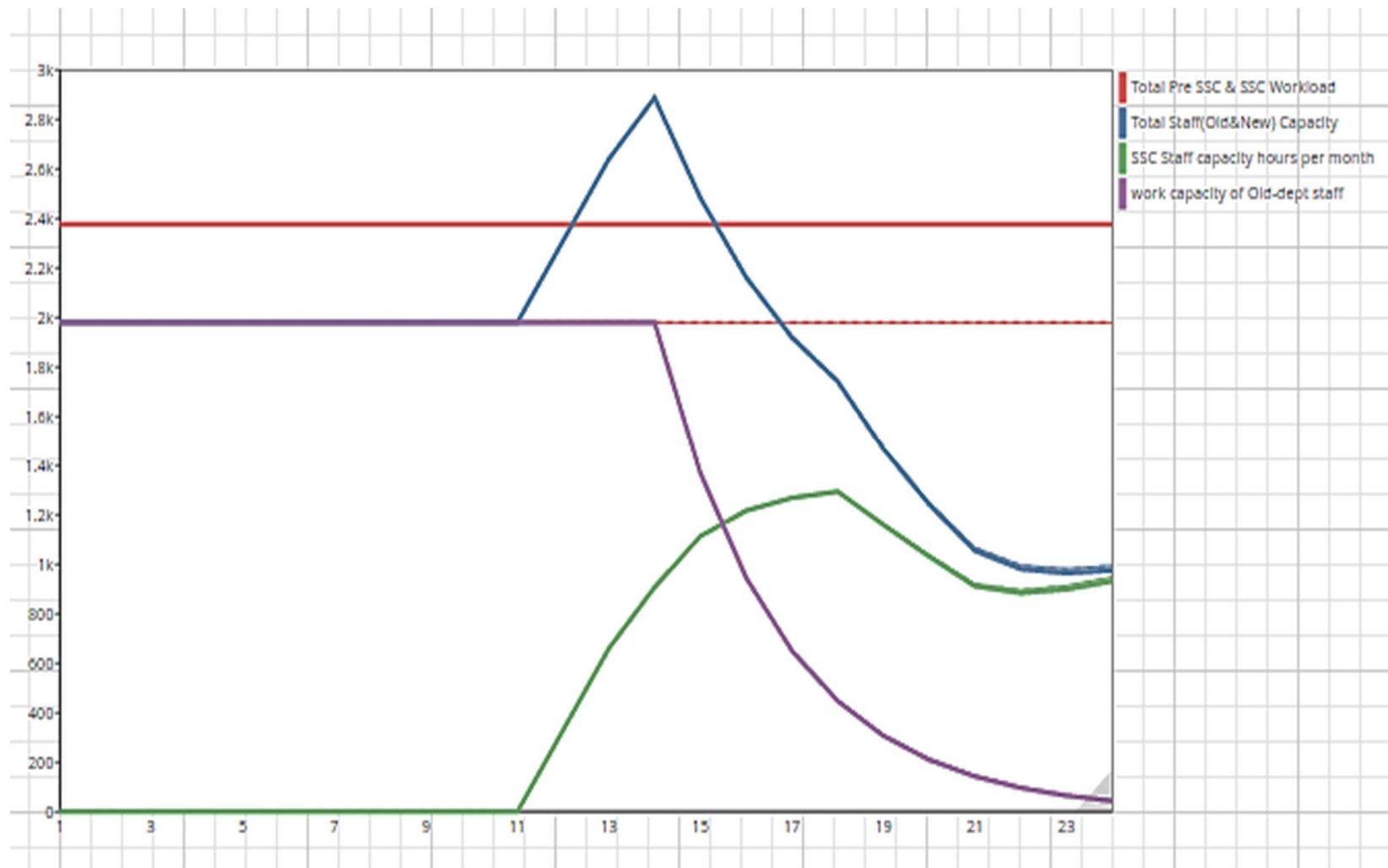
Figure 140 Impact on 'Workload i.e. Total Staff Capacity, Work Capacity of Old Staff and SSC Staff Capacity Hours per Month

	Total Pre SSC & SSC Workload			SSC Staff capacity hours per month			Total Staff(Old&New) Capacity			work capacity of Old-dept staff		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	1980.072	1980.072	2376	0	0	0	1980	1980	1980	1980	1980	1980
2	1980.072	1980.072	2376	0	0	0	1980	1980	1980	1980	1980	1980
3	1980.072	1980.072	2376	0	0	0	1980	1980	1980	1980	1980	1980
4	1980.072	1980.072	2376	0	0	0	1980	1980	1980	1980	1980	1980
5	1980.072	1980.072	2376	0	0	0	1980	1980	1980	1980	1980	1980
6	1980.072	1980.072	2376	0	0	0	1980	1980	1980	1980	1980	1980
7	1980.072	1980.072	2376	0	0	0	1980	1980	1980	1980	1980	1980
8	1980.072	1980.072	2376	0	0	0	1980	1980	1980	1980	1980	1980
9	1980.072	1980.072	2376	0	0	0	1980	1980	1980	1980	1980	1980
10	1980.072	1980.072	2376	0	0	0	1980	1980	1980	1980	1980	1980
11	1980.072	1980.072	2376	0	0	0	1980	1980	1980	1980	1980	1980
12	1980.072	1980.072	2376	330	330	330	2310	2310	2310	1980	1980	1980
13	1980.072	1980.072	2376	660	660	660	2640	2640	2640	1980	1980	1980
14	1980.072	1980.072	2376	907.5	907.5	907.5	2887.5	2887.5	2887.5	1980	1980	1980
15	1980.072	1980.072	2376	1113.75	1113.75	1113.75	2486.172	2486.172	2483.457	1372.422	1372.422	1369.707
16	1980.072	1980.072	2376	1216.875	1216.875	1216.875	2166.64	2166.64	2162.566	949.765	949.765	945.691
17	1980.072	1980.072	2376	1268.438	1268.438	1268.438	1924.593	1924.593	1920.031	656.156	656.156	651.593
18	1980.072	1980.072	2376	1294.219	1294.219	1294.219	1746.777	1746.777	1742.271	452.558	452.558	448.052
19	1980.072	1980.072	2376	1163.017	1163.017	1160.038	1474.678	1474.678	1467.564	311.661	311.661	307.526
20	1980.072	1980.072	2376	1037.544	1037.544	1031.698	1251.522	1251.522	1241.988	213.978	213.978	210.289
21	1980.072	1980.072	2376	920.597	920.597	912.014	1066.996	1066.996	1055.194	146.399	146.399	143.18
22	1980.072	1980.072	2376	895.565	895.565	884.388	995.328	995.328	981.39	99.763	99.763	97.002
23	1980.072	1980.072	2376	912.748	912.748	899.093	980.597	980.597	964.646	67.849	67.849	65.553
24	1980.072	1980.072	2376	947.82	947.82	931.816	993.945	993.945	976.089	46.124	46.124	44.272

Figure 141 Tabular Depiction of 'Impact on 'Workload i.e. Total Staff Capacity, Work Capacity of Old Staff and SSC Staff Capacity Hours per Month'

➢ **TRANSACTIONS**

- **Scenario One (1) Increase the 'Total % of New Transactions Added' (new transactions added and no change in other factors)**

Scenario 1_ Increase the 'Total % of New Transactions Added'		
Total % of New Transactions Added	Current	Simulated or Change
	0%	1%

Scenario One (1) involves increasing the 'Total % of New Transactions Added'

IMPACT ON Total Pre-SSC & SSC Transactions

By increasing the number of new transactions, the total number of transactions available increases, so that by month 24 the increased transactions are 136 compared to 108. This implies that, ultimately as the number of transactions increase, there will be an impact on other factors such as the workload, pressure on staff and also the costs. Figures 142 and 143 below depict this.
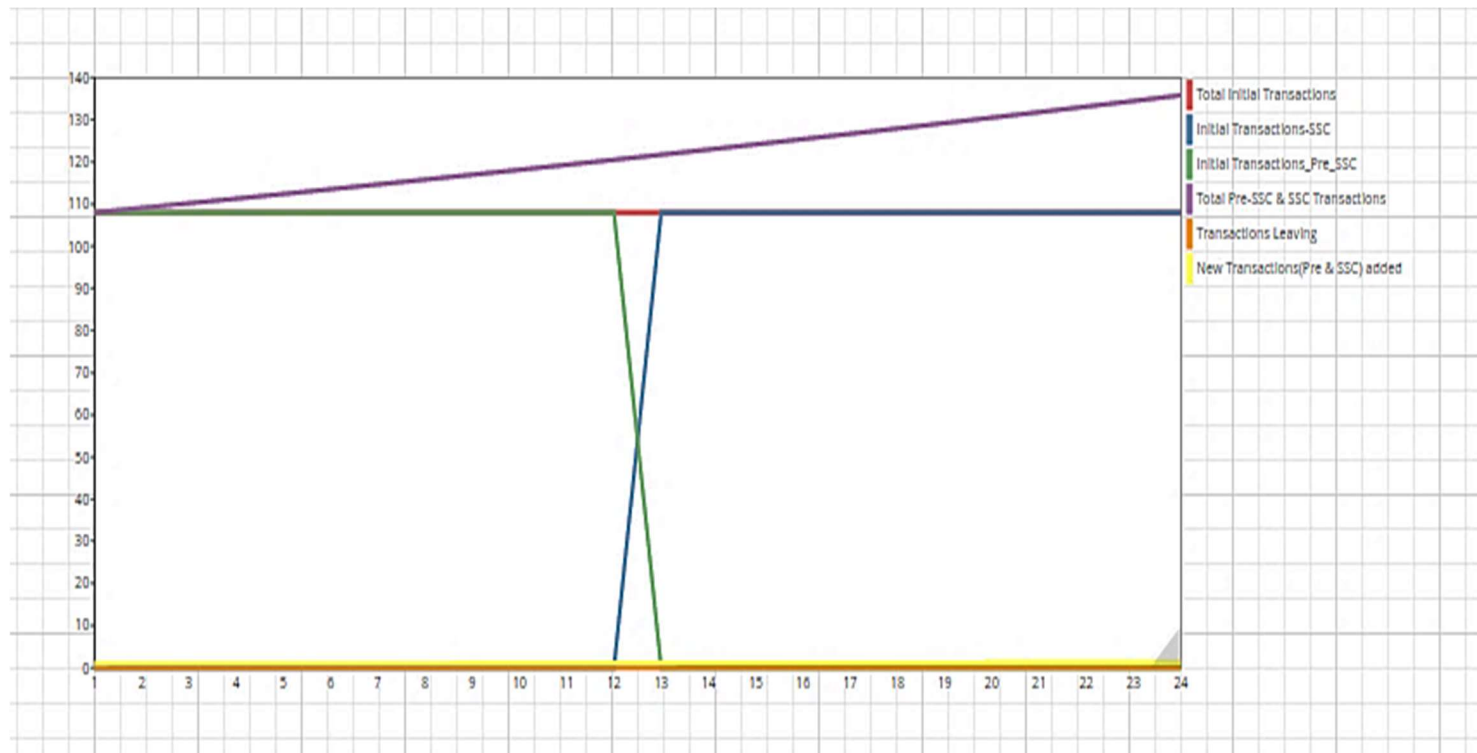
Figure 142 IMPACT ON Total Pre-SSC & SSC Transactions

	Total Initial Transactions			Initial Transactions-SSC			Initial Transactions_Pre_SSC			Total Pre-SSC & SSC Transactions			Transactions Leaving			New Transactions(Pre & SSC) added		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	108	108	108	.	0	0	108	108	108	108	108	108	0	0	0	0	0	1.08
2	108	108	108	.	0	0	108	108	108	108	108	109.08	0	0	0	0	0	1.091
3	108	108	108	.	0	0	108	108	108	108	108	110.171	0	0	0	0	0	1.102
4	108	108	108	.	0	0	108	108	108	108	108	111.273	0	0	0	0	0	1.113
5	108	108	108	.	0	0	108	108	108	108	108	112.385	0	0	0	0	0	1.124
6	108	108	108	.	0	0	108	108	108	108	108	113.509	0	0	0	0	0	1.135
7	108	108	108	.	0	0	108	108	108	108	108	114.644	0	0	0	0	0	1.146
8	108	108	108	.	0	0	108	108	108	108	108	115.791	0	0	0	0	0	1.158
9	108	108	108	.	0	0	108	108	108	108	108	116.949	0	0	0	0	0	1.169
10	108	108	108	.	0	0	108	108	108	108	108	118.118	0	0	0	0	0	1.181
11	108	108	108	.	0	0	108	108	108	108	108	119.299	0	0	0	0	0	1.193
12	108	108	108	.	0	0	108	108	108	108	108	120.492	0	0	0	0	0	1.205
13	108	108	108	108	108	108	.	0	0	108	108	121.697	0	0	0	0	0	1.217
14	108	108	108	108	108	108	.	0	0	108	108	122.914	0	0	0	0	0	1.229
15	108	108	108	108	108	108	.	0	0	108	108	124.143	0	0	0	0	0	1.241
16	108	108	108	108	108	108	.	0	0	108	108	125.385	0	0	0	0	0	1.254
17	108	108	108	108	108	108	.	0	0	108	108	126.638	0	0	0	0	0	1.266
18	108	108	108	108	108	108	.	0	0	108	108	127.905	0	0	0	0	0	1.279
19	108	108	108	108	108	108	.	0	0	108	108	129.184	0	0	0	0	0	1.292
20	108	108	108	108	108	108	.	0	0	108	108	130.476	0	0	0	0	0	1.305
21	108	108	108	108	108	108	.	0	0	108	108	131.781	0	0	0	0	0	1.318
22	108	108	108	108	108	108	.	0	0	108	108	133.098	0	0	0	0	0	1.331
23	108	108	108	108	108	108	.	0	0	108	108	134.429	0	0	0	0	0	1.344
24	108	108	108	108	108	108	.	0	0	108	108	135.774	0	0	0	0	0	1.358

Figure 143 Tabular Depiction of 'IMPACT ON Total Pre-SSC & SSC Transactions '

IMPACT ON Transactions Deficiency Gap

By increasing the number of new transactions, there is an impact on the total level of transactions and the 'Transaction Deficiency Gap'. The deficiency gap starts to grow (shown as a negative number as the desired number of transactions are less than the comparison run). Figures 144 and 145 below depict this.
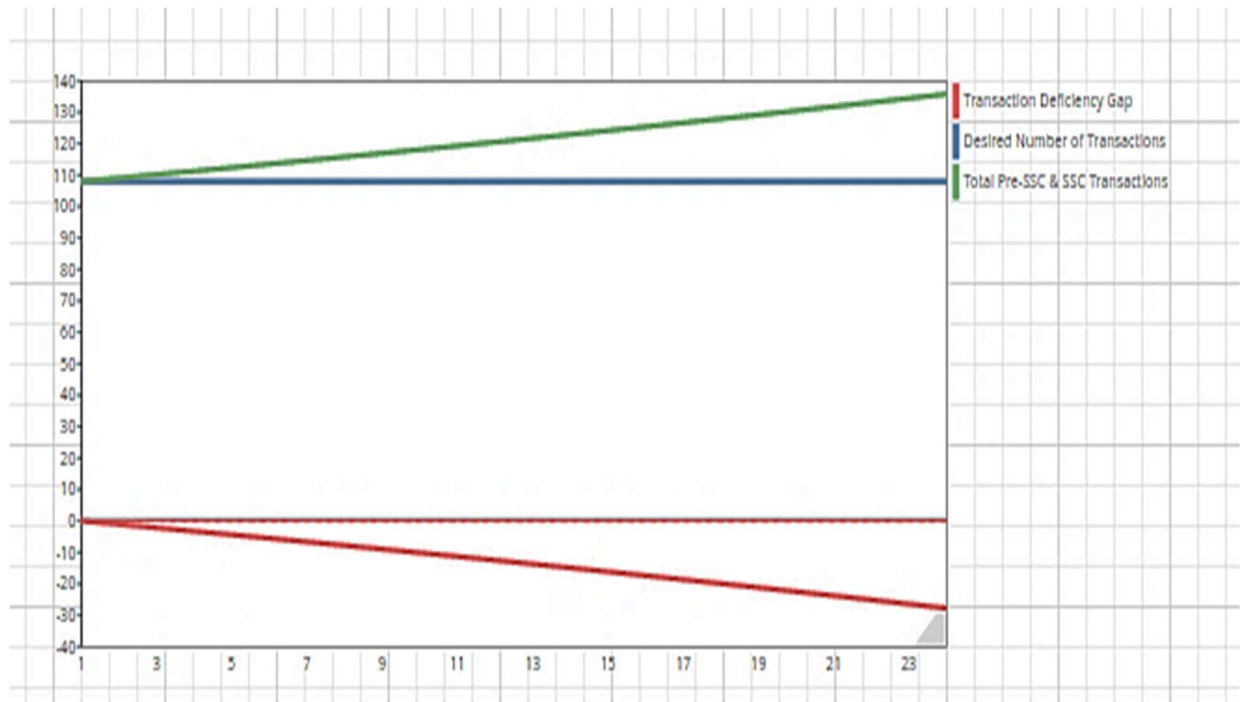
Figure 144 IMPACT ON Transactions Deficiency Gap

	Transaction Deficiency Gap			Desired Number of Transactions			Total Pre-SSC & SSC Transactions		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	0	0	0	108	108	108	108	108	108
2	0	0	-1.08	108	108	108	108	108	109.08
3	0	0	-2.171	108	108	108	108	108	110.171
4	0	0	-3.273	108	108	108	108	108	111.273
5	0	0	-4.385	108	108	108	108	108	112.385
6	0	0	-5.509	108	108	108	108	108	113.509
7	0	0	-6.644	108	108	108	108	108	114.644
8	0	0	-7.791	108	108	108	108	108	115.791
9	0	0	-8.949	108	108	108	108	108	116.949
10	0	0	-10.118	108	108	108	108	108	118.118
11	0	0	-11.299	108	108	108	108	108	119.299
12	0	0	-12.492	108	108	108	108	108	120.492
13	0	0	-13.697	108	108	108	108	108	121.697
14	0	0	-14.914	108	108	108	108	108	122.914
15	0	0	-16.143	108	108	108	108	108	124.143
16	0	0	-17.385	108	108	108	108	108	125.385
17	0	0	-18.638	108	108	108	108	108	126.638
18	0	0	-19.905	108	108	108	108	108	127.905
19	0	0	-21.184	108	108	108	108	108	129.184
20	0	0	-22.476	108	108	108	108	108	130.476
21	0	0	-23.781	108	108	108	108	108	131.781
22	0	0	-25.098	108	108	108	108	108	133.098
23	0	0	-26.429	108	108	108	108	108	134.429
24	0	0	-27.774	108	108	108	108	108	135.774

Figure 145 Tabular Depiction of 'IMPACT ON Transactions Deficiency Gap'

➢ **CUSTOMER SERVICE EFFECT**

 • **Scenario One (1)**

Scenario 1: Increase % of Clients/Other Staff Leaving		
	Current	Simulated or Change
% of Clients/Other Staff Leaving	0.012% times work errors	0.30% times work errors

Scenario One (1) involves increasing the % of Clients/Other Staff Leaving.

Impact on Support Quality and Work Errors

The impact on 'support quality' and 'work errors' (comparison run) is consistent with the simulated model assumptions. Up to month 17 the 'support quality' is stable at 0.9 and 'work errors' is also stable at 0.1. However, as the pressure on staff increases to 1.992 in month 24 both the 'support quality' and 'work errors' deteriorates to 0.252 and 0.748 respectively. Figures 146 and 147 below illustrate this.
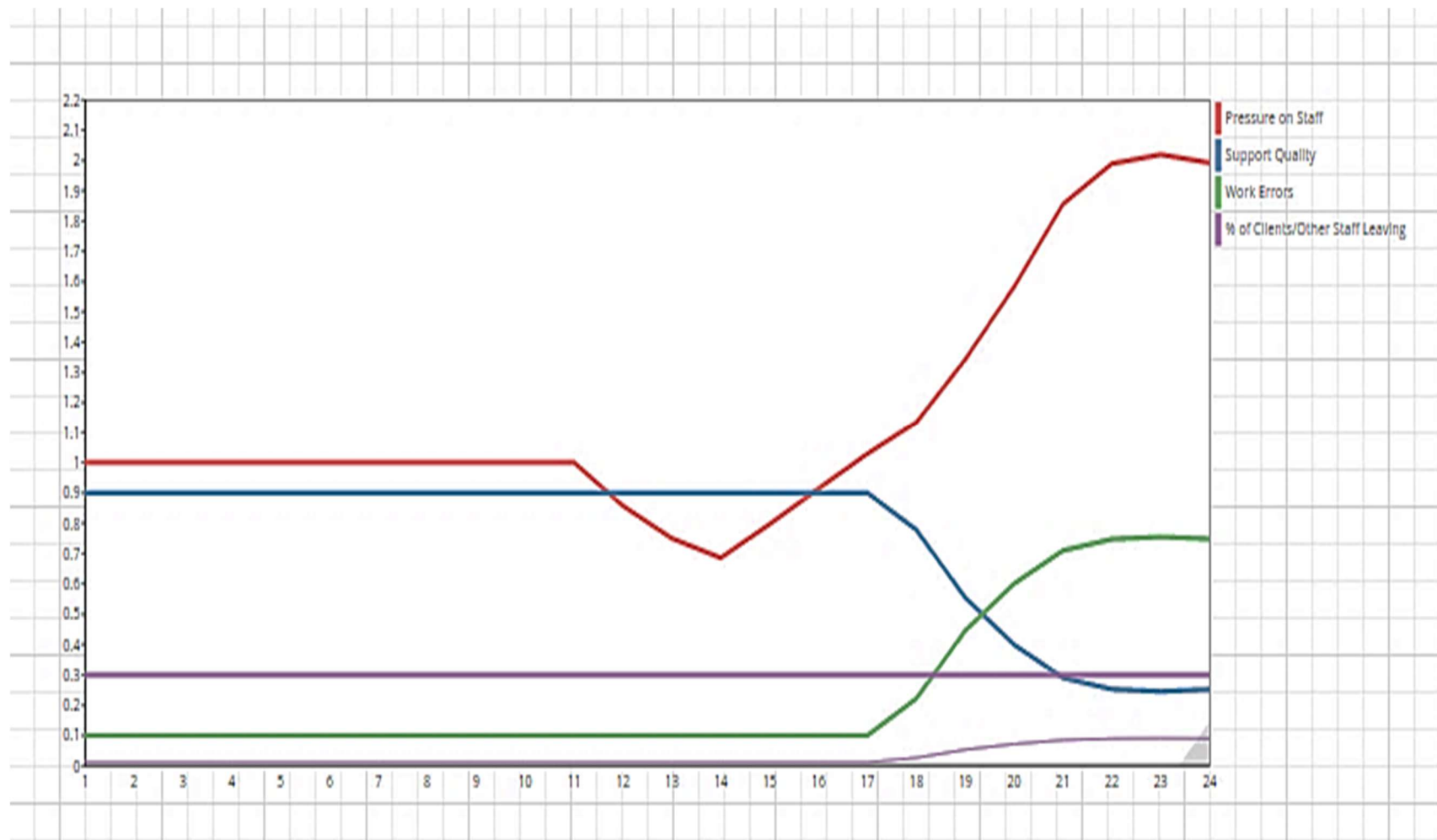
Figure 146 Impact on Support Quality and Work Errors

	Support Quality			Work Errors			Pressure on Staff			% of Clients/Other Staff Leaving		
	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison Ru...	Sketched	Simulated	Comparison Ru...
1	-	0.9	0.9	-	0.1	0.1	-	1	1	-	0.012	0.3
2	-	0.9	0.9	-	0.1	0.1	-	1	1	-	0.012	0.3
3	-	0.9	0.9	-	0.1	0.1	-	1	1	-	0.012	0.3
4	-	0.9	0.9	-	0.1	0.1	-	1	1	-	0.012	0.3
5	-	0.9	0.9	-	0.1	0.1	-	1	1	-	0.012	0.3
6	-	0.9	0.9	-	0.1	0.1	-	1	1	-	0.012	0.3
7	-	0.9	0.9	-	0.1	0.1	-	1	1	-	0.012	0.3
8	-	0.9	0.9	-	0.1	0.1	-	1	1	-	0.012	0.3
9	-	0.9	0.9	-	0.1	0.1	-	1	1	-	0.012	0.3
10	-	0.9	0.9	-	0.1	0.1	-	1	1	-	0.012	0.3
11	-	0.9	0.9	-	0.1	0.1	-	1	1	-	0.012	0.3
12	-	0.9	0.9	-	0.1	0.1	-	0.857	0.857	-	0.012	0.3
13	-	0.9	0.9	-	0.1	0.1	-	0.75	0.75	-	0.012	0.3
14	-	0.9	0.9	-	0.1	0.1	-	0.686	0.686	-	0.012	0.3
15	-	0.9	0.9	-	0.1	0.1	-	0.796	0.796	-	0.012	0.3
16	-	0.9	0.9	-	0.1	0.1	-	0.914	0.914	-	0.012	0.3
17	-	0.9	0.9	-	0.1	0.1	-	1.029	1.029	-	0.012	0.3
18	-	0.778	0.778	-	0.222	0.222	-	1.134	1.134	-	0.027	0.3
19	-	0.555	0.555	-	0.445	0.445	-	1.343	1.343	-	0.053	0.3
20	-	0.399	0.399	-	0.601	0.601	-	1.582	1.582	-	0.072	0.3
21	-	0.29	0.29	-	0.71	0.71	-	1.856	1.856	-	0.085	0.3
22	-	0.253	0.253	-	0.747	0.747	-	1.989	1.989	-	0.09	0.3
23	-	0.245	0.245	-	0.755	0.755	-	2.019	2.019	-	0.091	0.3
24	-	0.252	0.252	-	0.748	0.748	-	1.992	1.992	-	0.09	0.3

Figure 147 Tabular Depiction of Impact on Support Quality and Work Errors

Impact on Clients/Other Staff

Following on from the support quality and work errors, the number of clients/other staff lost is at an increasing rate (comparison run) compared to the simulated run. This is because there is an increase in the rate of clients leaving from approximately 52 to 0.027. What this tells us is that even though work errors are kept at the same rate, there are other variables that can influence the loss of customers and this will depend on the type of company in question. In effect, as the work errors increase, we lose clients/other staff at a much faster rate. Figures 148 and 149 below show this.
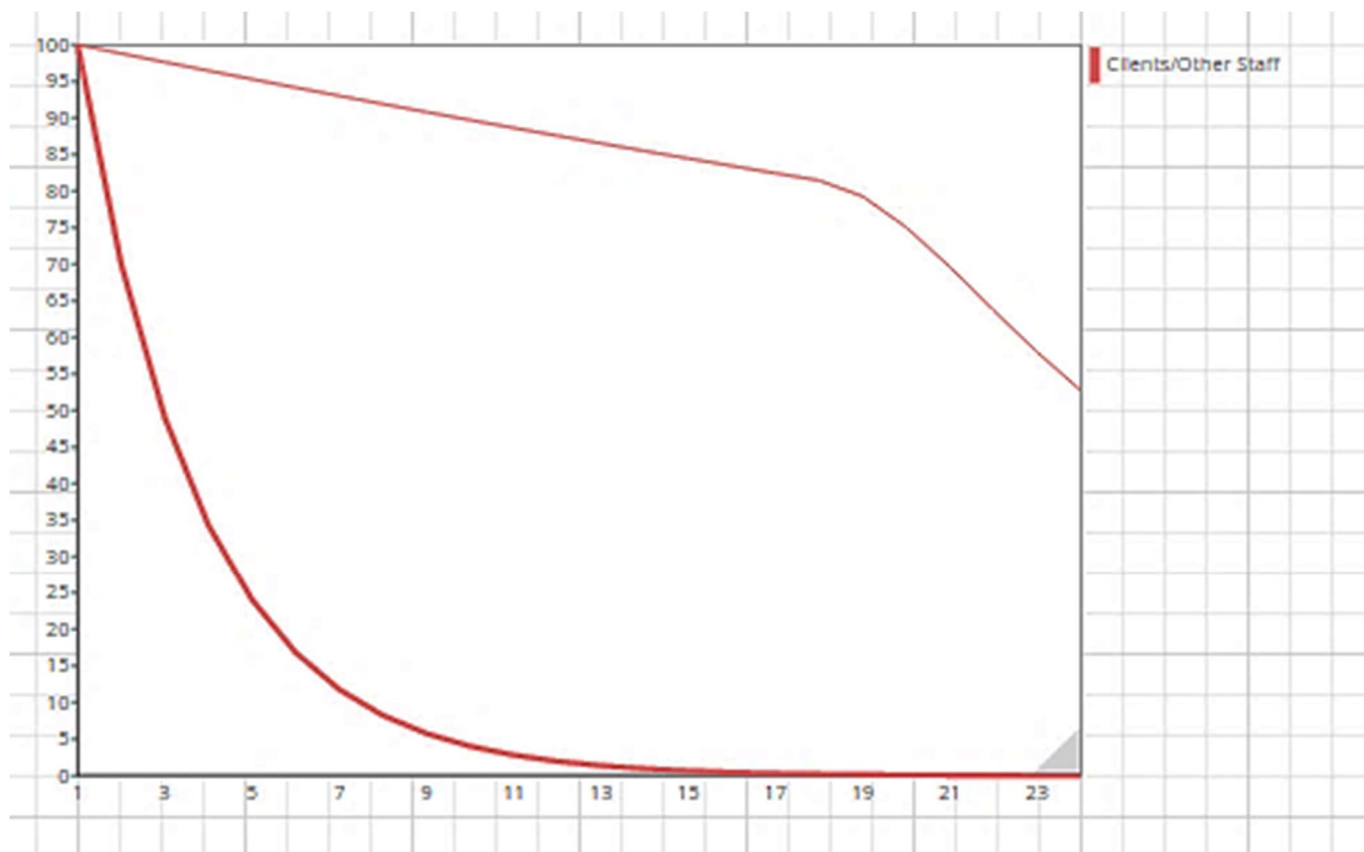
Figure 148 Impact on Clients/Other Staff

	Clients/Other Staff		
	Sketched	Simulated	Comparison Run
1	-	100	100
2	-	98.8	70
3	-	97.614	49
4	-	96.443	34.3
5	-	95.286	24.01
6	-	94.142	16.807
7	-	93.013	11.765
8	-	91.896	8.235
9	-	90.794	5.765
10	-	89.704	4.035
11	-	88.628	2.825
12	-	87.564	1.977
13	-	86.513	1.384
14	-	85.475	0.969
15	-	84.45	0.678
16	-	83.436	0.475
17	-	82.435	0.332
18	-	81.446	0.233
19	-	79.278	0.163
20	-	75.042	0.114
21	-	69.634	0.08
22	-	63.704	0.056
23	-	57.992	0.039
24	-	52.739	0.027

Figure 149 Tabular Depiction of Impact on Clients/Other Staff

➢ **TEMPORARY STAFF**

- **Scenario Two (2): Increase Time to adjust to new role**

Scenario Two (2) involves increasing the 'Time to adjust to new role'. Figures 150 and 151 below depict this.

Scenario 2: Increase Time to adjust to new role		
	Current	Simulated or Change
Time to adjust to new role	1 month	2 months

Figure 150 Increase Time to adjust to new role

	Time to adjust to new role			% of Temporary Staff Leaving		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	1	1	2	-	0	0
2	1	1	2	-	0	0
3	1	1	2	-	0	0
4	1	1	2	-	0	0
5	1	1	2	-	0	0
6	1	1	2	-	0	0
7	1	1	2	-	0	0
8	1	1	2	-	0	0
9	1	1	2	-	0	0
10	1	1	2	-	0	0
11	1	1	2	-	0	0
12	1	1	2	-	0	0
13	1	1	2	-	0	0
14	1	1	2	-	0	0
15	1	1	2	-	0	0
16	1	1	2	-	0	0
17	1	1	2	-	0	0
18	1	1	2	-	0	0
19	1	1	2	-	0	0
20	1	1	2	-	0	0
21	1	1	2	-	0	0
22	1	1	2	-	0	0
23	1	1	2	-	0	0
24	1	1	2	-	0	0

Figure 151 Tabular Depiction of Increase Time to adjust to new role

IMPACT ON Temporary Staff

From Figures 152 and 153 below, it can be observed that the increase in the 'Time to adjust to new role' results in the trained temporary staff entering at a later stage. This is shown by the fact that at month 24 the actual number of Temporary Staff was 0 (Sketched) and the change (comparison run) was 5.16 compared to a simulated run of 5.9. What this implies is that, this scenario deviates from the actual Temporary Staff during the transition period.
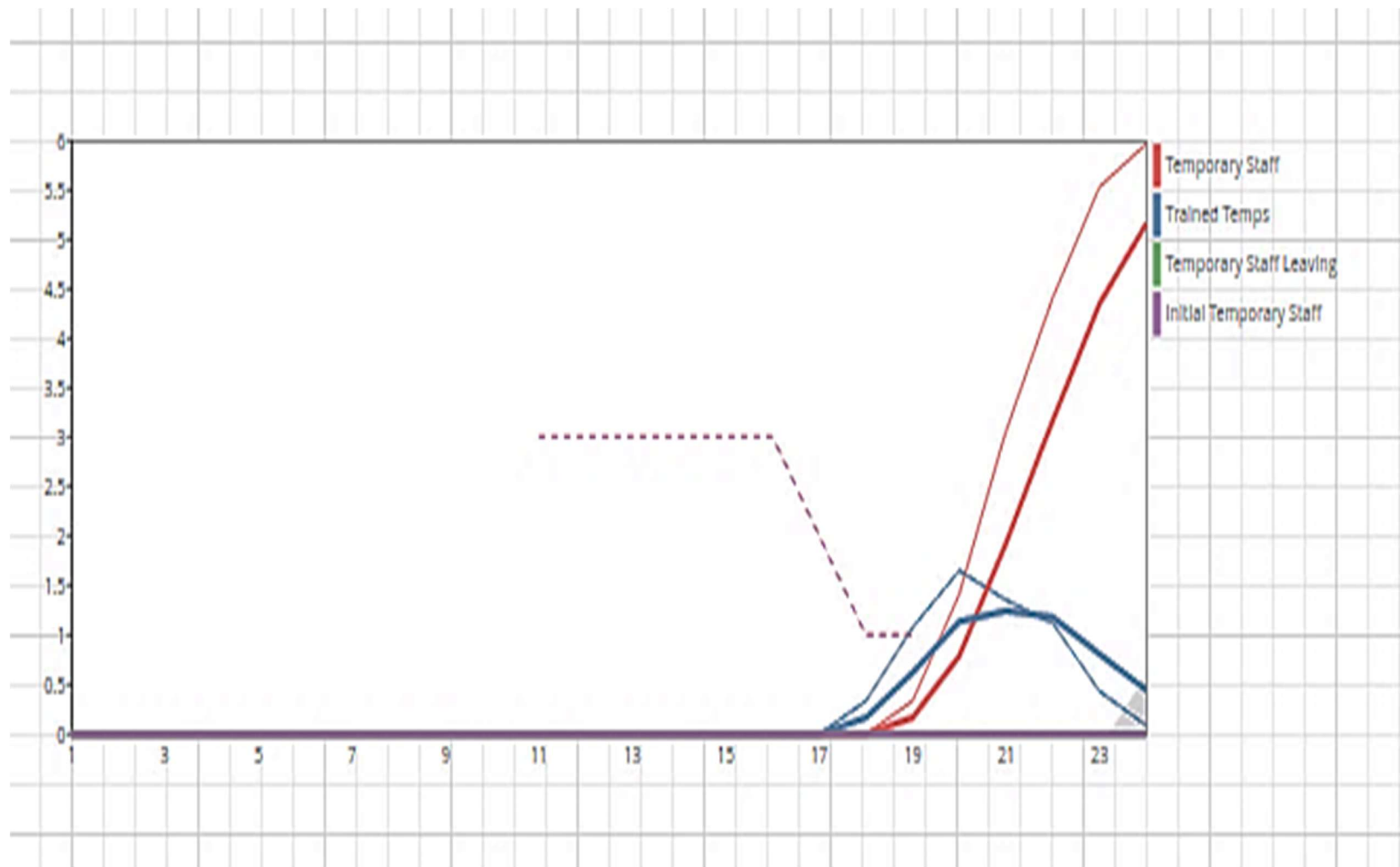
Figure 152 IMPACT ON Temporary Staff

	Temporary Staff			Trained Temps			Temporary Staff Leaving			Initial Temporary Staff		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	-	0	0	0	0	0	-	0	0	-	0	0
2	-	0	0	0	0	0	-	0	0	-	0	0
3	-	0	0	0	0	0	-	0	0	-	0	0
4	-	0	0	0	0	0	-	0	0	-	0	0
5	-	0	0	0	0	0	-	0	0	-	0	0
6	-	0	0	0	0	0	-	0	0	-	0	0
7	-	0	0	0	0	0	-	0	0	-	0	0
8	-	0	0	0	0	0	-	0	0	-	0	0
9	-	0	0	0	0	0	-	0	0	-	0	0
10	-	0	0	0	0	0	-	0	0	-	0	0
11	3	0	0	0	0	0	-	0	0	3	0	0
12	3	0	0	0	0	0	-	0	0	3	0	0
13	3	0	0	0	0	0	-	0	0	3	0	0
14	3	0	0	0	0	0	-	0	0	3	0	0
15	3	0	0	0	0	0	-	0	0	3	0	0
16	3	0	0	0	0	0	-	0	0	3	0	0
17	2	0	0	0	0	0	-	0	0	2	0	0
18	1	0	0	0.336	0.336	0.168	-	0	0	1	0	0
19	1	0.336	0.168	1.078	1.078	0.623	-	0	0	1	0	0
20	-	1.414	0.791	1.649	1.649	1.136	-	0	0	-	0	0
21	-	3.063	1.927	1.352	1.352	1.244	-	0	0	-	0	0
22	-	4.415	3.171	1.118	1.118	1.181	-	0	0	-	0	0
23	-	5.534	4.353	0.434	0.434	0.808	-	0	0	-	0	0
24	-	5.968	5.16	0.089	0.089	0.449	-	0	0	-	0	0

Figure 153 Table Depiction of IMPACT ON Temporary Staff

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Impact on Staff Deficiency Gap

From Figures 154 and 155 below, it can be observed that the increase in the 'Time to adjust to new role' has an impact on the 'Staff Deficiency Gap'. The impact reflects the same movement as the sketched, simulated and comparison run. This is shown by the fact that at month 24 the actual 'Staff Deficiency Gap' was 5.98 (Sketched) and the change (comparison run) was 5.98 compared to a simulated run of 5.98.
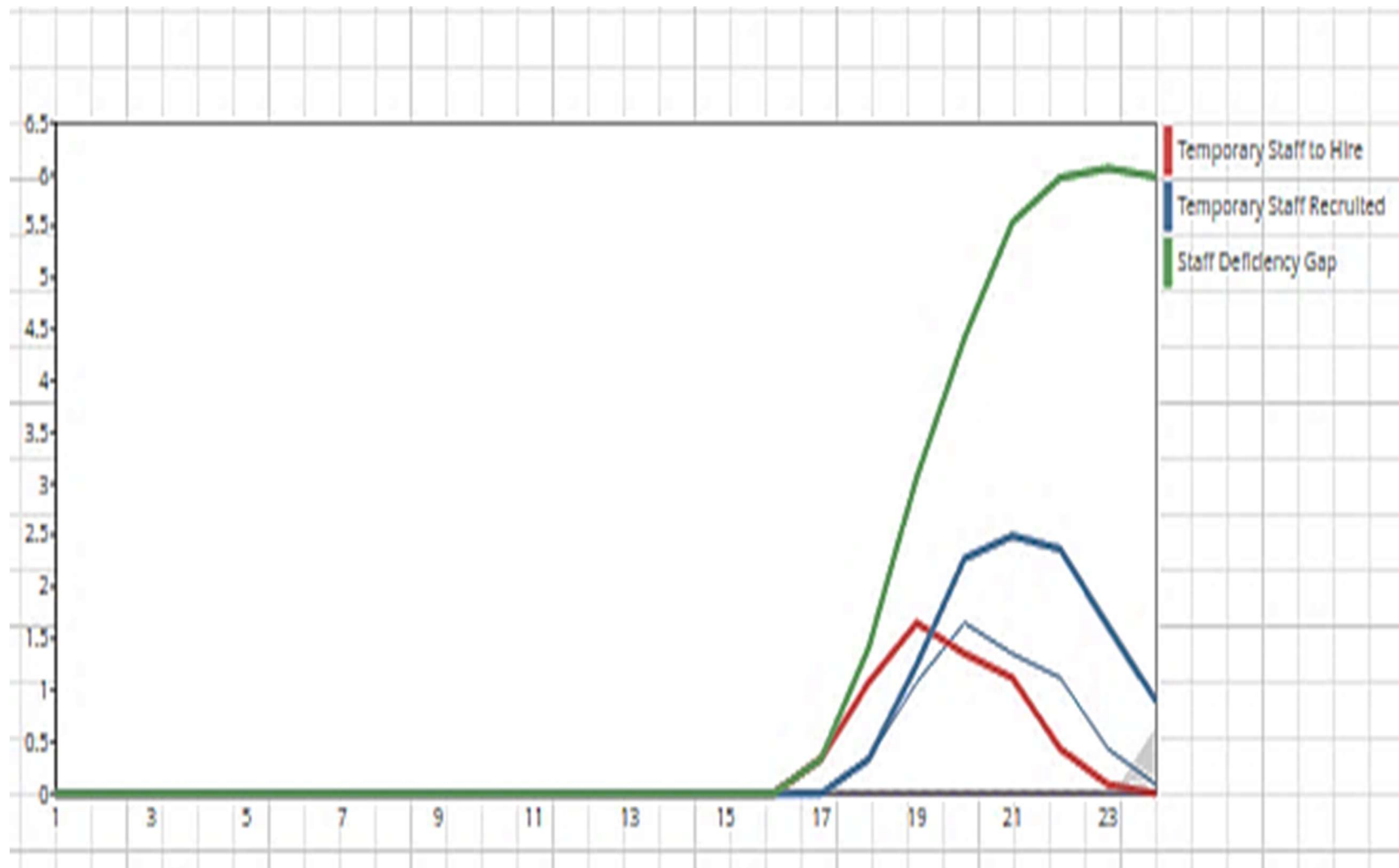
Figure 154 Impact on Staff Deficiency Gap

	Temporary Staff to Hire			Temporary Staff Recruited			Staff Deficiency Gap		
	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison R...	Sketched	Simulated	Comparison Run
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
17	0	0.336	0.336	0	0	0	0.336	0.336	0.336
18	0	1.078	1.078	0	0.336	0.336	1.414	1.414	1.414
19	0	1.649	1.649	0	1.078	1.246	3.063	3.063	3.063
20	0	1.352	1.352	0	1.649	2.272	4.415	4.415	4.415
21	0	1.118	1.118	0	1.352	2.488	5.534	5.534	5.534
22	0	0.434	0.434	0	1.118	2.363	5.968	5.968	5.968
23	0	0.089	0.089	0	0.434	1.616	6.057	6.057	6.057
24	0	0	0	0	0.089	0.897	5.977	5.977	5.977

Figure 155 Table Depiction of Impact on Staff Deficiency Gap

Temporary Staff Costs (SGA)

From Figures 156 and 157 below, it can be observed that the increase in the 'Time to adjust to new role' has an impact on the 'Temporary Staff Costs'. This is shown by the fact that at month 24 the actual 'Temporary Staff costs' was 0 (Sketched) and the change (comparison run) was 252K compared to a simulated run of 292K. What this implies is that if the correct number of Temporary Staff were allocated, the impact on 'SGA costs' is increased by 252K as compared to no 'Temporary staff costs' in the actual scenario in month 24.
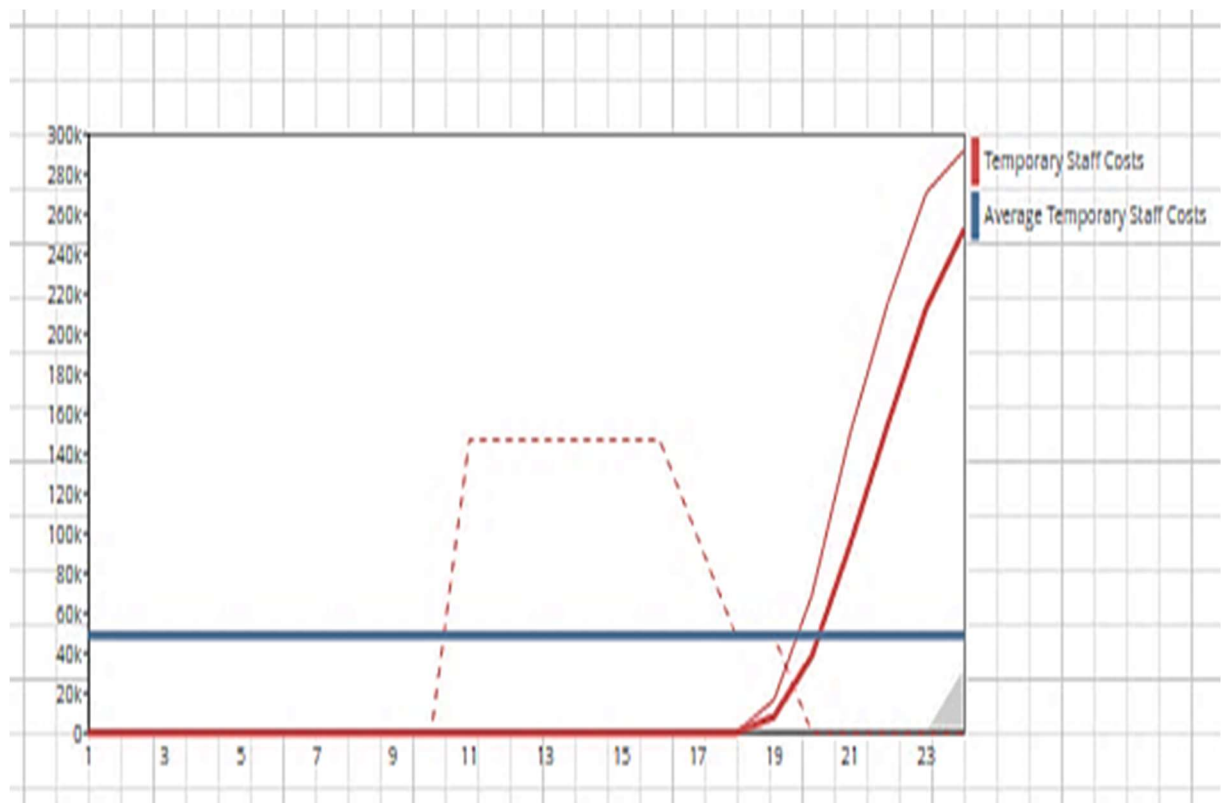

Figure 156 Temporary Staff Costs (SGA)

	Average Temporary Staff Costs			Temporary Staff Costs		
	Sketched	Simulated	Comparison Run	Sketched	Simulated	Comparison Run
1	48912	48912	48912	0	0	0
2	48912	48912	48912	0	0	0
3	48912	48912	48912	0	21.343	10.672
4	48912	48912	48912	0	21.343	16.008
5	48912	48912	48912	0	21.343	18.675
6	48912	48912	48912	0	21.343	20.009
7	48912	48912	48912	0	21.343	20.676
8	48912	48912	48912	0	21.343	21.01
9	48912	48912	48912	0	21.343	21.177
10	48912	48912	48912	0	21.343	21.26
11	48912	48912	48912	146736	21.343	21.302
12	48912	48912	48912	146736	21.343	21.323
13	48912	48912	48912	146736	21.343	21.333
14	48912	48912	48912	146736	21.343	21.338
15	48912	48912	48912	146736	21.343	21.341
16	48912	48912	48912	146736	21.343	21.342
17	48912	48912	48912	97824	21.343	21.343
18	48912	48912	48912	48912	21.343	21.343
19	48912	48912	48912	48912	16445.893	8233.618
20	48912	48912	48912	0	69157.082	38695.35
21	48912	48912	48912	0	149817.264	94256.307
22	48912	48912	48912	0	215968.623	155112.465
23	48912	48912	48912	0	270668.801	212890.633
24	48912	48912	48912	0	291914.056	252402.344

Figure 157 Table Depiction of Temporary Staff Costs (SGA)

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Appendix K APPROVED RESEARCH ETHICS FORM

Asante Gregory N.S   Registration No: 1033191

UNIVERSITY OF BEDFORDSHIRE

Research Ethics Scrutiny (Annex to RS1 form)

SECTION A   To be completed by the candidate

Registration No: 1033191

Candidate: Asante Gregory N.S

Research Institute: Business (BMRI)

Research Topic:

A SIMULATION APPROACH TO THE EVALUATION OF SHARED SERVICE CENTRES

External Funding: Own Funds and Company

The candidate is required to summarise in the box below the ethical issues involved in the research proposal and how they will be addressed. In any proposal involving human participants the following should be provided:

- clear explanation of how informed consent will be obtained,
- how will confidentiality and anonymity be observed,
- how will the nature of the research, its purpose and the means of dissemination of the outcomes be communicated to participants,
- how personal data will be stored and secured
- if participants are being placed under any form of stress (physical or mental) identify what steps are being taken to minimise risk

If protocols are being used that have already received University Research Ethics Committee (UREC) ethical approval then please specify. Roles of any collaborating institutions should be clearly identified. Reference should be made to the appropriate professional body code of practice.

The ethical issues involved in this work are

1. Obtaining confidential information from an organization and people working for its (possibly my organisation)
2. Possibly obtaining confidential information from companies and its employees with financial Shared Service Centres
3. Informed consent will be obtained by informing candidates of the type of research and that completing the survey is anonymous and data will be kept under the Data Protection Act
4. Information will be disseminated to participants by sending them an copy of the final research paper(where possible)n principally via email

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Asante Gregory N.S   Registration No: 1033191

Answer the following question by deleting as appropriate:

1. Does the study involve vulnerable participants or those unable to give informed consent (e.g. children, people with learning disabilities, your own students)?
    No X

2. Will the study require permission of a gatekeeper for access to participants (e.g. schools, self-help groups, residential homes)?
    No X (but will need consent of potential company/employees)

3. Will it be necessary for participants to be involved without consent (e.g. covert observation in non-public places)?
    No X

4. Will the study involve sensitive topics (e.g. sexual activity, substance abuse)?
    No X

5. Will blood or tissue samples be taken from participants?
    No X

6. Will the research involve intrusive interventions (e.g. drugs, hypnosis, physical exercise)?   **No X**

7. Will financial or other inducements be offered to participants (except reasonable expenses)?   **No X**

8. Will the research investigate any aspect of illegal activity?
    No X

9. Will participants be stressed beyond what is normal for them?
    No   X

10. Will the study involve participants from the NHS (e.g. patients or staff)?
    No X

If you have answered yes to any of the above questions or if you consider that there are other significant ethical issues then details should be included in your summary above. If you have answered yes to Question 1 then a clear justification for the importance of the research must be provided.

*Please note if the answer to Question 10 is yes then the proposal should be submitted through NHS research ethics approval procedures to the appropriate COREC. The UREC should be informed of the outcome.

Checklist of documents which should be included:

Project proposal (with details of methodology) & source of funding	
Documentation seeking informed consent (if appropriate)	
Information sheet for participants (if appropriate)	
Questionnaire (if appropriate)	

(Tick as appropriate)

Asante Gregory N.S   Registration No: 1033191

Signature of Applicant: Gregory Asante   Date: Aug-Sept 2011

Signature of Director of Studies: Date: 27 October 2011

This form together with a copy of the research proposal should be submitted to the Research Institute Director for consideration by the Research Institute Ethics Committee/Panel
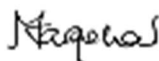
Note you cannot commence collection of research data until this form has been approved

SECTION B To be completed by the Research Institute Ethics Committee:

Comments: Gregory and I discussed his ethical form today. I am now perfectly satisfied with Gregory's access as well as any confidentiality issues, so am pleased to approve his ethics form. His topic is an interesting one and would be interesting in B2B marketing as well.

I shall be interested in the progress of this research, best wishes, Jillian Farquhar

Approved

Signature Chair of Research Institute Ethics Committee:

Date: 22.3.12

This form should then be filed with the RS1 form

If in the judgement of the committee there are significant ethical issues for which there is not agreed practice then further ethical consideration is required before approval can be given and the proposal with the committees comments should be forwarded to the secretary of the UREC for consideration.

There are significant ethical issues which require further guidance

Signature Chair of Research Institute Ethics Committee:

Date:

This form together with the recommendation and a copy of the research proposal should then be submitted to the University Research Ethics Committee

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