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Managerial Roles in Top Management Support for Information Technology and Systems Projects

Ochini Chameela Madanayake
University of Wollongong

UNIVERSITY OF WOLLONGONG

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Faculty of Engineering and Information Sciences

**Managerial Roles in Top Management Support for Information
Technology and Systems Projects**

Ochini Chameela Madanayake

**This thesis is presented as part of the requirements for the
award of the Degree of**

Doctor of Philosophy

**from
University of Wollongong**

July 2014

THESIS CERTIFICATION

I, Ochini Chameela Madanayake, declare that this thesis, submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy, in the Faculty of Engineering and Information Sciences, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. This thesis has not been submitted for qualifications at any other academic institution.

Ochini Madanayake
23rd July 2014

ABSTRACT

Top Management Support (TMS) is widely claimed to be a critical success factor (CSF) responsible for Information Technology and Systems Project Performance (ISPP). However, the literature has yet to unequivocally nominate the constituents of TMS and its varying nature in Information Technology and Systems (IT/IS) projects. Moreover, researchers have not made substantial progress towards consensus on a definition for TMS. This undesirable situation has led practitioners to a rather vague and superficial view of TMS. As such, top managers remain oblivious to optimal behaviours that ensure TMS in IT/IS projects. As a result of this lack of information, ISPP continues to suffer. This study investigates TMS in detail and its influence on ISPP in an effort to improve the awareness and help achieve better ISPP.

In order to improve understanding, thus, manageability for TMS, a definition that is both theoretically and empirically sound is needed. Managerial roles that are widely accepted in the discipline of management specify and categorise top management actions. The author argues in this thesis that, actions considered as TMS are part of a top manager's responsibility, therefore, already established in the managerial roles. A definition for TMS therefore is proposed based on the traditional managerial roles from Mintzberg's (1973) *Role-Theory*. In defining this new concept definition, the academic guidelines of Osigweh (1989) were followed. The research was further extended to investigate the effect of managerial role based TMS on ISPP. The theoretical notions were examined with empirical investigations.

A pluralistic approach with a mix of qualitative and quantitative methods was used in the investigations. The mixed-method approach consisted of a series of interviews, a focus group exercise and a questionnaire survey. The interview and the focus group methods were carried out first, in order to gather further understanding of the research context. Findings from these methods were utilised to refine the proposed concept definition for TMS and the conceptual framework. The survey method was carried out last to further investigate the refined concept definition and the conceptual framework, and was considered the more prominent of the methods, considering the relatively large number of participants and advanced statistical techniques employed.

The findings indicated that top management engagement in specific managerial roles leads to TMS. Consistent with the literature, the statistical results indicated that TMS is possibly among the top three most important CSFs for ISPP. It was also found that the need for TMS varies across a project and that certain top managers perform some roles better than the others.

The study contributes a new definition for the concept of TMS that is able to adapt to different situational circumstances by adjusting the level of abstraction. The constituents illustrated at the lowest level of abstraction identify that the Monitor, Disturbance Handler, Figurehead and Nurturing Leader play key roles in TMS. The definition also identifies that the Negotiator, Entrepreneur, Resource Allocator and Technical Expert play less important, but supportive roles in TMS. This study also contributes a new questionnaire that is statistically tested and verified. The questionnaire adheres to latest measurement trends in the literature and surpasses other tools by allowing concurrent investigation of ten managerial roles. The tested conceptual framework and the easily adaptable operational definitions are also contributions to the literature. The author further contributes an index that depicts the varying nature of TMS across an IT/IS project.

Findings from this research study promote TMS as a multifaceted concept and also as a resource that needs to be planned and managed in IT/IS projects. The findings and the contributions from this study allow access to a level of knowledge of TMS that was not previously available. Practitioners and academics can now potentially make use of this information for training purposes, planning and managing TMS in IT/IS projects.

The thesis concludes by discussing the applicability of the contributed knowledge and tools to improve ISPP and advance the area of research. Planning for TMS is advised to eliminate the competition in a multi-project environment. Training the top management, making them aware of key and supportive roles in TMS could potentially minimise issues with communication. Academics are encouraged to utilise the contributed information and tools to advance the knowledge regarding TMS and related disciplines.

DEDICATION

*I dedicate this thesis to,
the Sincere Seekers of Knowledge and the Earnest Educators,
the Heroes that fight for Justice, for the Downtrodden and for
the Fallen,
the Global Citizens working towards a United World,
&
the Good Individual who channels their inner Phoenix to rise
from the Ashes.*

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I set upon the journey towards a PhD to prepare myself for a cause which I have found appealing for some time. I wish to help underprivileged children with their education. Hence, I am eager to be part of a team that develop policies, subject material and deliver them across the world. In the process of completing a PhD, I was looking for a thorough training and experience to be able to work with and within diverse cultures. Although I expected at least 4 years of rigours academic work, nothing could have prepared me for what I experienced. As time went by, I have often pondered if the decision to pursue a PhD was the correct one. Yet, looking back, I am content about a few things. I discovered humanity across different races and faiths. I also had the opportunity to work with people from diverse cultures.

I mention Mohamed, Vivianne and my principal supervisor Peter, with much appreciation for stepping out of their comfort zone to help me in difficult times during my candidature. I thank all the good people who contributed their time and knowledge towards my data collection. I would also like to thank Ms. Amany Nuseibeh, the president of the Project Management Institute, Sydney and Mr. Chris Mansfield, the president of the Australian Institute of Project Managers, for encouraging members to participate. The Australian Computer Society is also thanked for advertising my research.

I spent years of my life in solitude, working on my thesis. I thank my friends, Aunty Sumana, Kolitha aiya, Sudewa & Vasaree for calling and inquiring how I was doing. Final vote of thanks goes to my parents *Mr. Mahinda Madanayake* and *Mrs. Jayanthi Madanayake*. My father, now deceased, would have been proud of my achievements. My mother has been calling me daily across the oceans, inquiring and listening to the ups and downs of this journey I chose for myself. Thank you, dear *thaththa* and *amma* for your encouragement and for instilling the importance of education in my mind from a young age.

ABBREVIATIONS

Abbreviation	Meaning
TMS	Top Management Support
IT	Information Technology
IS	Information Systems
ISPP	Information Technology and Systems Project Performance
CSF	Critical Success Factor
UOW	University of Wollongong
NGT	Nominal Group Technique
PMI	Project Management Institute
AIPM	Australian Institute of Project Managers
ACS	Australian Computer Society
CEO	Chief Executive Officer
CIO	Chief Information Officer
COO	Chief Operating Officer

ABBREVIATIONS RELATED TO STATISTICAL TECHNIQUES

Abbreviation	Meaning
KMO	Kaiser-Meyer-Olkin (measure of sampling adequacy)
SPSS	Statistical Package for the Social Sciences
AMOS	Analysis of Moment Structures
EFA	Exploratory Factor Analysis
CFA	Confirmatory Factor Analysis
SEM	Structural Equation Modelling
CR	Critical Ratio
AVE	Average Variance Extracted
GFI	Goodness of Fit
AGFI	Adjusted Goodness of Fit
RMSEA	Roots Mean Square Error of Approximation
SRMR	Standardised Root Mean Residual
CFI	Comparative Fit Index
NFI	Normed Fit Index
TLI	Tucker Lewis Index
PGFI	Parsimony Goodness-Of-Fit-Index
DF	Degrees of Freedom
CMIN/DF	A ratio between Chi-square and Degrees of Freedom
P	Probability

LIST OF RELATED PUBLICATIONS/CONFERENCE PRESENTATIONS

Madanayake, O., Gibson, P. (2014). *Taking the mystery out of the concept of top management support: The context of information technology projects*. Cambridge Business & Economics Conference. University of Cambridge. Cambridge. England

Madanayake, O., Gibson, P. (2013). *An investigation into the concept of top management support in information technology projects: A managerial role perspective*. Australian Institute of Project Managers (AIPM).National Conference. Perth. Australia

Madanayake, O., et al. (2009). *What we need: project managers' evaluation of top management actions required for software development projects*. European Conference on Information Systems. Verona. Italy. In ECIS (pp. 1247-1258).

Madanayake, O., et al. (2009). *Work that relationship: Investigating top management support via top and project manager relationships in software development projects*. Pacific Asia Conference on Information Systems. Hyderabad. India. Paper 66

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CHAPTER 1

1 THESIS INTRODUCTION

1.1 Chapter Introduction

This thesis reports a research study that investigated the concept of Top Management Support (TMS) and its effect on Information Technology and Systems Project Performance (ISPP). The interest in the research was founded on the concerns stated with regard to ISPP in both industry (Standish, 2009) and academic literature (Meredith & Mantel, 2011). Top management support is largely identified in the literature as one of the factors that critically affect ISPP. However, considering the large numbers of projects that reportedly underperform (Savolainen et al., 2012; Meredith & Mantel, 2011), it is questionable whether the top management realises the importance of their support. In-depth information with regard to the nature of TMS and its influence on ISPP will assist the top managers to understand the value of their contribution.

The literature review in this study demonstrates that there is considerable academic interest in TMS, but definitive studies that employ theoretical and/or empirical rigour are rare. The body of knowledge could benefit from a detailed study illustrating the absolute effect of TMS on ISPP. Noting this, the author of this thesis employs a bottom-up approach for the research study by first examining the concept of TMS. The definition for the concept of TMS is based on the managerial roles (Mintzberg, 1973) from the discipline of general management. A mixed-method approach that utilised both qualitative and quantitative methods was employed to investigate the changing nature and levels of TMS in an IT/IS project and the influence TMS has on ISPP.

This chapter provides an overview of the research study that was carried out. The organisation of the chapter is as follows. Section 1.2 discusses the research background and justifies the need of a research study such as the one reported in this thesis. Section 1.3 states the research questions and the hypotheses and is followed by Section 1.4 on the research methodology. The thesis structure is presented in Section 1.5 followed by Section 1.6 that states the research scope. Sections 1.7 and 1.8 list research contributions and limitations respectively. The chapter conclusions are available in Section 1.9.

1.2 Research Background and Justification

The importance of Information Technology (IT) and Information Systems (IS) for business as well as personal use is indisputable. Examples of personal use include health care, education, travel, entertainment and managing personal finances. In the business world, cutting edge information obtained via IT and IS provides strategic advantage (Johnson et al., 2011). In a broader context, for example state security and warfare, reliable IT infrastructure and IS may determine the difference between life and death. Given such importance, it is concerning to find reports of low performance with regard to the projects that undertake IT/IS endeavours (Savolainen et al., 2012; Meredith & Mantel, 2011).

The CHAOS report from the industry (Standish, 2013; Standish, 2009) expresses concern regarding the low ISPP as do many academic reports (Gingnell et al., 2014; Savolainen et al., 2012; Meredith & Mantel, 2011). These reports point a finger at the Critical Success Factors (CSFs) for ISPP. Researchers argue that when CSFs are not managed, they take the project down a perilous path, leading to failure (Williams & Ramaprasad, 1996). The importance of TMS for better ISPP has been established by previous researchers (Elbanna, 2013; Alsudiri et al., 2013; Boonstra, 2013; Young & Poon, 2013; Loonam & Donagh, 2005).

Top management support has almost always been referred to in the literature as one of the most important of the CSFs (Young & Poon, 2013; Zwikaël 2008a-b). Advice in the literature is to ensure TMS for the project in order to secure safe passage to

success (Young & Jordan, 2008). The literature indicates that there may be variations in the level and the nature or type of TMS during a project (Elbanna, 2013). Such subtle information however is rare to find in the existing body of knowledge. Academics that identified such gaps call for in-depth investigations of TMS and its impact on ISPP (Boonstra, 2013).

In contrast to this advice, the available literature appears to explore TMS at a surface level. Hence, the literature falls short of projecting an optimal view of TMS and is yet to appreciate what underlies TMS. There is also a lack of coherent literature where ISPP has been studied from the point of view of a single overarching concept such as TMS (Young & Poon, 2013). A study designed to investigate such demands should investigate not just TMS, but its constituents, the level and type variations during a project and finally the impact TMS has on ISPP. Such information is currently not available in the literature. Moreover, a consensus on the definition for TMS is yet to be established. This leaves a large void in the understanding on the concept of TMS.

Therefore, one could argue that the effect TMS has on ISPP has not yet been convincingly established. It is therefore assumed that this lapse of information in the literature is causing a lag of TMS in an IT/IS project context. Due to the underdeveloped body of knowledge, even the top managers with good intentions may fall short of rendering the necessary support at the hour of need. As such, the necessity of a detailed study that investigates the concept of TMS, and makes the effort to evaluate the effect TMS has on ISPP is *justified*.

This thesis reports a research study carried out to explore the missing elements in the literature that were described above. A definition for the concept of TMS is proposed based on popular theory from the discipline of general management. This novel definition utilises the widely accepted top management roles introduced by Mintzberg (1973). The research is advanced further with the use of empirical methods to investigate and evaluate the effect of managerial role based TMS on ISPP. The main aim of this research is to provide both top managers and project managers with a better understanding of the concept of TMS, and the influence TMS

has on ISPP. Findings from this study are expected to help practitioners to achieve better ISPP in the future.

1.3 The Research Question(s) & Hypotheses

Section 1.2 brought forth gaps in the literature that were assumed to be contributory factors for IT/IS projects not achieving desirable levels of performance. In order to redress these gaps in the literature, the concept of TMS and its effect on ISPP were investigated using a managerial role perspective in this study (Mintzberg, 1973). The research questions and the hypotheses for this research work are stated below.

The main research question for this study is:

“Does top management engagement in managerial roles help to achieve top management support, which in turn helps to improve the performance of IT/IS projects?”

A conceptual framework was utilised to illustrate the concepts being studied. The interview and the focus group methods provided better understanding regarding the research context. As a result, the conceptual framework was refined and the hypotheses were stated (Chapter 5, Section 5.4), the research question was supplemented with four sub-questions (Chapter5, Section 5.5).

The four sub-questions identified are as follows:

1. How does top management engagement in managerial roles relate to top management support in IT/IS projects?
2. Which top management roles contribute largely towards top management support?
3. How is managerial role engagement spread across project management processes?
4. Are certain roles more effectively carried out by certain top managers than by the others?

The hypotheses that were stated are:

H1: Top management carrying out Interpersonal roles leads to Top Management Support

H2: Top management carrying out Informational roles leads to Top Management Support

H3: Top management carrying out Decisional roles leads to Top Management support

H4: Top management carrying out the Technical role leads to Top Management Support

H5: The positive association between top managers carrying out managerial roles and TMS is moderated by the position of the top manager.

H6: The positive association between top managers carrying out managerial roles and TMS is moderated by the project management processes.

H7: Top management support is important for information technology/systems project performance

1.4 Methodology

This section outlines the methodology utilised for the research study reported in this thesis. Chapter 3 provides a more comprehensive explanation of the research methodology by further detailing the aspects outlined in this section. Previously, in Section 1.2, gaps in the literature were highlighted and the need for a study that would bridge these gaps was justified. This study was designed to fill these gaps and employs theoretical and empirical rigour.

A thorough literature review revealed that most previous studies refer to TMS as supportive actions based on the behaviour of the top management. A popular classification in the discipline of management for top management's actions is Mintzberg's (1973) managerial roles. A comparison between the actions from definitions of TMS and Mintzberg's (1973) managerial roles revealed an apparent similarity. Hence, it was assumed that actions that lead to TMS have already been

identified as part of a top manager's work, and thus included in the roles from management theory. This research study is designed based on this *assumption*.

A definition for the concept of TMS is proposed which suggests that top management engagement in managerial roles leads to TMS. The research conceptualisation (Chapter 2, Section 2.8) states the initial research question and illustrates the preliminary conceptual framework. The next step in the research design was to further investigate the definition for the concept of TMS, the research question and the framework using empirical methods.

A pluralistic approach (Venkatesh et al., 2013) was utilised for the research with a mix of qualitative and quantitative methods. In the first instance, 12 interviews were planned and were carried out. The approval to carry out the interview method was obtained by the relevant ethics committee. The interviews were recorded, transcribed and were subjected to a qualitative analysis. Participants' impression of TMS supported the research conceptualisation. Top management support was considered to be supportive actions carried out by the top management. Sixteen actions that were considered as TMS were identified. These actions were compared with the actions from the managerial roles from the management discipline (Mintzberg, 1973; Lau et al., 1980). Ten roles from theory (Mintzberg's, 1973; Lau et al., 1980) were found to have similar actions. Noting these findings the second qualitative method planned for the study was carried out.

The focus group method was carried out after obtaining an extension on the previous ethics protocol. The Nominal Group Technique (NGT) was employed to facilitate the focus group. The ranking system utilised in the NGT assisted in eliciting the top five answers to the questions asked of the focus group participants. Further analysis by the author of this thesis revealed that the answers provided were a close match with the descriptions of six of the managerial roles (Mintzberg, 1973). The information elicited from the interview and focus group methods provided further information in relation to the context of this research study.

Noting the findings from the qualitative methods, the conceptual framework was refined and the hypotheses were stated. The research question was revisited and was

supplemented with four sub-questions. The operationalisation of the constructs with operational definitions and reflective measures were completed next. The ethics committee approval was obtained and the survey method was implemented. The data collected were subjected to rigorous statistical analysis tests. Reliability and validity tests were also carried out to ensure the robustness of the research.

Findings from the literature review and all of the mixed methods were compared where relevant. Prominence was given to the survey method due to the relatively large number of participants and the rigour employed with the use of statistical techniques. The findings were used to test the hypotheses and answer the research questions. Thereafter, research conclusions were made, limitations were identified and future research directions were suggested. The steps mentioned above are listed in Table 1.1 below.

Table 1.1: Outline of steps and outcomes in the adopted methodology

Step / Method in the Research Design	Outcome / Status
Literature Review	Call for attention on the relationship between TMS and ISPP was recognised. Information regarding TMS was inadequate for in-depth investigations on ISPP. Behaviour based TMS was found to be popular, and was selected for this study. Recognised that actions from behaviour based TMS in the literature could be matched with the actions from the managerial roles (Mintzberg, 1973; Lau et al., 1980). A new definition for the concept of TMS was suggested. Research question was compiled and the preliminary conceptual framework was drawn.
Ethical approval for Interviews	Protocol 2007/2282 was obtained
Administer Interview Method	Sixteen supportive actions carried out by the top management were elicited. Interview participants referred to these actions as the manner in which the top management provided support for their IT/IS projects. These 16 actions were matched with the actions from ten managerial roles (Mintzberg, 1973; Lau et al., 1980).
Ethical Approval for Focus Group	Protocol 2007/2282 was extended
Administer Focus Group Method	Answers provided to the two questions by the participants were further analysed to find that they match the descriptions of six managerial roles (Mintzberg, 1973).
Refine Research Conceptualisation	The conceptual framework was refined and the hypotheses were stated. Research question was supplemented with four sub-questions.
Operationalisation	Operational definitions for the constructs were introduced and reflective measures were created.
Survey Design	A questionnaire survey was designed. An 11 point ratio Likert scale was used to gather data.
Ethical Approval for the Survey	Protocol HE13/291 was obtained
Administer the Survey Method	117 usable responses were obtained.
Statistical Analysis	Exploratory and Confirmatory factor analysis exercises were carried out. Causal relationships were determined with Structural Equation Modelling.
Validity and Reliability Tests	Inter-coder and Intra-coder analysis, Content Validity, Face Validity, Cronbach's Alpha, Convergent validity, Discriminant validity, Common method bias tests were carried out.
Address the Research Conceptualisation, finalise Concept Definition for TMS	The hypotheses were addressed. The research questions were answered. The definition for the concept of TMS was finalised.
Interpret Findings	Contributions and limitations were stated. Future research directions were suggested.
Draw Conclusions / Conclude Thesis	Conclusions with reference to the mixed-method approach were stated and the Thesis was concluded

1.5 The Thesis Structure

The thesis is designed to contain eight chapters. Given below is the name of each chapter with a brief description of the contents. The thesis structure is graphically represented in Figure 1.1 below.

Chapter 1 (Thesis Introduction) – This chapter provides an overview of the research that is being reported in this thesis. The information presented in necessary detail include, the research background, justification for the research and the research methodology. The research questions, hypotheses, research scope, contributions and limitations are also listed to provide a comprehensive overview of the research that was undertaken.

Chapter 2 (Literature Review) – This chapter provides the theoretical background for this research study. The literature from both the parent and immediate disciplines (Perry, 1998) are reviewed and are logically organised. Hence, the literature on IT/IS projects, top management, CSFs are reviewed along with TMS, managerial roles and ISPP. The gaps in the literature related to the research context are highlighted. New research is suggested to bridge these gaps. The preliminary research question, the conceptual framework and a new definition for the concept of TMS are proposed.

Chapter 3 (Methodology) – This chapter details the research methodology. Research methods are discussed and the justification for utilising a mixed-method approach is stated. Each method is explained comprehensively, featuring the participant selection, data collection, analysis and storage. The reliability and validity tests carried out to ensure research rigour are also mentioned.

Chapter 4 (Interview and Focus Group Methods) – This chapter explains in detail both the interview and the focus group methods. The design, participant selection, material used, ethical considerations, implementation, analysis and the findings pertaining to each of these methods are explained. A comparison of the findings from the two methods is also presented.

Chapter 5 (Refined Concept Definition and Conceptualisation) – This chapter presents the process of refining the preliminary concept definition for TMS, the conceptual framework and the research question. The findings from the literature review, the interviews and the focus group are all consulted to bring forth changes that are incorporated for further testing with the survey method.

Chapter 6 (Questionnaire Survey Method) – This chapter explains the use of the questionnaire survey method in this study. Prerequisites for the survey method that include construct definitions and measures for the constructs being studied are presented. This is followed by the questionnaire design and the implementation of the questionnaire survey method. The ethical considerations pertaining to the survey method are also discussed.

Chapter 7 (Data Collection, Preparation and Analysis) – This chapter explains the steps and techniques used for the data collection, preparation and the analysis. In further detail, the steps followed to collect data from well informed respondents with minimal risks to them are discussed. Also discussed in detail are initial manual tests, deletion of cases with discrepancies, application of remedies for missing values and coding utilised in preparation of the data. The discussion on the data analysis presents preliminary manual tests, descriptive statistics, exploratory factor analysis, confirmatory factor analysis exercises, and the use of structural equation modelling for causal analysis. The reliability and validity tests employed to ensure academic research rigour are also discussed.

Chapter 8 (Conclusions, Contributions and Limitations) – This chapter presents the final research conclusions, describes the contributions of the study and states the limitations. In doing so, the hypotheses are addressed and the research questions are answered. Also finalised and presented is the definition for the concept of TMS. Suggestions for future research directions are made with the intention of encouraging future researchers.

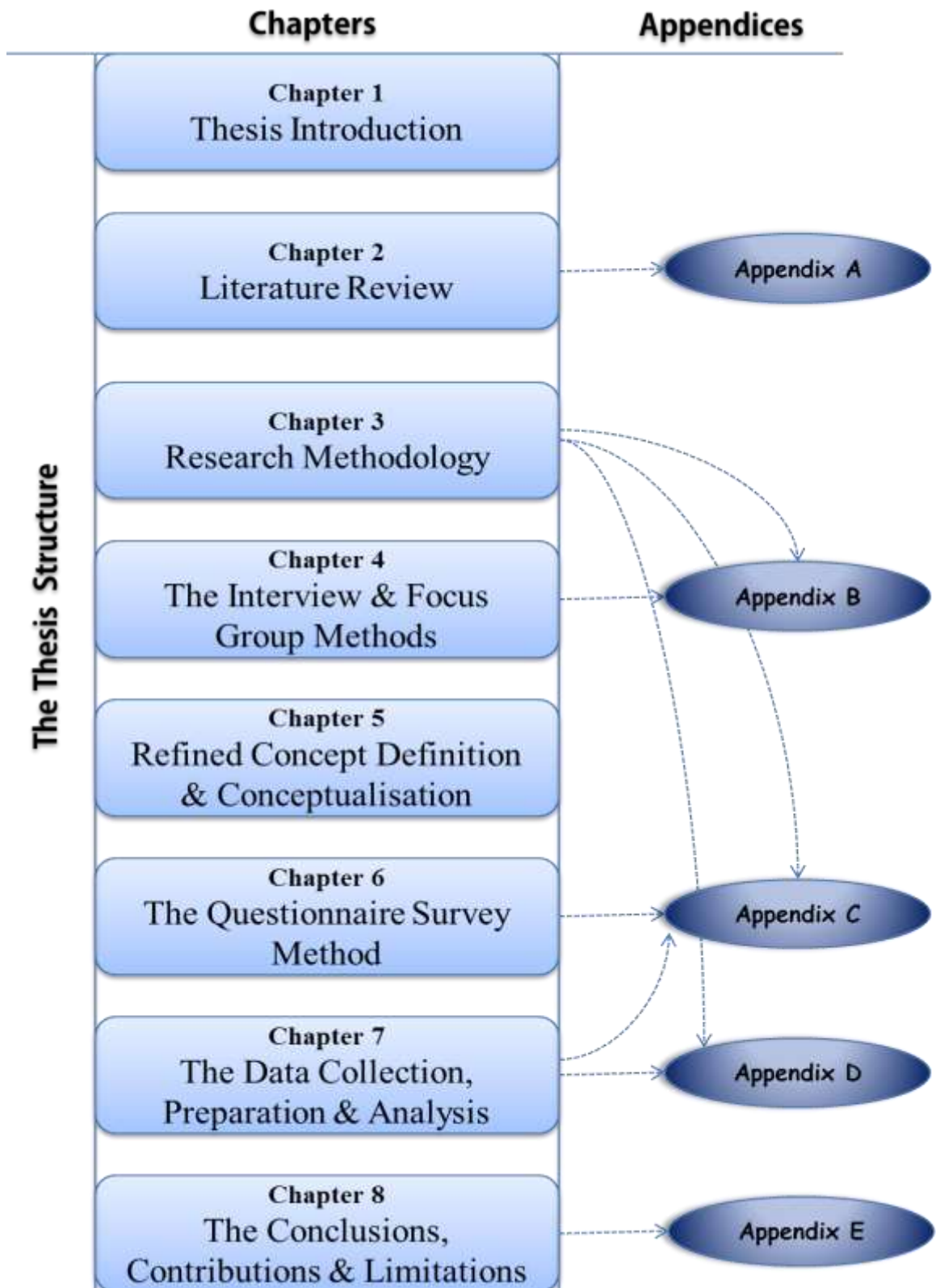


Figure 1.1: Graphical representation of the thesis structure

1.6 The Research Scope

The research scope was defined in terms of how the constructs being studied were identified or recognised in this thesis. Anything additional was considered as outside of the scope.

Top management support is investigated in this study as actions that arise from the *behaviour* of the top management. Classifications explaining the behaviour of the top management are available in previous literature. Top management support is just one organisational expectation from the top management among many. Therefore, TMS was assumed as part of the work carried out by the top manager. As such, TMS is expected to be embedded in the classifications given in the literature.

The managerial roles from Mintzberg's (1973) *role-theory* (Leader, Liaison, Figurehead, Disseminator, Monitor, Spokesman, Entrepreneur, Disturbance Handler, Resource Allocator, Negotiator) were selected as the preferred classification of a top manager's work. Two new additions to these roles were proposed following the literature review and the empirical investigations. These two roles are the Technical Expert role by Lau et al., (1980), that was identified in subsequent literature and the Nurturer role that was elicited from the interview method. The study in this thesis assumed that the top management engagement in these managerial roles leads to TMS.

Information technology/systems project performance in this study is identified with the project's product performance and process performance (Nidumolu, 1995). The relationship between TMS and ISPP is expected to be influenced (moderated) by the position of the top manager and the project management processes.

The project management processes are identified as Initiation, Planning, Execution, Monitoring & Control and Closure (PMBOK®Guide, 2008). The project management processes are used in conjunction with other constructs to identify the varying need for TMS across a project. According to the literature, top management has multiple levels. Mintzberg's (1973) classification for the levels within the top management i.e. Internal and External, introduced with the *role-theory* was selected

for this study. Hence, for the purpose of the study reported in this thesis, senior managers consulted for support on IT/IS projects were accepted as top managers.

Other decisions that were important to the scope of the research study are as follows. The unit of study is an IT/IS project. Data on completed projects were collected regardless of the level of performance in order to investigate TMS from across all of the project management processes. Participants selected were either project managers or middle managers who carried out IT/IS projects.

1.7 Research Contributions

A new concept definition for TMS – A concept definition for TMS that is based on top management's work roles has been defined and tested. This contribution fills a gap in the literature that existed due to the lack of a theoretically defined and empirically investigated concept definition for TMS. This novel definition identifies the constituents of TMS and therefore introduces the possibility to better manage TMS.

A new and validated questionnaire to measure managerial roles, TMS and ISPP – A questionnaire was designed with reflective measures adjusting to the current trends in the literature. Previous literature offered questionnaires to test only a few of the roles being investigated in this study. Moreover, previous questionnaires are engaging formative measures that have recently been questioned for their suitability for research. The questionnaire compiled as part of this thesis study was tested utilising rigorous statistical techniques. This questionnaire is easily adaptable and can even be applied to contexts other than IT/IS projects.

A validated research framework and verified operational definitions – This research utilised a conceptual framework for illustrating the concepts and the relationships between the concepts that were being studied. The framework was tested and contributed to the body of literature as a form of reference for future research. The operational definitions may be utilised for similar contexts. These

operational definitions are also easily adaptable to different contexts. Hence, future researchers are encouraged to refer and/or adapt as required.

A guide to the most important managerial roles for TMS – The new concept definition for TMS based on the managerial roles made it possible to gauge which roles are of more importance for ISPP. Hence, *key roles* (Disturbance Handler, Monitor, Figurehead, Nurturing Leader) and *supportive roles* (Technical Expert, Negotiator, Resource Allocator, Entrepreneur) for ISPP were revealed as a result of the study reported in this thesis. Acquiring such knowledge would definitely prove to be useful as attention could be exercised on more important roles than on the others. This information may also be beneficial for project and organisational training to educate practitioners.

An index depicting the demand for managerial role engagement across the project management processes – The research study identified that the need for TMS was variable in level and type across an IT/IS project. Thus, managers need to be aware of this and engage in managerial roles accordingly. The varying need for TMS in a project was investigated using the project management processes as a moderator. As it is needed for better ISPP, TMS needs to be considered as a resource for projects like any other. Hence, it is recommended that the varying nature in the need for managerial role engagement be considered during resource planning. Such planning would help a multi-project environment to function seamlessly, without having to compete constantly with each other for TMS.

1.8 Research Limitations

1. The findings may be limited to the sample size.

Two qualitative methods and one quantitative method were carried out in this research study. Twelve interviews were carried out with 12 participants in the first qualitative method. The second qualitative method was a focus group with 5 participants. The quantitative method was a questionnaire survey and was supported by 117 participants. The author acknowledges that these are only representative samples when considering the vast number of IT/IS projects that may have been carried out concurrent to the investigations made in this study. The findings of this study therefore, may be limited to the samples selected.

2. The research was carried out on projects from an IT/IS context.

The findings presented in this thesis may not be common to all contexts. As an example, research carried out on building construction projects may find different managerial roles as Key and Supportive roles instead of the ones identified in this work. The author of this thesis acknowledges this and encourages adapting this research idea to other contexts and to compare the findings.

3. Concept definition for TMS is based on a managerial role perspective. It is appreciated that there may be other means to define TMS.

This study hypothesised and presented with supporting evidence that managerial role engagement leads to TMS. The definition for the concept of TMS (Section 8.3), therefore, is based on managerial roles. It is acknowledged that there may be other ways to define TMS.

4. Content validity and Face validity tests were carried out in place of a pilot survey due to participant, time and cost constraints.

This study adhered to a mixed-method approach that utilised three methods. Once the respondents participated in one method, they were not eligible to participate in another. Hence, in order to preserve participants for the final survey and also due to the time and costs involved in duplicating the survey method, thoroughly executed content and face validity tests replaced a pilot survey.

1.9 Chapter Conclusions

This chapter presented an outline of the research that was carried out. The purpose of this chapter is to facilitate the readership of this research study that addressed a complicated research problem.

In this chapter, the background to the research problem was discussed and the need for the research study reported in this thesis was justified. The research questions and the hypotheses were introduced. The methodology was outlined while the steps that were followed were illustrated in a tabular format to improve clarity. The scope of the study was stated in relation to the constructs used in the research. The research contributions and limitations were also listed.

As per the thesis structure presented above (Section 1.5), each chapter describes in detail, a portion of the work carried out in this research study. The chapter that follows is the Literature Review, and is responsible for laying the theoretical foundation for this research study.

CHAPTER 2

2 LITERATURE REVIEW

2.1 Chapter Introduction

Information Technology and Systems Project Performance (ISPP) is claimed to be below expectation and concerns are reported (Gingnell et al., 2014). The blame generally falls on project managers for not having effectively managed the Critical Success Factors (CSFs). Despite the convention that managing CSFs is the route to better ISPP, a close look at the literature shows that there is a lack of depth in knowledge. For example, research studies utilising a fine-grained approach to elicit detailed information about each CSF and its impact on project performance are still rare. As a result, most literature available at present has only gone as far as to advise securing CSFs for IT/IS projects to ensure a better outcome. The complexities with and within CSFs are rarely addressed. The literature does however identify some CSFs as more important than others. Top Management Support (TMS) is one such profoundly important CSF (Young & Poon, 2013).

Prior research suggests that ISPP tends to be better when TMS is ensured. Some theoretical development pertaining to this view is available in the literature. However, the constituting elements for TMS and how these elements contribute towards TMS and project performance have not yet been established. Hence, the research reported in this thesis is employed to investigate TMS and the causal relations towards ISPP in more depth.

This chapter explores knowledge on parent and related subject disciplines in order to lay the foundation and conceptualise the research (Perry, 1998). The next Section 2.2 discusses the approach taken and the resources utilised for this literature review. Section 2.3 presents information on IT/IS projects and their management, while the

CSFs are explained in Section 2.4. In Section 2.5, information on the top manager and the nature of managerial work is presented. Section 2.6 that follows is utilised to propose a definition for the concept of TMS, following this, Section 2.7 presents notions on the project outcome. Section 2.8 presents the research conceptualisation. The chapter is concluded with Section 2.9.

2.2 Approach and Resources Utilised

A literature review is instrumental in understanding the progression of a particular field of interest over the past years and taking note of any shortfalls. Such information is helpful in conceptualising future research and planning contributions to advance the body of knowledge. Scholars call for adequate structuring of information from the parent and immediate subject disciplines (Perry, 1998). Inclusion of guiding theory, frameworks or prescriptions is also advised to add rigour to the planned future research (Webster & Watson, 2002). This chapter describes the gradual build up towards the conceptualisation of the research to investigate the effect of managerial role based TMS on IT and IS projects.

Information on TMS, managerial roles and project performance were consulted as the immediate subject disciplines. The parent disciplines, IT/IS project management, CSFs and managerial work were also referred to and drawn from as per the advice by Perry (1998). To add rigour to the research, the established conventions of Rockart's (1979) *critical success factor approach*, Mintzberg's *role-theory*, and Osigweh's (1989) *guidelines for concept definition* were all utilised. This information was gathered using various online and University of Wollongong's (UOW) library resources.

While there is an abundance of information, care was taken to find closely related information from reputable sources (Fisher et al., 2007). For example, when in doubt about a particular conference or journal article, the author referred to the ranked conference and journal lists from the Australian Research Council. Google Scholar was also used as a search engine with the article title to see if there were valid citations. Books and digital theses from the library were also borrowed when needed.

The online sources utilised included the UOW's databases such as ProQuest Central, Scopus, Science Direct, JSTOR, ABI/INFORM Complete, Web of Science etc. Google scholar was also utilised and at times was more accurate than the UOW's search engine in pointing out the exact database where a particular resource was available. These online sources were summoned using key words entered as search criteria.

It is seldom that all relevant material contains the exact keywords being researched. As a remedy for this, several related key words were tried separately. For instance, when searching for TMS, these other terms were also tried: 'management support', 'executive support', and 'senior management support'. In addition, it was discovered that some authors use top management: support, involvement and commitment interchangeably (Felekoglu & Moultrie, 2014), hence separate searches were carried out as appropriate. This approach was also utilised for all other relevant online searches. The literature reviewing is a recursive exercise and as advised by scholars (Pautasso, 2013), was repeated a number of times. The material collected was read and observations were made.

The organisation of the chapter is important as it should assist a reader to traverse through the observed information gaining an understanding of the current situation to the point where new developments are suggested. The logical order in which the information is presented is depicted in Figure 2.1 below.

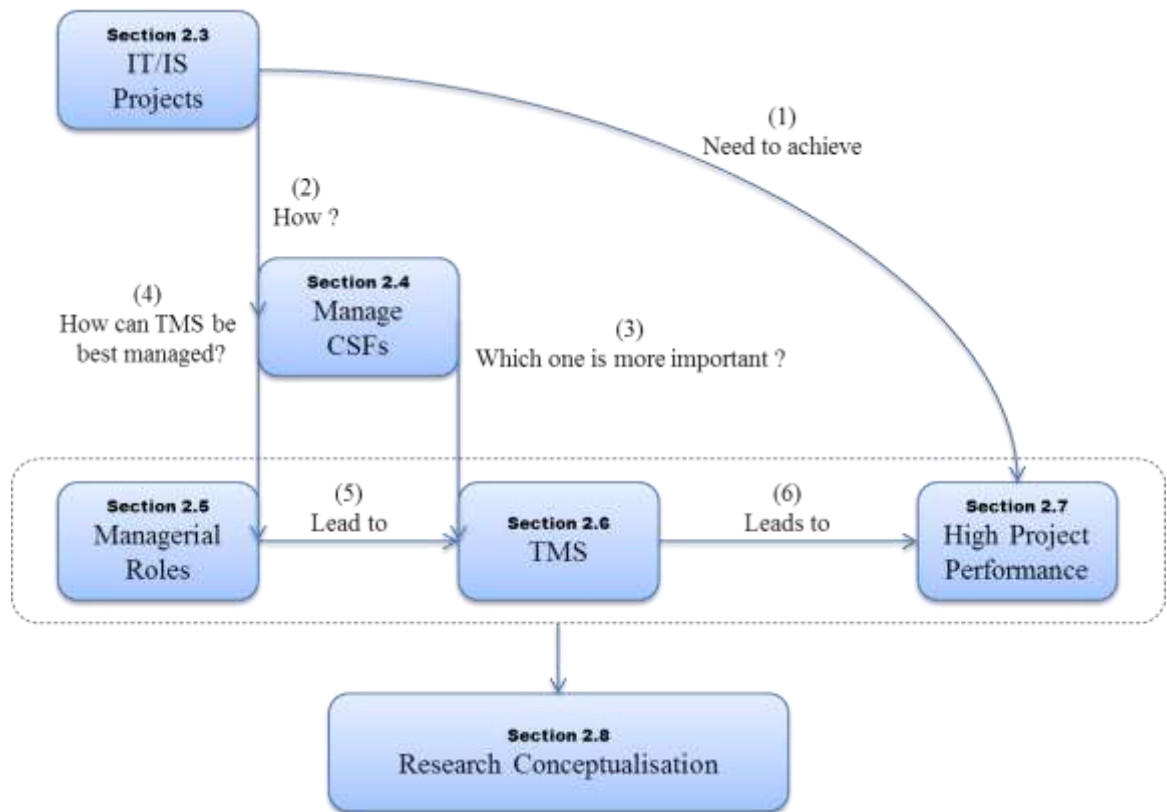


Figure 2.1: Logical organisation of information pertaining to the research study

2.3 Information Technology/Systems (IT/IS) Projects and Managing Them

2.3.1 IT/IS Projects

Computers were introduced to the business world in the mid twentieth century. They revolutionised the work environment, although at first considered to be just faster calculating machines than abacuses and calculators; they evolved into multi-tasking machines which assisted in increasing the overall efficacy of many tasks. Computers have joined forces with other related technologies and are known as constituents of IT. Information technology is defined in the Oxford dictionary for media and communication as “a synonym for computers and computer networks but more broadly designating any technology that is used to generate, store, process, and/or distribute information electronically.....” Chandler & Munday (2011). Business organisations now depend heavily on computerised systems built with business logic for their everyday work. Hence, giving rise to “IT enabled business solutions” Benbasat & Zmud (2003, p. 184) known as information systems (IS).

Invent of such technology brought the possibility of better products and services. Developing these products and services and selling them has become a lucrative business in the present day. The tasks involved in these endeavours are usually undertaken as IT or IS projects. A project is defined as “*a temporary endeavour undertaken to create a unique product, service or result*” PMBOK® Guide (2008, p. 5). Engaging the above definitions, IT and IS projects are defined for the research reported in this thesis as follows:

An IT Project is *a temporary endeavour undertaken to create a unique product, service or result that involves generating, storing, processing, and/or distributing information electronically using computers and computer networks.*

An IS project is *a temporary endeavour undertaken to create a computerised business solution that may generate, store, process and/or distribute business information electronically via computer networks.*

Hence, IT/IS projects may include, but not be limited to projects that undertake software and related infrastructure: development, implementation, customisation, upgrading, migration and/or maintenance.

Compiling a project involves breaking work into manageable and related clusters and handing over responsibility for this work cluster to a project manager. This is referred in the literature as projectification (PMBOK® Guide, 2008; Geraldi, 2008; Midler, 1995). Projects inherit certain aspects from the organisation (Bourne, 2006; Cicmil & Hodgson, 2006; Shenhar & Dvir, 1996); hence, their conduct may differ from one organisation to the other (Rockart, 1982). A project is expected to traverse through five project management processes during its life span (PMBOK® Guide, 2008). Those are project Initiation, Planning, Execution, Control-Monitoring and Closure. Each phase has different set of activities and requirements from stakeholders (PMBOK® Guide, 2008).

Projects involve much intricacy and need to be managed to stay inside the scope, under budget and on time. As well as inheriting all the concerns of a standard project,

IT/IS projects may have further complexities that are not limited to the following: volatile requirements, competing ideas of highly educated team members, managing knowledge from multiple domains, rapid evolution of tools and catering to multiple stakeholders (Larson & Gray, 2011; Hartman & Ashrafi, 2002). IT/IS projects also involve vast amounts of finances. Some reasons for such expenses are the costs involved with: the criticality of work, unique human expertise, advanced machinery and use of certain software. With all these complexities, the risk of failure is high (Meredith & Mantel, 2011; Kearns, 2007; Schwalbe, 2007; Sutterfield et al., 2006; Nah et al., 2001; Reel, 1999). Appreciating the intricacies of projects, professional bodies have developed a body of knowledge to assist professionals manage projects.

2.3.2 Managing IT/IS Projects

“Project management is the application of knowledge, skills, tools and techniques to project activities to meet project requirements. Project management is accomplished through the application and integration of the project management processes of initiating, planning, executing, monitoring and controlling. The project manager is the person responsible for accomplishing project objectives” (PMBOK® Guide, 2004, p. 8).

The profession of project management is much highlighted in the present day. Especially in the limelight are IT and IS projects due to the intricacies and monetary value they involve. Recent business trends have made delivery on time, within budget and inside scope an iron triangle to which projects need to adhere. Appreciation of additional criteria to be met is not uncommon and will depend on the contractual agreements with the stakeholders (Savolainen et al., 2012). Meeting such expectations is the responsibility of the project manager and she/he needs experience and skill to succeed.

The discipline of project management crosses the boundary into general management. Therefore, project managers are expected to possess attributes defined for general managers such as strategic planning, accounting and supply chain management as well as attributes required of a project manager such as the knowledge of project environment and interpersonal skills (PMBOK® Guide 2008,

Maguire & Redman, 2007). Some researchers specify that project managers are expected to be technically aware, yet good at communication and people skills (Maguire & Redman, 2007). There is evidence to support the fact that top management prefers project managers to have transformation style of management with technical ability (Thite, 2000). Previous studies appreciate project managers who can develop and deploy personal competences and good judgement in frequently changing and challenging circumstances, rather than project managers who dwell on the traditional disciplines (Augustine et al., 2005). All of these are preferred attributes for a project manager and are expected to be helpful in managing the factors that are critical for project performance.

Performance of IT/IS projects are reported to be still lower than expected (Savolainen et al., 2012; Meredith & Mantel, 2011). Mismanagement of CSFs is commonly blamed for this outcome (Ram et al., 2013). Since a project is profoundly influenced by CSFs, a deeper understanding of these factors is necessary. The next section looks at CSFs in some detail.

2.4 Critical Success Factors (CSFs)

2.4.1 An Introduction to the CSF Approach

The CSF approach is a popular research area and has accumulated some worthy literature. There are debates as to the exact origin of the CSF approach (Belassi & Tukel, 1996; Wasmund, 1993) but, there is agreement that Rockart (1979) pioneered the CSF approach for “*project management and IS implementation*” (Remus & Wiener, 2010, p. 29). The CSF approach could be applied to find the factors that are important for success in many contexts such as the CSFs for an individual, CSFs for a project and/or organisation (Williams & Ramaprasad, 1996; Belassi & Tukel, 1996; Rockart, 1982). According to Rockart (1982, p. 4) CSFs are “*those few key areas of activity in which favourable results are absolutely necessary for a particular manager to reach his or her goals*”. Hence, *CSF approach* is utilised to draft a solution to a business problem by concentrating on achieving optimal results in the key areas of activity identified (Wasmund, 1993). Although CSF approach is acclaimed as an academic concept (Butler & Fitzgerald, 1999; Williams & Ramaprasad, 1996), there is much interest from industry practitioners as well

(Standish, 2013; Standish, 2009). In fact, IT/IS project management is one area of research where academics and practitioners frequently refer to each other's research findings.

The importance of CSFs in the discipline of IT/IS project management is evident from the large quantity of literature found. This may be due to the fact that CSFs in IT/IS projects are considered to be related to the fundamentals of project management techniques (Reel, 1999). It is advised that the CSF approach be initiated at IT/IS project definition by identifying the CSFs for that project (Wasmund, 1993). The importance of a particular CSF however, may vary during various stages of a project (Bassellier et al., 2001). The importance of CSFs may also vary based on the organisation and the type of the IT/IS project (Fortune & White, 2006). Some CSFs may even influence each other. Hence, it is clear that there are complexities involved with the CSF approach.

2.4.2 An Observation on the Types of Existent CSF Research

Possibly due to the identification of the above mentioned complexities, research on CSFs has seen a few different waves¹ since Rockart (1979). The most common type of research involving CSFs is identifying, sifting and short listing a set of important factors to arrive at a *dominant few* for a particular project, outcome, status or position (Shaul & Tauber, 2013; Ali & Kidd, 2013; Koumaditis et al., 2013; Ofori, 2013; Lee et al., 2010; Lam, 2005; Cooke-Davies, 2002; Butler & Fitzgerald, 1999; Teo & Ang, 1999; Sumner, 1999; Pinto & Covin, 1989; Magal et al., 1988). A step wise approach to identifying such CSFs, rejecting superficial listing, is recommended by Wasmund, (1993). Academics and practitioners have commonly referred to a list of ten CSFs by the Standish Group. According the Standish Group's (2013) recent newsletter and report (2009), *Top Management Support* was listed as the number one CSF, followed by: User Involvement, Clear Business Objectives, Emotional Maturity and Optimising Scope.

Next, there is the type of research that has been carried out to find relationships between CSFs (Butler & Fitzgerald, 1999). The more prominent studies follow a

¹ The author of this thesis notes that this is only a careful qualitative observation on her part for the purpose of this study.

structured approach by employing academic models such as the Formal Systems Model (Fortune & White, 2006) and Project Excellence Model (Westerveld, 2003) to depict the relationships. Another type of relationship discussed is between the CSFs and their sub-factors, which may run in to one or even two levels (Lam, 2005, p. 184).

Certain other studies classify CSFs into various groups. Williams & Ramaprasad (1996) offer taxonomy of CSFs, where CSFs either: 1) lead to success, 2) are necessary and sufficient for success, 3) are necessary for success and 4) are associated with success. Other studies indicate that there is more to *critical factors* than just success. They say that critical success and failure factors are like two sides of a coin and that both need to be addressed on a project (Chow & Cao, 2008; Belassi & Tukul, 1996). Strategic and tactical are two other classifications given to CSFs (Shultz, Slevin & Pinto, 1987). Examples of strategic CSFs are *top management support* and *project mission* while *client consultation*, *training* are considered to be tactical CSFs. Another prominent study also reports two CSF categories, i.e. collective and generic (Butler & Fitzgerald, 1999). The similarity with such dual classifications is that one is always found to be more important than the other. The multi-level reach of CSFs i.e. individual, project and organisation is further extended in recent studies with additional dimensions such as technology, process and business, etc. (Bayona-Oré, 2014; Ali & Kidd, 2013; Lam, 2005).

There is also the type of research that has looked at quantifiable causal effects by CSFs on a project's outcome or the effectiveness of a particular individual in the organisation or the like (Ika et al., 2012; Chow & Cao, 2008; Belassi & Tukul, 1996; Yap et al., 1992). The *cause-and-effect* type of research however is not as common as the others, but is recommended (Williams & Ramaprasad, 1996). Other researchers acknowledge this advice; Remus & Wiener (2010) recommends four steps for qualifying CSF research to such an advanced state. They specify that CSF research should follow these steps: state-of-the-art (literature review), CSF identification, CSF analysis and CSF management.

2.4.3 Call for Further Research

Although the different waves of research mentioned above can be considered as progression in CSF based research, the low project performance rates indicate that the IT/IS discipline has not yet obtained a proper grasp of the CSF approach. One cause for this may be the scarcity of research that looks at each CSF in much depth to identify causal effects on the project outcome. Each critical factor needs careful investigation to identify its constituents; in fact, the call is for rigorous pluralistic research methods (Remus & Wiener, 2010). An understanding at the *atomic* level may provide the IS/IT discipline with the competence to further manage each CSF. Prior researchers who understand the magnitude of the CSF approach also call for further research on CSFs. They advise to, “*probe beneath CSFs to comprehend fully their meaning*”, (Butler & Fitzgerald, 1999, p. 368).

Top management support, identified as a most important critical success factor for IT/IS projects is a fine specimen for further in-depth research (Gingnell et al., 2014; Koumaditis et al., 2013; Shaul & Tauber, 2013; Liu et al., 2010). Yet, the intricacies have rarely been explored (Butler & Fitzgerald, 1999). Some of these intricacies are: the constituents of TMS, the changing need for TMS during a project (Elbanna, 2013; Müller & Jugdev, 2012; Remus & Wiener, 2010; Fortune & White, 2006; Pinto & Covin, 1989; Pinto & Prescott, 1988) and the quantified absolute effect of TMS on a particular outcome (Young & Poon, 2013). However, before investigating TMS, it is necessary to understand about the top management responsible for rendering support. Section 2.5 below presents details regarding the top management and their work.

2.5 The Top Manager and the Nature of Managerial Work

2.5.1 The Top Manager

The term, *top manager* exists because there are different management levels defined in organisations. The literature indicates that management levels may differ according to organisational size (Lim et al., 2012; Sambamurthy & Zmud, 1999) and structure (Li & Harrison, 2008). Researchers have associated authority and information needs (Felekoglu & Moultrie, 2014; Stemberger et al., 2011) with different managerial levels. The naming of managerial levels in the literature varies

even with the same functionality. Some studies categorise management levels as corporate managers, functional managers and frontline managers (Hill & McShane, 2008). Others refer to management levels as operational, middle and top (strategic) level management (Johnson et al., 2011). For clarity and ease of use, this thesis refers to the latter.

These management levels have different managerial responsibilities (Liu et al., 2010; Bassellier et al., 2001). Top level managers are involved with long term organisational goals, whereas lower level (operational) managers are more involved with short term goals, firefighting and conflict management (Luthans et al., 1992). It is noted in the literature that lower levels in the management hierarchy experience greater levels of brevity and fragmentation of work (Mintzberg 1994; Mintzberg 1989; Mintzberg, 1973). Hence, support from management levels above has been noted as important when handling exceptions and escalations (Boonstra, 2013; Olie et al., 2012; Ragu-Nathan et al., 2004). Advice may also be useful in periodic reviews and to generate ideas (Shaul & Tauber, 2013). The flow of support and information needs to travel through the lines of hierarchy to the affected areas.

According to prior literature, a range of managers could be labelled the top management, for example the chief executive officer, senior manager, chief information officer, director and so on. There is some literature that uses such labels interchangeably without indicating a particular reason (Sharma & Yetton, 2003), this tends to confuse the reader. Many studies however say that the top management itself could be divided into multiple layers (Johnson et al., 2011; Hill & McShane, 2008; Mintzberg, 1973). In order to eliminate any ambiguities and clearly understand which levels of managers are commonly known as top managers, a look at the literature from over the years was taken. According to the studies listed in Table 2.1 below, chief level managers, board of directors and senior managers may all be addressed as the top management.

Table 2.1: Top manager – as defined as various studies in the past

Study	C level Managers	Senior Manager	Board & Director
Lee et al., (2013); Carmeli et al., (2011); Carmeli,& Halevi, (2009)	Yes	N/A	N/A
Sabherwal, et al., (2006); Augustine, et al.,(2005); Crawford, (2005); Atkinson & Butcher, (2003 a-b); Gosling & Mintzberg, (2003); Thomas et al., (2002); Gibson & Tesone, (2001); Swink, (2000); Thite, (2000) Krumwiede et al.,(1998); Correll, (1994); Sabherwal & Tsoumpas, (1993)	N/A	Yes	N/A
Ngwenyama & Nørbjerg, (2010)	N/A	N/A	Yes
Manfreda & Štemberger, (2014); Liu et al., (2010); Kor, (2003)	Yes	Yes	N/A
Francoeur, Labelle & Sinclair-Desgagne, (2008)	N/A	Yes	Yes
Felekoglu & Moultrie, (2014); Boonstra, (2013); Cycyota & Harrison, (2006); Ragu-Nathan et al., (2004)	Yes	Yes	Yes

While the above stated observation is noted, some studies advise that the top management in smaller organisations will directly involve when requested, others from much larger organisations may delegate (Sabherwal & Tsoumpas, 1993). In order to understand the complexities of a top manager's job, it is necessary to understand the nature of managerial work. Hence, studies conducted in the general management discipline were also referred in addition to IT/IS studies. The next section looks at what top managers do and their responsibilities and worries.

2.5.2 The Nature of Top Manager's Work

“No Job is vital to our society than that of the manager. It is the manager who determines whether our social institutions serve us well or whether they squander our talents and resource”. (Mintzberg, 1989, p. 24). The quotation given above, from the work of one of the most prominent management researchers in the modern world, indicates the importance of the manager.

Managers are organisational employees who have been entrusted and given responsibility and explicit authority (Mintzberg, 1994) to execute the organisational strategy. As per their position in the management hierarchy in an organisation, a manager may be in charge of an organisation or one of its subunits. Managing is no easy task, much intricacy lies within managerial work (Mintzberg, 1989; Kurke & Aldrich, 1983; Mintzberg, 1973). The work has to be executed, completed to quality on time, within budget and according to expectations, while taking care of other internal and external factors such as looking after staff welfare and attending social gatherings of significance. Managers also have to take care not to upset the superiors/peers, subordinates and organisational procedures in executing such work.

Apart from the above mentioned, input from managers is needed for almost every aspect of the organisation. These include but are not limited to formulating strategy (Collier et al., 2004), training (McLagan, 1988), staff development (Trinka, 2005), procurement, establishing trust, that lead to work relationships (Atkinson, 2004), and instilling ethical behaviour and harmony (Viswesvaran et al., 1998) in the work place. Managers also liaise with external parties that have stakes in the organisation. These stakeholders may be suppliers, customers and networking organisations (Luthans et al., 1985). Managerial work is chaotic, and managers have little control over how their time is spent (Allan, 1981). As such, managers may have to attend sequentially to many different people and problems. Therefore, managers are expected to be conscious of such occurrences. Managing is said to be no longer just planning, monitoring and controlling (Gosling and Mintzberg, 2003) but is the fundament of organisational design, change, planning, development and production (Kurke & Aldrich, 1983).

Previous studies have completed commendable work in trying to categorise managerial work in order to better understand and advance the discipline. Managerial roles (Shapira & Dunbar, 1980; Morse & Wagner, 1978; Mintzberg, 1973), managers' behaviour (Kotter, 2010; Stewart, 1975) managers' characteristics (Mintzberg, 1973), managerial dimensions (Radner, 1992; Dakin & Hamilton, 1990; Allan, 1981; Tornow, & Pinto, 1976), managerial facts (Thite, 2000; Stephens et al., 1992; Mintzberg 1989), guidelines for managers (Trinka, 2005; Atkinson, 2004; Atkinson & Butcher, 2003a-b; Levinson et al., 1993; Kerr et al., 1986), management activities (Luthans, 1988; Torrington & Weightman, 1987) and management functions (Kraut et al., 1989; Carroll & Gillen, 1987) are some of the classifications of interest. The literature indicates that much of this classification was done in the 1970s, 1980s and the 1990s. More recent literature consists of follow up studies that have the elements from early studies at the core. There is one research study that stands out since it has been adapted vastly and referred to very frequently. This particularly popular study is Mintzberg's seminal work from the 1970's.

Mintzberg's (1973) work is famed as managerial *role-theory* and is the most popular of the many conceptualisations of managerial work (Pinsonneault & Rivard, 1998; Scudder & Guinan, 1989; Carroll & Gillen, 1987; Segev, 1987; Mintzberg et al., 1976). At the time this thesis was written and submitted in the year 2014, Google Scholar indicated that the Mintzbergian managerial roles have been cited close to 8,000 times. While the purpose of this section was to identify the nature of top management work, it was presented as a prerequisite to establish a connection with how top managers may render support.

Section 2.4 above, mentioned TMS as one of the most important CSFs for IT/IS projects. This current section discussed the work that a top manager is expected to do. Therefore, if *TMS is expected of a top manager, then, it should be part of the work they usually do*. Hence, an overlap between managerial work and TMS is expected. In order to carry out further investigations, the managerial *role-theory* by Mintzberg (1973) is chosen due to its popular past (Montgomery, 1986) and present use (Lim et al., 2012). The next section will discuss in some detail Mintzberg's managerial roles and the studies that have adopted them.

2.5.3 Mintzberg's Managerial Roles From 1973

Introducing Mintzberg's Managerial Roles

Mintzberg has suggested ten roles and then grouped them into three categories. The three main categories are named as Interpersonal, Decisional and Informational. The underlying roles are: Figurehead, Leader, Liaison, Negotiator, Resource Allocator, Disturbance Handler, Entrepreneur, Monitor, Disseminator and Spokesman. Figure 2.2 below illustrates the roles in their respective categories. These findings are preceded by a long line of work accomplished by Mintzberg (1970, 1971, 1973, 1975). The original role details by Mintzberg can be seen on pages 92-93 in the book he published (Mintzberg, 1973).

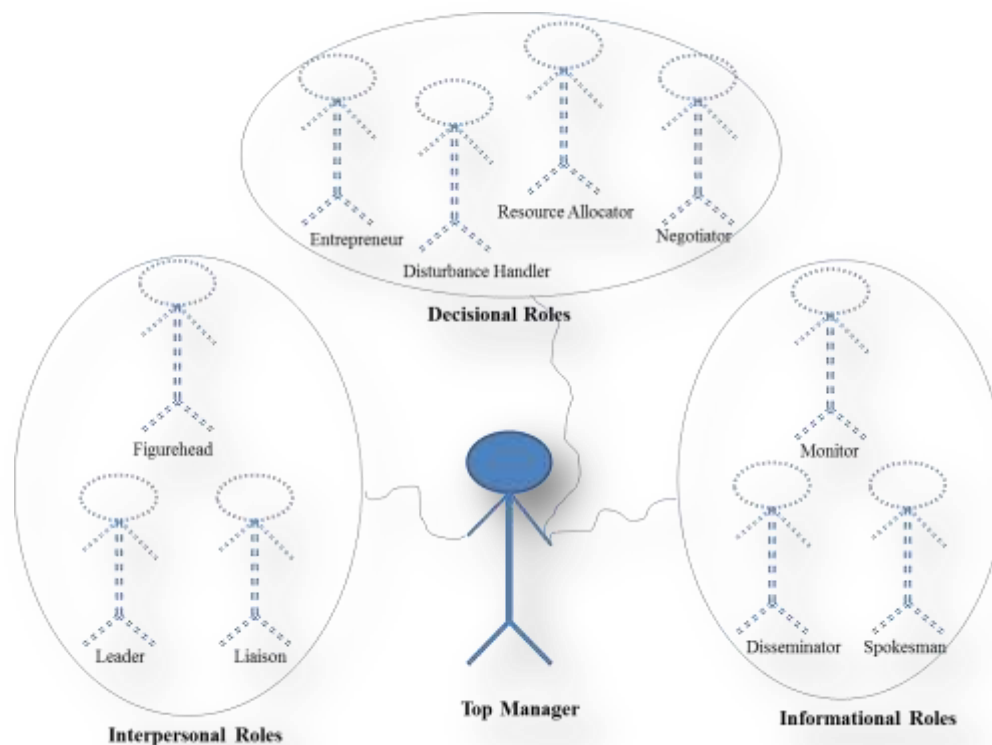


Figure 2.2: The Managerial Roles carried out by a Top Manager (Mintzberg, 1973)

Criticisms and Support for Mintzberg's Roles

There are noteworthy criticisms regarding Mintzberg's work (Carroll & Gillen, 1987). The first criticism is regarding the managerial roles not being linked to organisational performance. The argument presented by critics is regarding how Mintzberg could prove that these roles were the correct roles to play in order to achieve performance. The second criticism states that the data collected by Mintzberg are all qualitative. Hence, there is the question of validity as no quantitative analysis was carried out. The third criticism is on the generalisation of the results as Mintzberg only gathered data from five Chief Executive Officers (CEOs) in five organisations based in the United States. Fourth criticism is that Mintzberg does not provide empirical support on the classification of the ten managerial roles into three categories. Mintzberg also does not illustrate if any one of the roles is of more importance than the others (Shapira & Dunbar, 1980). Subsequent to Mintzberg's publications other researchers have further investigated these roles.

Some studies not only agree with Mintzberg, but also provide support, for instance, Kurke & Aldrich (1983) report finding similar results to that of Mintzberg. Following an investigation that was carried out 10 years later, with different organisations in a different state of the United States, Kurke & Aldrich claim that their results illustrate the generalisability of managerial roles. Shapira & Dunbar (1980) is yet another study that reports empirical evidence for Mintzberg's role classifications. Support on the applicability of managerial roles in the international arena comes from many studies. Some suggest that Mintzberg's *role theory* could be applied in a broad sense as a universal doctrine (Chareanpunsirikul & Wood, 2002), yet, advises caution. They call for future research that pays attention to the caveats identified in Mintzberg's work (see paragraph immediately above). Given below are some studies that adopted Mintzberg's managerial roles in their research efforts.

Application of Mintzberg's (1973) Managerial Roles

Mintzbergian managerial roles, acclaimed as the most popular (Al-Taie et al., 2013) among many others, have been put to test across different contexts. Some common ones for IT and IS are organisation (Tsui & Ohlott, 1988; Paolillo, 1987; Tsui, 1984) and project contexts (Gottschalk & Karlsen, 2005). However, prior researchers offer a note of advice in that they say that the roles may differ across organisations (Shapira & Dunbar, 1980), organisational levels, projects types (Gottschalk & Karlsen, 2005) and functions (Kraut et al., 1989). Prior researchers advise that complexity and dynamism may increase the use of the Decisional roles, while environmental complexity may increase the use of Informational roles (Gottschalk, 2002). Repetitive and routine tasks however may decrease the frequency of managerial role engagement. Mintzberg's role theory has also branched out into different industries; some of the more common ones include the IT/IS industry (Pinsonneault & Rivard, 1998), Academia and Education (Guo, 2009; Mech, 1997; Pavett, 1984) and Hospitality (Ley, 1978).

The roles have also been tested internationally multiple times. Many claim that there are no concerns with regard to using the roles in different cultures. Research studies from Europe (Gottschalk, 2002), Africa (Montgomery, 1986), Asia and the Pacific (Al-Taie et al., 2013) are available in addition to research from the United States where it was first tried and tested. Following an investigation of role applicability locally and internationally, Andersson & Florén (2011) also found that Mintzbergian roles are universally applicable. Andersson & Florén mention that the role engagements of international managers are more proactive with their networking, delegating and strategic planning activities. Lubatkin et al., (1997) also provides support for international use of Mintzberg's roles by finding that the relative frequency in which the roles are used in different cultures is the same when similar activities are undertaken.

Mintzberg's managerial roles have also been tested with different managerial levels such as, the CEO (Guo, 2009; Watts, 2001), CIO (Milliron, 2008; Lineman, 2006;

Karlsen et al., 2002; Gottschalk, 2002; Grover et al., 1993; Stephens et al., 1992), IT Manager (Gottschalk & Karlsen, 2005) and the Project Manager (Karlsen et al., 2002). Prior research has established that although all role categories may be present in all managerial levels, (Carter et al., 2011) different functional managers offer different emphasis on different roles. Consistent with Mintzberg, Karlsen et al., (2002) found that upper management is more external² bound compared to middle management. There are other factors that may affect role engagement. Some of these are listed as Project Type, Age, Gender, Organisational Size, IS Management Maturity and the industry in which the organisation competes (Lim et al., 2012; Johnson et al., 2011; Williamson, 2011; Henderson & Stackman, 2010; Grover et al., 1993).

Some studies have done well to supplement the knowledge on Mintzberg's managerial roles. Tsui (1984) identified a factor that will motivate managers to better engage in managerial roles. Tsui indicates that the credibility of the managers improves upon successful engagement in managerial roles. Some studies provide typologies (Guo, 2009) using these managerial roles. Other studies have recommended a new role, i.e. the Technical Expert as an important addition to the existing *role-theory* by Mintzberg (1973). Follow up studies have found empirical evidence that support this new Technical Expert role (Dierdorff et al., 2009; Mclean & Smits, 2003; Pavett, 1984; Lau et al., 1980).

Another important addition to research on Managerial roles are the questionnaire surveys that have been developed by prior researchers. Such addition is important as they aid in quantitative analysis of the *role-theory* (Glick 2013; Guo, 2009; Mount & Bartlett, 1999; Lau et al., 1980; McCall & Segrist, 1980). However, many of these questionnaires are not able to test all ten roles and an improvement will prove valuable for future researchers.

In summary, Mintzberg's managerial roles are applicable in various contexts, with different managerial levels, both locally to USA and internationally. The use of Mintzberg's (1973) roles is current with recent studies drawing from his *role-theory*.

² Managers who are concerned with carrying out tasks beyond the organisation, e.g. recruiting clients.

Many concerns stated earlier with regard to the managerial roles have been successfully refuted by subsequent research. The managerial roles therefore are a globally accepted theory suitable for future research, and the roles themselves stand to gain more credibility from further research work. Two areas that may further benefit from future research are as follows. One is the illustration of the managerial roles as a means to an end, such as how roles may affect the performance of an IT/IS project. Another contribution that can be made in this is a questionnaire survey instrument developed with the latest IT/IS survey trends.

The material discussed in this section presented information on top managers and their work. This information was presented as a prerequisite to understand TMS (Section 2.6), a CSF that is needed to achieve a positive outcome on projects.

2.6 Understanding Top Management Support (TMS)

This section presents the efforts expended in an effort to gauge an understanding of the concept of TMS, and contributes towards the remedy of any misgivings. For this purpose, the need for TMS in IT/IS projects is discussed first. This is followed by a discussion regarding the treatment in the literature for TMS. Having considered various options in the discussion mentioned in the previous sentence, a choice is made to study behaviour based TMS. Hence, actions specified in prior definitions/descriptions for *behaviour* based TMS are investigated. It is then noted that the actions specified in TMS definitions closely resemble actions from popular management theory (Mintzberg, 1973). Most definitions however, are identified with one major drawback, i.e. a lack of theoretical and empirical support. In order to remedy this situation, theoretical guidance is consulted and discussed. This is followed by a contribution towards knowledge progression – a new definition for the concept of TMS that adheres to the guidelines discussed below.

2.6.1 The Need for Top Management Support in Projects

A project's manager is entrusted with achieving high level of project performance. However, in most organisations, project managers are positioned at the operational level on the management hierarchy (Young & Jordan, 2008; Zwikael, 2008a-b;

Zwikael et al., 2008; Ragu-Nathan et al., 2004; Desouza, 2003; Thomas, 2002; Stephens et al., 1992). Hence, project managers may have practical implications in executing certain tasks due to the hierarchical nature of authority in organisations. Therefore, project managers may require the support of management higher up in the hierarchy.

Top management support is one of the most important CSFs for achieving higher levels of project performance (Elbanna, 2013; Alsudiri et al., 2013; Boonstra, 2013; Young & Poon, 2013; Young & Jordan, 2008; Akgün et al., 2007). According to industry and academic reports, performance in IT/IS projects is still low (Meredith & Mantel, 2011; Nah et al., 2001), and therefore, it is questionable whether the project managers receive the support they need (Loonam & Donagh, 2005). A contributing factor for this lag of TMS is considered to be the lack of understanding by the top management of what is expected of them. The culprit: non-existent or misinformed knowledge of TMS in the literature (Young & Poon, 2013). The top managers may well be unaware of the type of support needed, the best time to engage, the concentration of applicability etc. Top managers may also not realise the fact that they are valuable resources needed on the project. Hence, findings from new research such as the study reported in this thesis should be utilised as training material for top managers. Prior researchers have identified the concept of TMS to be multifaceted (Elbanna, 2013). Hence, the call is for further specialised research that moves away from shallow investigations (Boonstra, 2013).

2.6.2 Treatment in the Literature for Top Management Support

Treatment in the literature for TMS is ambiguous and does not agree on a common view of the concept (Dong et al., 2009; Jarvenpaa & Ives, 1991). The majority argues that TMS is a set of resultant actions arising from the behaviour of top managers (Manfreda & Štemberger, 2014; Boonstra, 2013; Garrett & Neubaum, 2013). Others argue for managerial perceptions (Leonard-Barton & Deschamps, 1998; Teo & King, 1997; Bardi et al., 1994; Jarvenpaa & Ives, 1991). Some even argue for both (Bassellier & Pinsonneault, 1998), but have failed to attract many followers. This indecision further adds to the confusion on the state of the concept. Hence, it

becomes obvious that the concept has rarely been studied in adequate depth (Butler & Fitzgerald, 1999; Williams & Ramaprasad, 1996).

The behaviour based TMS, the more popular of the TMS notions, specifies a set of actions that are executed by the top management. These actions appear to be no more than the actions executed by the top management when engaging in their managerial roles (Mintzberg, 1973). Therefore, rendering support for projects by the top management is most possibly embedded in managerial roles. Hence, it is possible that a firm foundation for the definition for the concept of TMS could be initiated using Mintzberg's *role-theory* explained in Section 2.5.3. However, before progressing with this notion, a thorough examination of behaviour based TMS is necessary.

2.6.3 Examining Behaviour Based TMS in the Literature

The literature specifies that when top managers extend support, there is a high possibility of achieving better performance at both project and organisational levels (Williams & Ramaprasad, 1996). This study refers across these levels with the intent of understanding the treatment in the literature on the concept of *behaviour* based TMS. The most logical reason for behaviour based TMS to be more popular is the possibility of observing and reporting the actions, either by the top management or the project managers who are in need of supportive actions.

Behaviour based definitions/descriptions from over 50 studies were collected. Table 2.2 below illustrates a handpicked selection of definitions that are recent and past that can be easily segregated into actions mentioned in them. The remaining definitions, by no means inferior, are appended in Appendix A.1. It is noted that not all studies that undertook to investigate TMS offered explicit theoretical definitions for TMS, some are merely casual descriptions.

Table 2.2: Behaviour based definitions for TMS and key actions specified

TMS Definitions in the Literature	Key Activities
<i>“supporting the initiatives of IS personnel and understanding the importance of IS.....”</i> (Manfreda & Štemberger, 2014, p. 110)	Support IS initiatives Refer information
<i>“.... is based on factors such as strength of commitment, sustainability of top manager's commitment during a projects life and speed of response to issues.”</i> (Young & Poon, 2013, p. 946)	Commitment Respond to issues
Understanding the importance of IT/IS, supporting and participating in IS activities (Stemberger et al., 2011)	Participate in relevant activities Refer information (to understand)
<i>“extent to which a top manager personally engages in behaviors that attempt to promote the success of an information technology project”.</i> (Mahoney, 2011, p. 10)	Behaviours promoting success
<i>“Top Management support can be summed up as the support provided by the management/ leaders onto knowledge sharing activities in their corporation “</i> (Rahab et al., 2011, p. 116)	Provide support
Granting rights to the project, provides vision, clear statement of work (Ngwenyama & Nørbjerg, 2010)	Grant rights to the project Provide vision Clear statement of work
Reviewing technical plans and providing guidance in solving technical issues. Evaluating available technology for project adaptation (Dierdorff, Rubin, & Morgeson, 2009; Lau & Pavett, 1980; Pavett & Lau, 1983).	Review Technical plans Guidance for technical issues Evaluate technological options
<i>“the extent to which top managers in the organization provide direction, authority, and resources during and after...”</i> (Ifinedo, 2008, p. 555)	Provide direction Provide authority Provide resources
Engaging in the operational work under them (De Holan & Mintzberg, 2004).	Engaging in operational work
Help establish project management as a Strategic capability (Thomas et al., 2002).	Establish Project management as a strategic capability
Top managers set of psychological states & behaviours about IT (Bassellier & Pinsonneault, 1998).	Attitudes/perception & behaviours
Chief executive officer's (CEO) support for bringing up a Chief operating officer (COO), who might be his successor (Levinson, Humphrey, Evans, & Berry, 1993).	Nurturing Subordinates
Chief Executive Officer involvement in steering committees to enhance linkage between information systems (IS) strategic planning and organisational strategic planning. As a result improved effectiveness of IT is expected (Raghunathan, 1992).	IS strategic planning Organisational strategic planning, Minding effectiveness of IS, Aligning IT and business
Using significant business understanding available to the top manager for system conception, implementation and organisational change (Rockart, 1988).	Provide business knowledge Effect changes needed for implementation

TMS definitions given in Table 2.2 (also see Appendix A.1) cover a large number of activities that are carried out by the top management. These activities no doubt help improve project/organisational performance. However, these definitions have not employed theoretical or empirical rigour when compiling definitions. Hence, many IT/IS researchers tend to initiate and follow many different notions regarding TMS (Dong et al., 2009). Academics are criticised for uncritically accepting theoretical concepts (Donaldson & Preston, 1995). The implication of working with ill-defined concepts is usually unreliable research outcome, as “*concepts are the building blocks of science upon which propositions are based*” (Osigweh, 1989, p. 579).

Academic guidelines demand that the components of a thoroughly defined concept include a strong theoretical base, properly stated boundaries and the ability to adjust to situational circumstances (Osigweh, 1989). The existing concept definitions for TMS appear to fall short of these academic prescriptions leading to an absence of theoretical and empirical rigor and could pose a significant threat to the reliability of research projects that utilise these concept definitions. Therefore, it is vital that the concept of TMS is defined adhering to theoretical guidelines, and be supported by empirical methods. In the next section, a brief discussion on suitable guidelines for concept definition is presented.

2.6.4 Theoretical Guidelines for Defining a Concept

The building blocks for any research are the concepts that are undertaken for the study and are of undeniable importance. Adopting a clearly defined concept is essential for carrying out reliable research. Poorly defined concepts will leave fundamental gaps in research findings. Although there may be more than one way to define a concept (Medin & Smith, 1984; Sartori, 1970; Dubin, 1969), guidelines from Osigweh (1989) have gained popularity on their *travelling concept* domain (Klein et al., 2012; Oswick et al., 2011; George & Marino, 2011).

A concept needs to have degrees of varying abstraction; i.e. it should be collapsible and expandable as per the situation (Osigweh, 1989). Osigweh has compared travelling along the lines of abstraction in concept definition to that of climbing a ladder. In this scenario the definition with more specificity and detail will be at the bottom of the ladder of abstraction while the universal definition resides at the top. Osigweh (1989, p. 584) points out that it is important “*to retain extensional (breadth or denotation) gains by ladder climbing, while minimising losses in connotative (intention or depth) precision.*” Osigweh (1989, p. 584) further explains the terms denotation and connotation saying that, “*the extension of a concept refers to the class of things to which it applies, or the totality of objects which it identifies, the connotation of that same term refers to the sum total of characteristics or collection of properties that anything must possess to be denoted by that term*”.

In order for a concept to be considered sufficiently defined there are three domains to note on the ladder of abstraction (Osigweh, 1989). First of these domains is when a concept is distinguished with a narrow scope and explained with many attributes. In the second domain, a concept is identified with a broad coverage of one or more classes with few attributes. While these are the prominent two, a middle domain between the two is also accepted. This middle domain is expected to be defined with the breadth of the scope balanced by the number of attributes. Osigweh (1989) warns that when a concept is given a narrow scope and two few attributes or when a concept is too broad with many attributes, it cannot be claimed as an effective concept. In the next section, using these guidelines, a few behavioural based TMS

definitions are critically evaluated, and the problems with these definitions are discussed.

2.6.5 Problems with the Available Definitions on Top Management Support

Definitions on the concept of top management support appear to fall short of the guidelines presented in Section 2.6.4. They fail to illustrate adequate retention in extension and minimised losses in connotation while travelling the ladder of abstraction (Osigweh, 1989). Yet another downfall of these definitions is that they do not make the boundary for TMS clear. Therefore, most definitions are not suitable for future research. Osigweh (1989) states two undesirable domains in concept definition. The first is the “*stretched concept domain*” (Osigweh, 1989, p. 587) with a broad coverage and too many classes with packed ideas. The second is the “*configurative situational concept domain*” (Osigweh, 1989, p. 587) with narrow coverage and too few attributes. A few definitions from the literature were selected for comparison with these guidelines. The rationale for selecting these particular definitions is that they could be easily utilised to illustrate the observations made.

The definition by (De Holan & Mintzberg, 2004) “*Engaging in the operational work under them*”, could be criticised as having too broad a coverage, as operational work under the supervision of the top manager may have many underlying dimensions. The definition “*Top manager’s set of psychological states & behaviours about IT*” (Bassellier & Pinsonneault, 1998) has *too many classes* (Osigweh 1989, p. 582) as both mental state and behaviour have been considered. Therefore, it could be declared *an exaggeration* (Osigweh 1989, p. 584). The definition by Rahab et al., (2011, p. 116), “*the support provided by the management/ leaders*” can also be identified as having a *broad coverage* (Osigweh 1989, p. 587) without the orderly benefit of proper taxonomy. According to (Thomas, et al., 2002), TMS is “*Helping to establish project management as a strategic capability*”. This definition seems packed with intention and non-specification of the term strategic capability, and is considered *over encompassing* (Osigweh 1989, p. 584). The same can be said about the definition by Mahoney, (2011, p. 10) “*top managers engaging in behaviours that attempt to promote project success*”, which does not specify the behaviours. The

evidence suggests that the above definitions identify with the stretched concept domain on the ladder of abstraction (Osigweh, 1989).

The definition, *CEOs support for bringing up a COO, who might be his successor* (Levinson et al., 1993) has a narrow coverage where it is assumed that the work of a top manager is only to nurture subordinates. The definition, *granting rights to the project, provides vision, clear statement of work* (Ngwenyama & Nørbjerg, 2010) also has a narrow coverage where they perceive very high level activity by the top manager, possibly only at the beginning of a project. The definition by Štemberger et al., (2011, p. 110) “*understand the importance of IT/IS, support initiatives of IT/IS personnel and participating in projects of IS activities*”, has only a few attributes with a narrow coverage (Osigweh, 1989, p.587). These definitions can be identified as belonging to the configurative situational concept domain in the ladder of abstraction (Osigweh, 1989). Many of the definitions presented in Table 2.2 and appended in Appendix A.1 can be identified with some shortfall related to concept definition. Therefore, since a considerable number of definitions are identified with undesirable states of a concept, the need for a theoretically defined and empirically verified concept definition for TMS is clear (Felekoglu & Moultrie, 2014). The first step towards a sufficiently defined concept is to firmly ground the definition in theory.

2.6.6 Setting the Ground for a New Concept Definition

In order to firmly ground the new concept definition in theory, both management theory and the body of available literature on TMS are utilised. It was proposed in Section 2.6.2 that a suitable base for the concept of TMS may be Mintzberg’s *role-theory*. The rationale being that the actions that are considered to be TMS appear to closely resemble actions from Mintzberg’s roles. In order to strengthen this argument, a qualitative examination was carried out. Thus, actions from TMS definitions from over fifty (50) studies were compared with actions specified in Mintzberg’s roles. Also referred for comparison, when available, were questionnaire measures for these TMS definitions.

Multiple rounds of such comparisons between actions from Mintzberg's (1973) role descriptions and actions from the TMS definitions were carried out until there was consensus between the trials carried out by the author. The total time taken for the trials were 3 weeks, each one was carried out a week apart from the other. The results from this exercise suggest that actions from eight roles are often referred to, when describing TMS. Table 2.3 below presents an excerpt from the work carried out in this regard. It must be noted that the actions from the definitions and actions from roles were not always a direct match. However, the author looked for the underlying meaning before each action from the definitions was identified with the actions from the managerial roles. Seven roles from Mintzberg's (1973) initial list were found to contain actions from TMS definitions. These are the Leader, Monitor, Disseminator, Entrepreneur, Resource Allocator, Disturbance Handler and Negotiator roles. The eighth is the role that emerged from the literature beyond the realm of Mintzberg's (1973) roles. This is the Technical Expert role (Lau, Newman, & Broedling, 1980). It was noted at this point that a new role category needs to be introduced for this role. This new category was named as the Technical role category.

The next step is to propose a new concept definition for TMS using the managerial roles (Mintzberg, 1973) and academic guidelines.

Table 2.3: Comparison of activities from TMS definitions with Mintzberg's (1973) Managerial Roles

Previous studies and activities they propose as TMS	R1*	R2*	R3*	R4*	R5*	R6*	R7*	R8*	R9*	R10*	R11*
Raghunathan, (1992) -IS strategic planning, Organisational strategic planning, Effectiveness of IS, Aligning IT and business		√							√		
Manfreda & Štemberger, (2014) ; Support IS initiatives, Refer information				√							
Levinson et al., (1993) - Nurturing Subordinates		√									
Ifinedo, (2008) - Provide direction, Provide authority, Provide resources		√							√		
Bassellier & Pinsonneault, (1998) - Attitudes & behaviors	Stretched concept – cannot identify activities										
Thomas et al., (2002) - Establish Project management as a strategic capability		√					√		√		
De Holan & Mintzberg, (2004) - Engaging in operational work	Stretched concept – cannot identify activities										
Ngwenyama & Nørhjerg, (2010) - Grant rights to the project, provide vision, statement of work	Not recognised as a supportive role.		Not recognised as a supportive role.	√	√	Not recognised as a supportive role.					
Kerzner, (2006) - Conflict resolution, Continuous feedback					√			√			
Zwikael, (2008a-b) - Appropriate Project manager (PM) assignment, Communication between the PM and the ,organisation, Existence of project success measurement, Existences of interactive inter departmental project groups, Organisational projects resource planning, Use of standard project management software		√		√	√		√		√		
Young & Jordan, (2008) - Devote time, Review plans, Follow up on results, Integrating ICT with the business management		√		√	√		√				
McLagan & Patricia, (1988) - Insist on training strategy, Insist on training in projects, Analyse cost, benefit, Sustain commitment, Provide links		√		√					√		
Rockart, (1988) - Provide business knowledge, Effect changes needed for implementation				√						√	
Dierdorff et al.,(2009); Lau et al., (1980); Lau & Pavett, (1980); Pavett & Lau, (1983) - Review Technical plans, Guidance for technical issues, Evaluate technological options											√
Mahoney, (2011) - Provide support	Stretched concept – cannot identify activities										

(* R1 = Figurehead, R2= Leader, R3= Liaison, R4= Monitor, R5= Disseminator, R6= Spokesman, R7= Entrepreneur, R8= Disturbance Handler, R9= Resource Allocator, R10= Negotiator, R11=Technical Expert)

2.6.7 Proposed New Concept Definition for Top Management Support

The first step in defining a concept is to set the boundary for the concept. This study is defining a concept for TMS in IT/IS projects and has adopted a managerial role based perspective. Managerial roles are “*an organized set of behaviours belonging to an identifiable office or position*” (Mintzberg, 1973, p. 54). Therefore, essentially, the suggested definition for the concept of TMS addresses top management behaviour. The term *identified position* is interpreted for this study as *the top manager consulted by the project manager for support on projects*. She/he will reside above the project manager in the organisational hierarchy and may belong to any of the classifications (C level manager, senior manager, board or director) identified in Section 2.5.1. He/she may also be a delegated authority (Sabherwal & Tsoumpas, 1993) with whom the responsibility is entrusted with.

Observations from the previous exercise (Section 2.6.6) are noted, but the evidence is considered insufficient to make the decision to stop investigating roles that did not secure a match with TMS definitions from the literature. Therefore, all ten roles identified by Mintzberg in 1973, and the new Technical Expert role are included in the theoretical definition with the intention of further investigation using empirical methods. The theoretical concept definition for TMS closely follows Osigweh’s (1989) guidelines, and for better clarity and comparison, the three levels of abstract are illustrated in Figure 2.3 below. In the first instance, i.e. at the lowest abstraction level, a precise coverage is given with many attributes. In the middle abstraction level, the breadth of the concept is managed with the number of attributes offered in the definition. At the universal level with the highest abstraction, a broader definition is suggested. The suggested definition does not travel to the undesirable domains condemned by Osigweh (1989). Although Osigweh’s (1989) academic prescriptions end here, in order to apply further empirical rigour to the process of concept definition, this theoretical definition was empirically investigated. This thesis will gradually explain (see Chapter 5) each step in this process and will present a theoretically defined and empirically tested definition for TMS as a contribution to theory in Chapter 8.

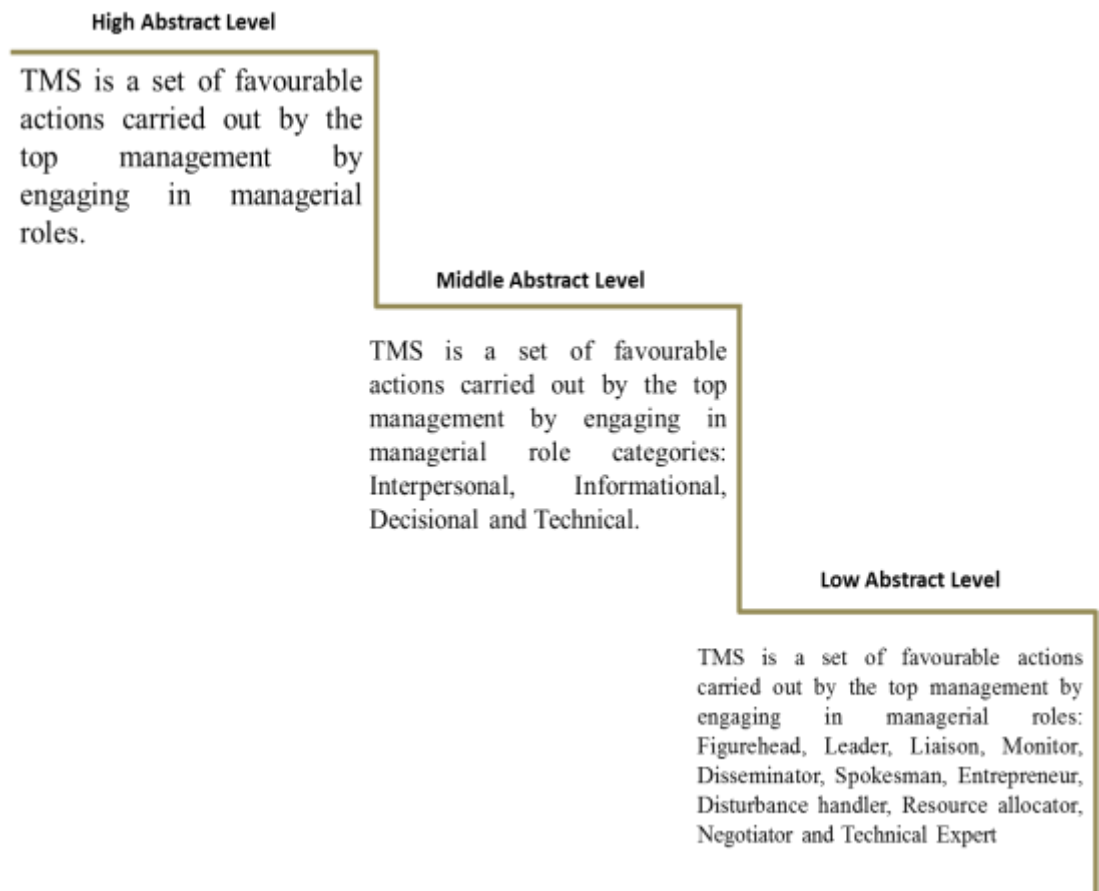


Figure 2.3: The a-priori concept definition for TMS in IT/IS projects

(Travelling the ladder of abstraction as per Osigweh's (1989) guidelines)

In this section, details of the concept of TMS were discussed in an effort to further understand the concept. Such an understanding is expected to present more eloquent knowledge on how to achieve better ISPP by better utilising TMS. In the next section of this chapter, notions on the project outcome are discussed.

2.7 Project Outcome – Project Performance / Project Success

This section discusses the notions of project outcome in the literature. Project outcome is considered the dependent variable in this research study. Section 2.6 brought forth the fact that TMS affects the outcome of IT/IS projects. Hence, in order to proceed with the thesis, it is necessary to illustrate how different notions were considered when selecting the most appropriate project outcome or the dependent variable. In general, the literature identifies two popular notions when discussing the outcome of IT/IS projects (Savolainen et al., 2012). The first group identifies achieving the project goals as project success (Agarwal & Rathod, 2006; Shenhar et al., 2002) while the second group identifies this as project performance (Barclay, 2008; Na et al., 2007; Na et al., 2004; Nidumolu, 1996; Nidumolu, 1995). It is difficult to determine if one notion is preferred above the other, as some refer to these terms interchangeably (Gemino et al., 2007). Few others say that positive project performance will lead to project success (Hong, 2011), others do not report a direct connection (Turner & Müller, 2004). For the purpose of this research, both project success and performance notions were looked at in some detail.

Both project success and performance are reported as multi-dimensional, some of which are similar across performance and success notions. Project performance descriptions in the literature are usually segregated into two dimensions, following which further sub-dimensions are identified. *“Process performance, which describes how well the software development process has been undertaken”* (Nidumolu, 1995, p. 201) and the *“product performance, which describes the performance of the system actually delivered to users”* (Nidumolu, 1995, p. 201) are two main dimensions of ISPP. The concept of project success was the first to appear in the literature and scholars claim that the first initiatives towards a definition of project success were seen in the 1970’s (Davis, 2014) and early 1980’s (Müller & Jugdev, 2012). Project performance was a phenomenon that followed, possibly as a progression of the early knowledge.

When considering both performance and success notions on project outcome, most agree that a project has to meet the requirements of the iron triangle: i.e. time, cost and scope (PMBOK®Guide, 2008; Agarwal & Rathod, 2006; Turner, 1993; Pinto &

Mantel, 1990). Other researchers have added more dimensions to supplement the iron triangle. Most studies still include the iron triangle as part of project success. Others warn that they are parts of project management success. Hence, they advise not to confuse the iron triangle with actual project success, which they explain is more customer oriented (Savolainen et al., 2012; Papke-Shields et al., 2010; Ika, 2009; Pinto & Slevin, 1988). Some researchers maintain that the quality of the product is as important as the iron triangle (PMBOK®Guide, 2008; Agarwal & Rathod, 2006; Mahaney & Lederer, 2006; Turner, 1993; Pinto & Mantel, 1990). Other factors that are mentioned as important include the project's product (Wohlin & Andrews, 2001; Glass, 1999; Nidumolu, 1995; Cooper & Kleinschmidt, 1987), the satisfaction of the team (Glass, 1999; Turner, 1993; Pinto & Mantel, 1990), the satisfaction of the customer (Agarwal & Rathod, 2006; Shenhar et al., 2002; Shenhar et al., 2001; Shenhar et al., 1997; Pinto & Mantel, 1990), and the satisfaction of the contractor (Shenhar et al., 2001; Lipovetsky et al., 1997; Shenhar et al., 1997; Cooper & Kleinschmidt, 1987). The preceding list captures many of the dimensions in the literature. However, it could still be argued that it is not an exhaustive list as there may be other project success/performance dimensions considered important by stakeholders (Davis, 2014; Agarwal & Rathod, 2006; Procaccino & Verner, 2006). Table 2.4 presents an eminent few studies and their notion of the project outcome. Due to space limitations and to avoid large tables that may obstruct the core reading material many other studies that were referred to by the author are appended in Appendix A.2.

Table 2.4: Notions of project outcome – Success and Performance

Study	Iron Triangle	Quality	Customer Satisfaction	Contractor Satisfaction	Overall Product	Profit	Project Outcome	Learning	Success (PS) / Performance(PP)
Meng and Gallagher, (2012)	Cost Time	√							PP
Ling et al., (2009)	Budget Schedule	√	Public	Owner		√			PP
PMBOK®Guide, (2008)	√								PS
Na et al., (2007)	Cost Schedule				√			√	PP
Mahaney and Lederer, (2006)		√	√						PS
Agarwal and Rathod, (2006)	√	√	√				√		PS
Shenhar et al., (1997);(2001); (2002)			√	√		√	√		PS
Nidumolu, (1996)	√	Interaction Quality	√		√			√	PP
Nidumolu, (1995)	√	Interaction Quality	√		√			√	PP
Pinto and Mantel Jr, (1990)	√	√	√	√			√		PS

After reviewing large number of studies on the two notions, the author decided that the project success and failure notions appear to be rather rigid and inflexible with the likes of a binary success or failure flag. Another issue considered was reporting statistical results for success and failure in the chapters that follow. That is, what percentage is acceptable as success and what percentage is not? In addition, with the notion of project success, there is still a debate with regard to boundaries between project management success and project success.

Project performance definitions on the other hand offer more definitive and subjective dimensions that cover a range of areas (Na et al., 2007). Past researchers have done extremely well to point out different facets of project performance (Ghapanchi et al., 2011; Gemino et al., 2007; Barki et al., 2001). In this regard, Nidumolu (1995-1996) provides a comprehensive view of software development project performance and hence it is proposed that these ideas be adapted for this study. Nidumolu (1995) maintains that a project's performance could be measured based on how well the project's product and the project's process perform and suggests that product performance should be measured using the operational efficiency, responsiveness, and flexibility of software. Nidumolu (1995) also suggests that process performance be measured as learning acquired during the project, process control, and quality of interaction. Subsequent studies have adapted these dimensions, indicating that these notions are still current (Espinosa & Cummings, 2012; Gopal et al., 2011; Na et al., 2007; Gemino et al., 2007; Wallace & Keil, 2004; Wallace et al., 2004). Therefore, an IT/IS project's outcome in the research reported in this thesis will be referred to as project performance. The abbreviation used for IT/IS project performance in this thesis is ISPP.

This chapter has so far presented the main research areas of study undertaken by this thesis. Hence, Section 2.8 that follows will present the research conceptualisation.

2.8 Research Conceptualisation

2.8.1 The Main Research Question

This literature review has been instrumental in identifying that TMS, a CSF for ISPP needs adequate theoretical and empirical sustenance (Sections 2.6). It was also brought out that misinformation with regard to TMS may be contributing to lower the level of project performance (Section 2.6.1). Further reading indicated that the actions from the definitions/descriptions of TMS resemble actions that top managers usually do while engaging in traditional managerial roles. Based on this information and utilising Mintzberg's *role-theory* and adhering to academic guidelines (Osigweh, 1989), a new definition for the concept of TMS was initiated in Section 2.6.7. A thoroughly defined concept definition for TMS is expected to be beneficial for achieving better levels of performance in IT and IS projects. The research conceptualisation therefore describes the research study plans to investigate the effect of managerial role based TMS on ISPP. The description given above is succinctly illustrated in Figure 2.4 below.

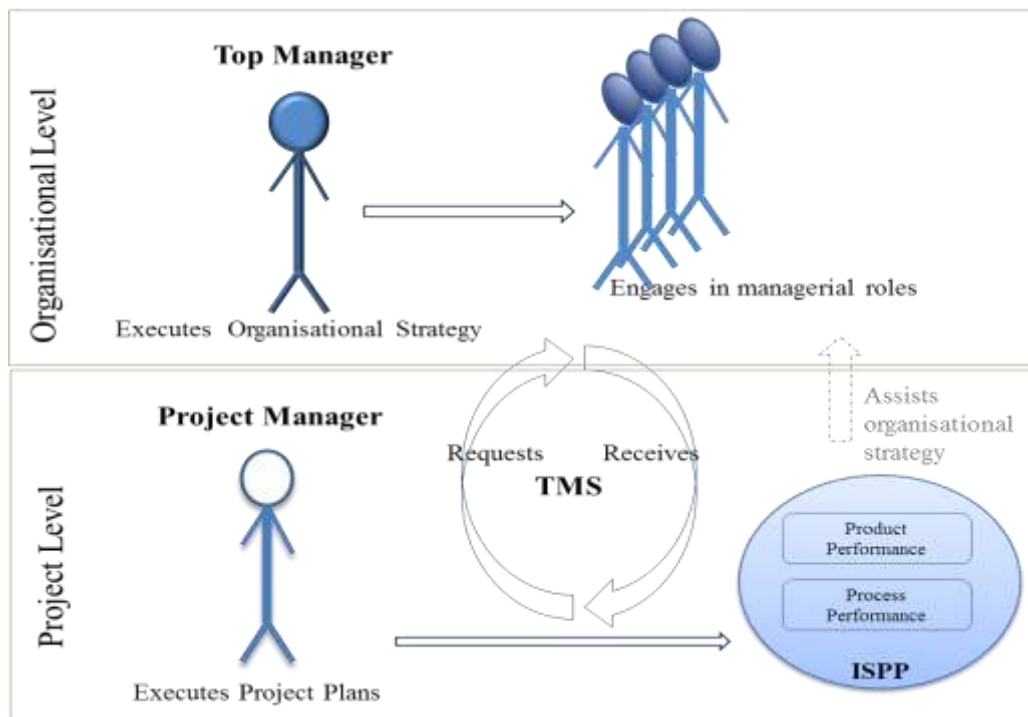


Figure 2.4: Succinct pictorial depiction of the research conceptualisation

The overarching research question proposed is:

“Does top management engagement in managerial roles help to achieve top management support, which in turn helps to improve the performance of IT/IS projects?”

2.8.2 Preliminary Conceptual Framework

A preliminary framework is suggested following the literature review. Following aspects are noted. There are eleven managerial roles identified from the literature. Ten of these managerial roles are from Mintzberg’s (1973) seminal work, while the eleventh is subsequently introduced and used by other researchers (Ngwenyama & Nørbjerg, 2010; Lau, Newman, & Broedling, 1980). Performance of an IT and IS project is identified with two dimensions, i.e. Process and Product (Nidumolu, 1995). In addition to these main constructs, variables that may moderate the sequence of events are noted along with variables that need to be controlled. These moderator and control variables are explained below prior to presenting the preliminary conceptual framework.

Moderating Variables

The Position of the Top Manager

The position of the top manager is expected to moderate the association between managerial roles and TMS. The origin of this notion hails from the same seminal work of Mintzberg (1973) that is adapted at the core of this research. According to Mintzberg, there are two types of top managers, External and Internal. External managers tend to engage in work that needs looking beyond the organisation, and are very high up in the organisational hierarchy. Internal managers are concerned about tasks within the organisation, and are generally placed below the External managers in the organisational hierarchy. Section 2.5.1 of this literature review stated that C level managers, senior managers, the board and the directors were all identified as the top management. This provides support for Mintzberg’s notion of a multi-level top management.

Beyond the work of Mintzberg, other academics acknowledge different managerial positions in the organisational hierarchy (Lim et al., 2013; Olie et al., 2012; Johnson et al., 2011; Radner, 1992) and different types of work responsibility as a result (Wu et al., 2004; D'Aveni & MacMillan, 1990). Scholars point out that role ambiguity among the managers may affect performance, hence, managers will do well to be aware of their responsibilities (Ngwenyama & Nørbjerg, 2010; Lederer & Mendelow, 1988; Hartog & Herbert, 1986; Baroudi, 1985).

Therefore, *some managers may play certain roles better than the others*. Hence, the position of the top manager introduces a moderating effect in the association between managerial role play and TMS.

Project Management Process Groups

Top managers and project managers should appreciate that TMS is an organisational resource and needs to be channelled towards a project similar to other resources such as analysts, programmers etc. The importance of TMS is that it's a *power-resource* with *make-or-break* ability. Since organisations seldom carryout projects in isolation at any given time, there may be multiple projects competing for TMS (Boonstra, 2013). Prior researchers have questioned if CSFs such as TMS is required in equal levels throughout the project (Butler & Fitzgerald, 1999). Availability of such information is useful but unfortunately scarce. If such information is available it can be used as input for resource planning and will be beneficial for multi-project environments.

Project management institute in the USA has identified five project management process groups: Initiation, Planning, Execution, Monitoring and Control and Closure (PMBOK®Guide, 2008). Although there is some overlap, generally, each process group consists of different tasks that need different resources. Knowing the type of TMS needed during each of these processes will help channel the correct type of TMS to each project at the right time. Project management process groups, referred to as project management processes from now on in this thesis for ease of use, are identified as moderator variables in the relationship between TMS and ISPP.

Control Variables

The aim of the study reported in this thesis is to investigate the effect of managerial role based TMS on ISPP. However, there may be other factors that affect the performance of IT/IS projects. Section 2.4 explained that TMS is possibly only one of the CSFs that a project manager may need to be concerned about (Belassi & Tukel, 1996). In fact, there are studies that investigate various other factors in relation to the project outcome.

Organisational Size: Organisational size is identified by numerous studies as an important variable (Lim et al., 2012; Bajwa et al., 2008; Boh & Yellin, 2007; Karake, 1995), and was selected to be controlled to prevent undue influence on the findings from this research. The size of the organisation is known to dictate the organisational structure, and it is said that the strategy follows structure (Grant, 2010). Strategy will command everything about an organisation, including projects that are carried out within. Hence, it was decided to control organisational size that dictates structure and strategy.

Industry: The industry in which an organisation competes, has a lot to do with the way it operates (Johnson et al., 2011; Grant, 2010). Certain industries such as airline, health care, telecommunication, banks etc. take a critical approach towards ISPP. It is almost needless to point out that some of the projects carried out in these industries may be life threatening if not properly handled. Hence, it was decided that the industry in which the organisation (that hosts the project) operates should also be added as a control (Boh & Yellin, 2007; Tai & Phelps, 2000).

Project Type: The type of the project may be identified with the terminology associated with the host organisation. Whatever this terminology is, if a project is deemed important for the survival and success of an organisation, then the top management will inevitably pay attention to it (Müller & Turner, 2007). Examples of some project types are: software development, implementation, integration, migration and so on.

Gender & Age: The project manager's *gender and age* were two variables that were also controlled in order to prevent any impediment to the main area of research. There are studies that investigate the possibilities of project manager gender (Henderson & Stackman, 2010) and age (Eweje et al., 2012; Karake, 1995) being influential factors in determining the project outcome.

Project Complexity: When a project is identified as highly complex, it may be prioritised and placed under close scrutiny by the top management and more support may be channelled to the project. Hence, project complexity may impede the intended course of research. There are many measurements of project complexity; some common ones include project budget, number of project employees and project duration (Williamson, 2011; Yang et al., 2011; Green, 1995).

The preliminary conceptual framework for this study is illustrated below (Figure 2.5), with independent, dependent, moderator and control variables.

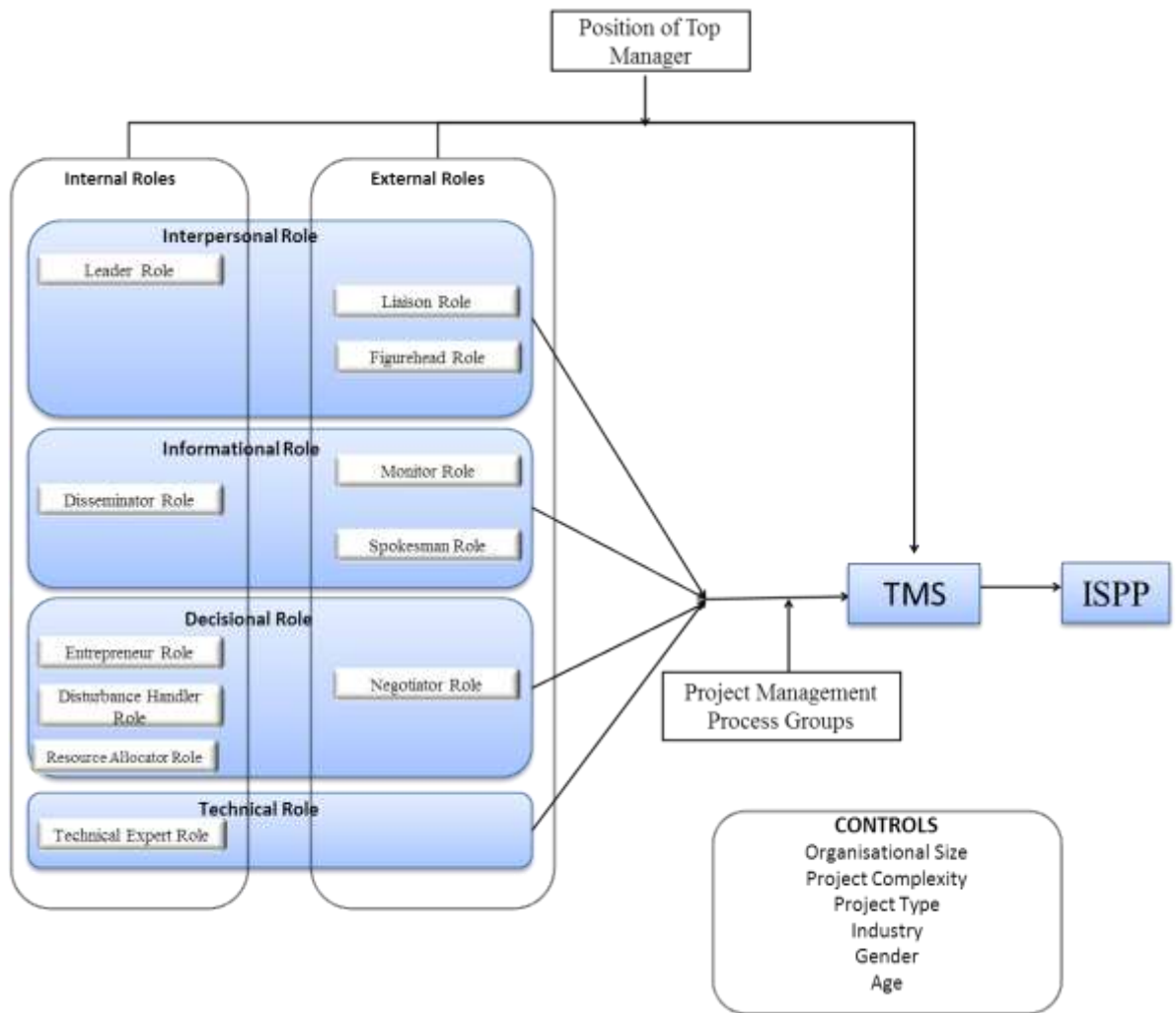


Figure 2.5: The preliminary conceptual framework

This preliminary conceptual framework is considered the entry point to this research study. Further investigations are suggested to refine the preliminary conceptual framework. Therefore, two qualitative investigations were carried out, and are explained in Chapter 4. The conceptual framework was further refined using the findings from the qualitative methods. These findings were also utilised to compile the propositions. The refined conceptual framework and the propositions are discussed in Chapter 5.

2.9 Chapter Conclusions

This chapter placed the theoretical foundation for the research study reported in this thesis. Care was taken to refer to reputable sources for information to improve the credibility of the study. Information referred to on IT/IS projects pointed out that there is a large interest concerning these projects. However, project performance is reportedly unsatisfactory. The blame is directed at inadequate management of CSFs. An array of CSFs is stated in the literature as important for projects. However, only a handful of them have been identified as CSFs of high importance.

Top management support is identified as a CSF of very high importance for ISPP. Yet, adequate information with regard to what constitutes TMS and its changing nature within a project has not yet properly been recognised. Thus, top managers that render support and project managers that request support appear to be unaware of the type of support needed, and when support should be requested. As a result, project performance appears to suffer. Therefore, it is necessary to advance the body of knowledge with regard to top management support for IT/IS projects.

This study chose to investigate TMS from the perspective of supportive actions brought about by the behaviour of the top management. There appears to be a close resemblance between actions that are considered supportive, and the actions that make up traditional managerial roles. Hence, an a-priori definition based on Mintzberg's *role-theory* from 1973 is proposed for the concept of TMS. This novel definition adheres to academic guidelines (Osigweh, 1989). Utilising this definition, the author plans to redress the gaps found in the literature. Hence, further investigations are planned to identify the causal effects of TMS on ISPP.

In preparation for further study, this chapter introduces the main research question and the preliminary conceptual framework. The conceptual framework illustrates the concepts being studied and their general direction. Also illustrated are moderator and control variables. Further investigations using qualitative methods are expected to provide further insight into the research study. Chapter 3 presented next will explain the selection of methods and their applicability for this study.

CHAPTER 3

3 RESEARCH METHODOLOGY

3.1 Chapter Introduction

This chapter presents the research methodology, thus, discussed in detail are the methods utilised, the framework and the decisions made with regard to the research study (Perry, 1998).

The Section 3.2 that follows presents a brief reminder of the research problem in preparation for the lengthier discussion on the research design. Section 3.3 presents the research design; first, the importance of the choice of methods is discussed prior to identifying the suitable approach for this research study. After considering the differences between the multi-methods and the mixed-methods approaches, the latter is selected for this study. The mix of methods utilised in this research study, i.e. the interviews, the focus group and the survey are explained in some detail. Also discussed in this section is the use of the conceptual framework. The research operationalisation with the construct definitions and construct measurement is presented next.

Section 3.4 discusses the selection of participants for the study, the unit of analysis, and the storage of the data. Section 3.5 that follows discusses the ethical considerations for each method undertaken. The analysis of the data obtained from each method is discussed in Section 3.6, followed by the section that discusses the research rigour. The rigour applied during a research is highly influential towards the acceptance of the study by the research community. Section 3.7 discusses the reliability and validity tests carried out for ensuring the research rigour in this study. The conclusions with regard to the research methodology are presented in Section 3.8.

3.2 The Research Problem

Information Technology and Systems Project Performance (ISPP) is below expectation (Wright & Capps, 2011; Meredith, & Mantel, 2011). Hence, there is a general call for in depth analysis on the factors that critically influence project performance (Müller & Jugdev, 2012). Top Management Support (TMS) is one such Critical Success Factor (CSF) listed in industry reports (Standish Group, 2013) and academic literature (Elbanna, 2013). A critical review of the literature indicates that a clear view of the concept of TMS is not yet available (Dong et al., 2009). This is seen as a contributing factor for the undesirable levels of ISPP. The research reported in this thesis investigates TMS, its constituents and its effect on ISPP. In line with this plan, a novel concept definition for TMS is proposed using top management roles from popular management theory (Mintzberg, 1973). The research study then proceeds to evaluate how TMS obtained via managerial roles affect ISPP.

The research question that was designed to capture these investigations in a single research inquiry reads, *“Does top management engagement in managerial roles help to achieve top management support, which in turn helps to improve the performance of IT/IS projects?”*.

3.3 Research Design

3.3.1 The Importance of the Choice of Methods

The outcome and the impact of the research are usually highly influenced by the methods employed (Scandura & Williams, 2000). A combination of methods or as the literature points out, a pluralistic approach (Mingers, 2001) is better recognised in the IT/IS discipline. However, before proceeding any further, it is necessary to first state the method(s) selected for this research study, and why they were selected.

A pluralistic approach was selected since the phenomenon that is being investigated is employing a novel approach. The concept of TMS has never before been investigated using a managerial role perspective. In fact, TMS has not been considered and researched as a concept that has certain attributes that needs

recognition. The causal effect on ISPP has also not been investigated from the viewpoint of a single overarching concept such as TMS.

Hence, the problems being investigated and the context in which it's being investigated are novel. A research project with such attributes will benefit from being investigated using more than one method (Venkatesh et al., 2013). An integrated view of the findings from a pluralistic method is expected to provide a more conclusive view of the phenomenon. There are two popular pluralistic approaches, the mixed-methods and the multi-methods. The next section describes the considerations made on the method selection.

3.3.2 The Choice of Methods: Multi-Methods or Mixed-Methods?

A study that is designed to adhere to a pluralistic approach for the benefit of a single research inquiry may employ an array of quantitative or qualitative methods. This approach is known as the multi-method approach. On the other hand, a research that utilises a mix of methods is identified as adhering to the mixed-methods approach. The terms *mixed-methods* and *multi-methods* are used interchangeably in the literature, but, clear identification of the research method(s) being utilised is necessary (Venkatesh et al., 2013). Employing a mixed-method approach in research studies help to achieve, “*complementarity, completeness, developmental, expansion, corroboration/confirmation, compensation, and diversity*”, (Venkatesh et al., 2013, p. 25).

A pluralistic method, although much acclaimed is not without its problems. While case studies, interviews and surveys account for most used methods in a pluralistic approach (Gable, 1994), they bring about compatibility issues. For example, case study and interview methods are mostly reported in the interpretivist paradigm while the use of the survey method is mostly reported in the positivist paradigm. Hence, a researcher has to compare and interpret findings that are possibly contradicting. Biases on methods by research community, insecurities regarding publishing and legitimacy in combining two opposing paradigms are also some matters of concern (Smithson, 1991).

Veterans advise that one should not be overly concerned about the divide between the interpretivist and the positivist paradigms (Weber, 2004). They say that these paradigms are debatable based on the context being used. The advice given is to consider the complementary values that are available when using different methods. For instance, qualitative studies with their exploratory abilities to discover information are advised to be used prior to quantitative research such as the survey method. Qualitative studies are known to be better liaisons when building research frameworks (Gable, 1994). Focus group studies are also quite popular with the research community as they bring the possibility of creating a synergy of expertise. Sutton & Arnold, (2013, p. 84) has noted that it is advisable to carry out focus group studies after interviews to, *“help the researcher develop a baseline understanding that may allow for better facilitation of group sessions”*.

Taking into account the problem context and the theoretical background, the study reported in this thesis adhered to a mixed-method approach (Mingers, 2000). The research study was designed to carry out the interview method first (Gable, 1994). As per scholarly advice (Sutton & Arnold, 2013), with further understanding gathered on the research context following the interview findings, the focus group method was carried out next. The preliminary Conceptual framework was refined using the findings from the interview and the focus group methods and was further investigated with the survey method. In summary, the research reported in this thesis utilised a mixed-method approach with both qualitative and quantitative methods. A comparative view of the details with regard to the methods used is presented in Table 3.1 below. The next section describes the choice(s) made on the presentation of the research concepts and the hypotheses.

Table 3.1: A comparative view of the mixed-methods

	Interviews	Focus Group	Survey
Purpose of Study	To refine the Conceptual Framework & Research Question	To refine Conceptual Framework & Research Question	To test Conceptual Framework, Answer Hypotheses & Research Question(s)
Source of the Constructs & Variables	From the Literature Review	From the Literature Review & Interviews	From the Literature Review, Interviews & Focus Group
Duration	Between 45 minutes - 1.15 hours	Approx. 1.5 hours	Approx. 15-20 minutes
Participants	IT and IS Project Managers and their Top Managers	IT and IS Project Managers	IT and IS Project Managers, Program Manager, IT Manager, IT Executive
No of Participants	12	5	117 (valid responses)
Unit of Study	IT/IS Project	IT/IS Project	IT/IS Project
Status of Projects	Completed	Completed	Completed
Tools / Techniques	Semi-Structured Interview Questions, Short Questionnaire	Nominal Group Technique	Questionnaire (both online & hard copy)
Data Format	Transcripts from the audio files, Microsoft Excel worksheet with Questionnaire answers	Ranked answers, Participant work sheets, audio file	Excel worksheets.
Origin of the Data	Sri Lanka	Australia	Australia
Year	2008	2009	2013
Data & Analysis Type	Qualitative	Qualitative	Quantitative
Main Data Analysis Techniques	Qualitative Coding	NGT (intergroup analysis at the focus group), Mind Maps (later)	Exploratory Factor Analysis Confirmatory Factor Analysis Structured Equation Modelling
Software	NVivo Version 8.0	--	SPSS & AMOS Version 22.0
Reliability	Intra-coder and Inter-coder	Intra-coder and Inter-coder	Cronbach's Alpha
Validity	N/A	N/A	Content Validity, Face Validity, Convergent Validity, Discriminant Validity
Other Tests	N/A	N/A	Common Method Bias

3.3.3 The Conceptual Framework Utilised in the Research

A conceptual framework is being utilised for the research reported in this thesis to pictorially depict the concepts being researched and to illustrate the direction of the research content. A conceptual framework is defined as “*a set of abstract and general concepts and propositions that provides a distinctive frame of reference for the phenomena of interest to a discipline*” (Fawcett & Downs, 1992, p.83).

Most researchers ignore giving due credit or even mentioning the conceptual framework when discussing the research design. A conceptual framework illustrates the concepts on which the methods are employed and the direction of the relationships between these concepts. Also illustrated are the propositions/hypotheses on which the findings are compared and reported. Hence, the conceptual framework is an important part of the research conceptualisation, and should be discussed in some detail with the research design.

The literature praises the many benefits of the conceptual framework (Fawcett & Downs, 1992). Some of which include the ability to depict the concepts under investigation, the ability to include previous work (theory, views etc.) along with new assumptions and the ability to connect the concepts being researched into a network. The use of these capabilities in this research study is discussed below.

The conceptual framework presented in Chapter 2, Section 2.8.2, was compiled utilising prior theory, approaches and views from the literature. The conceptual framework in this research refers to, and utilises managerial *role-theory* (Mintzberg, 1973), *critical success factor approach* Rockart’s (1979), views on ISPP and TMS. The arrows on the conceptual framework indicate the direction of the hypotheses. The Figure 3.1 below illustrates the interactions between the mixed-method approach and the conceptual framework.

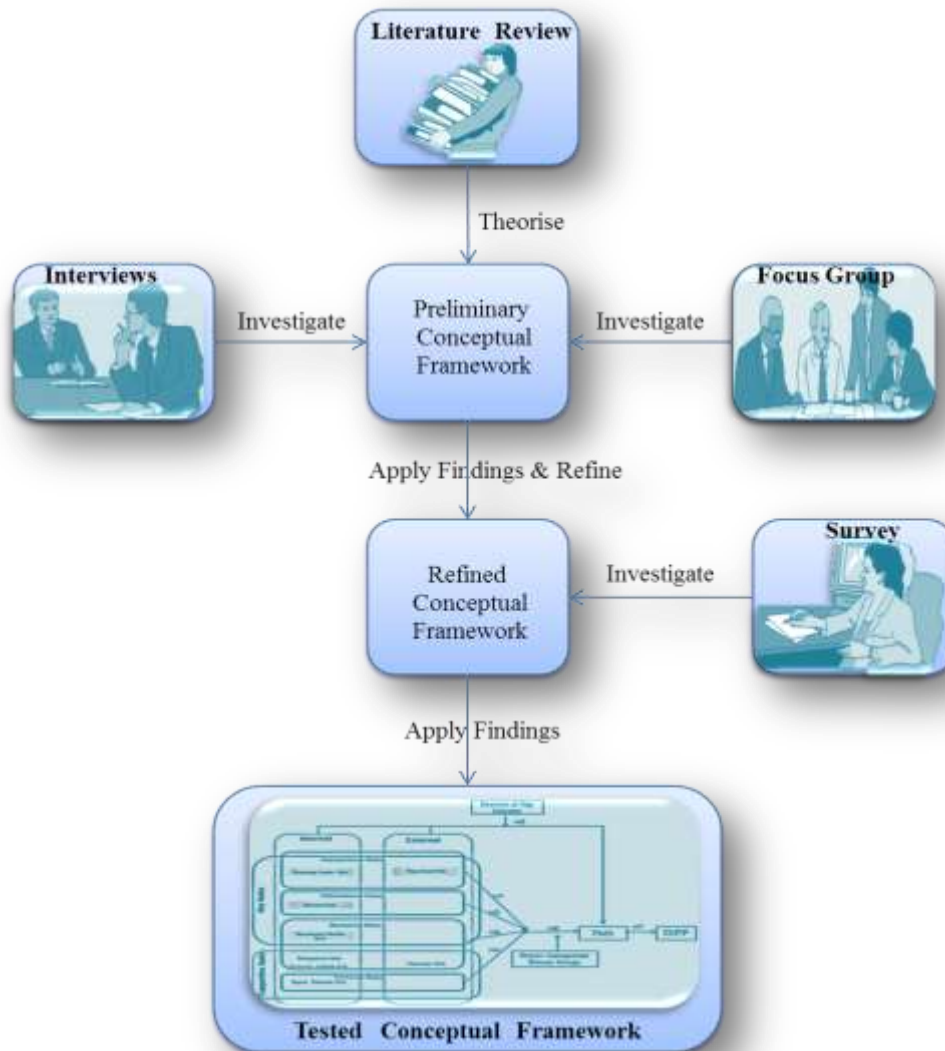


Figure 3.1: Interaction between the mixed-method approach and the conceptual framework

The preliminary conceptual framework is discussed in detail in Chapter 2, Section 2.8.2. The refined conceptual framework is presented in Chapter 5 and is tested and verified and contributed to the literature as a point of reference for future research in Chapter 8. The steps and the outcomes of the research reported in this thesis are illustrated below in Figure 3.2³.

³ Illustration adapted from Gable (1994).

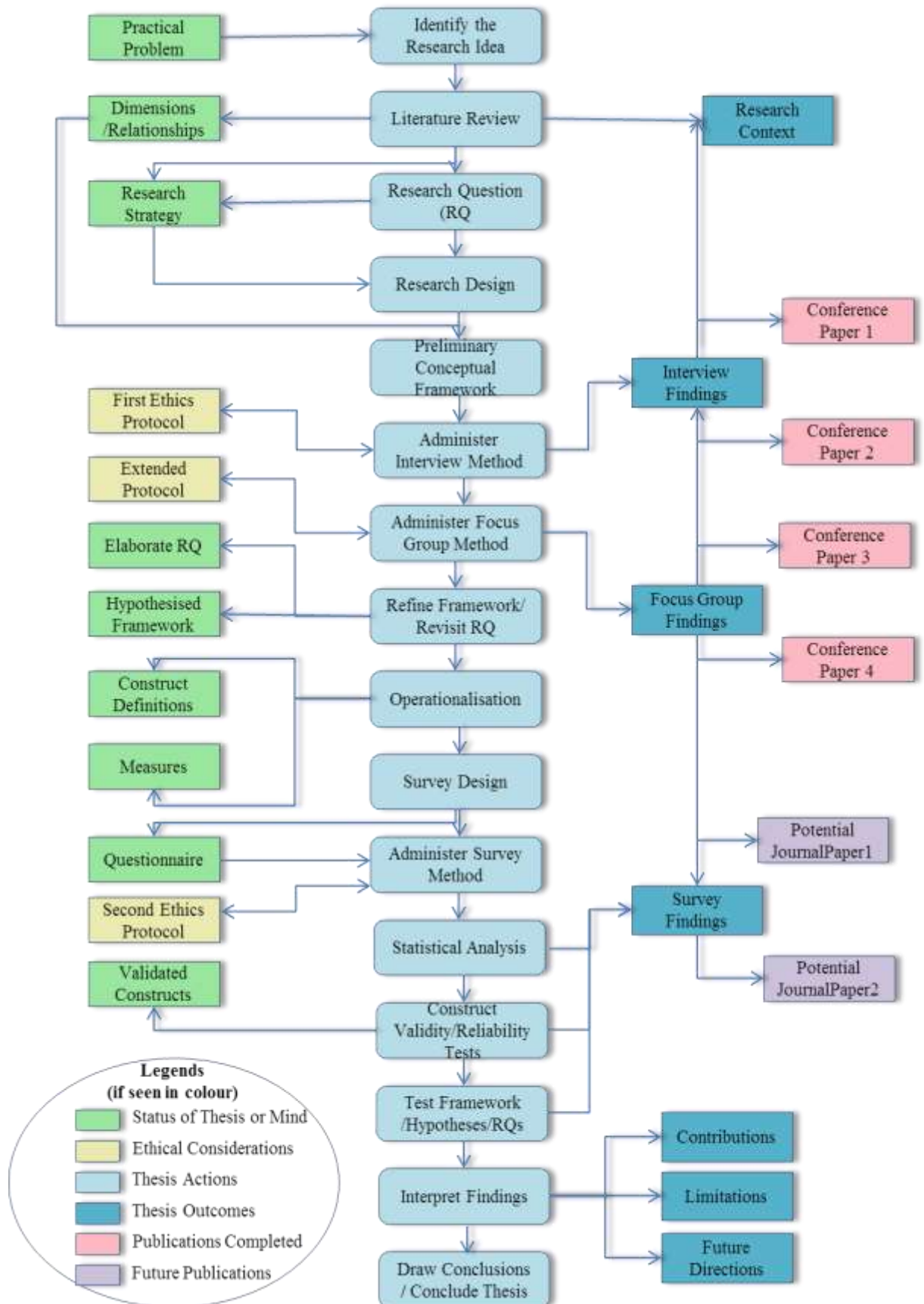


Figure 3.2: The steps and the outcomes of the research reported in this thesis

3.3.4 Use of the Terms, Concept, Construct and Variable

The terms, concept, construct and variable are used interchangeably in the literature and at times manage to confuse the reader. Author appreciates the fact that there is a very fine line between some of these terms. A concept and a construct for instance, are seen as highly interchangeable (Hoy, 2009). However, adequate differentiation between these terms at the onset of the research study will prevent misunderstandings with regard to the phenomenon being investigated. The author refers to all three of these terms in this research, thus, each term and its use in this thesis is identified as follows.

A concept is known as the domain of a construct (Byrd & Turner, 2000), and “*are the building blocks of science upon which propositions are based, and scientific knowledge exists*” (Osigweh 1989, p. 579). A construct⁴, on the other hand, “*is an abstract representation of a phenomenon of interest to researchers*” (Byrd & Turner, 2000, p. 171). Operationalising a research involves assigning operational definitions for the constructs being studied and assigning variables to measure them (Hoy, 2009). A variable, as the name implies should vary as per the situation and should not be a constant. There are many ways that a variable can be measured. The ratio scale is of particular interest for this study as it is ordered, starts with a zero, and has equal intervals until the maximum number for the variable is reached. The use of these terms in this thesis is as follows.

This research study investigates in detail the effect TMS has on ISPP. For this purpose, this study identifies TMS as not just a shallow factor of concern, but as a multifaceted concept that needs attention. Hence, finding the constituents and the nature of TMS and how they affect ISPP were all included in the research scope. The findings from the study reported in this thesis were utilised to propose a new definition for the concept of TMS.

⁴ A construct is also known as a latent variable. (Hoy,2009)

The constituents of TMS and ISPP were identified and referred to as constructs throughout this thesis. Operational definitions were compiled and (reflective) measures were created for the constructs being studied. The measures were referred to as items / questions on the questionnaire and Ratio scales were used for recoding data points. During the analysis, the data collected across all questionnaires for a particular measure/item/question is referred to as a variable. The variable names used during the quantitative analysis using statistical techniques⁵ are available in Appendix D.2.

3.3.5 The Operationalisation

Constructs investigated in the study reported in this thesis were grounded in theory (Mintzberg, 1973; Lau et al., 1980) and practice (e.g. the Nurturer role elicited from the interview method). The operationalisation of a research focuses on two main areas. The first is the assignment of appropriate definitions for the constructs being studied. The second is making available the measures that are suitable for these constructs.

Some measures and definitions exist in the literature for the constructs being studied (Grover et al., 1993; McCall & Sergist, 1980). However, they do not meet the current trends in the IT/IS discipline. One highly noticeable trend seen in the literature recently i.e. from after the year 2008, is the call for the use of the reflective measures. Some prominent studies have identified the formative measure to be problematic (MacKenzie et al., 2011; Kim et al., 2010; Petter et al., 2007). Hence, it was decided to adapt, modify and/or create definitions as appropriate and also to create the necessary reflective measures for the constructs. The operationalisation is discussed in detail in Section 6.3 and Section 6.4, in Chapter 6.

⁵ Statisticians refer to statistical terminology that is universally accepted. It should be noted however, that they are different from the terminology used in the research design/conceptualisation. For example, techniques such as EFA and CFA refer to the construct/latent variable as a factor.

The construct definitions and reflective measures were first subjected to a Content Validity test. Then, after making the necessary changes, the measures were subjected to a Face Validity test. Reflective measures were created for the managerial roles and ISPP. A suitable construct definition and reflective measures were identified for TMS in the literature (Akgün et al., 2007). The reflective measures that were created in regard to ISPP and the managerial role engagement were assigned an eleven (11) point ratio Likert scale. This scale has zero (0) as the origin and five (5) as the middle point and ten (10) as the end point. The scale increments by 1 and could be substituted as percentages in respondents mind when answering questions. New measures were created for the moderating and controlling variables also. Detailed information regarding the questionnaire is available in Chapter 6.

The Figure 3.3 depicting the conceptual framework illustrates in colour⁶ the constructs for which the new construct definitions and measures were created.

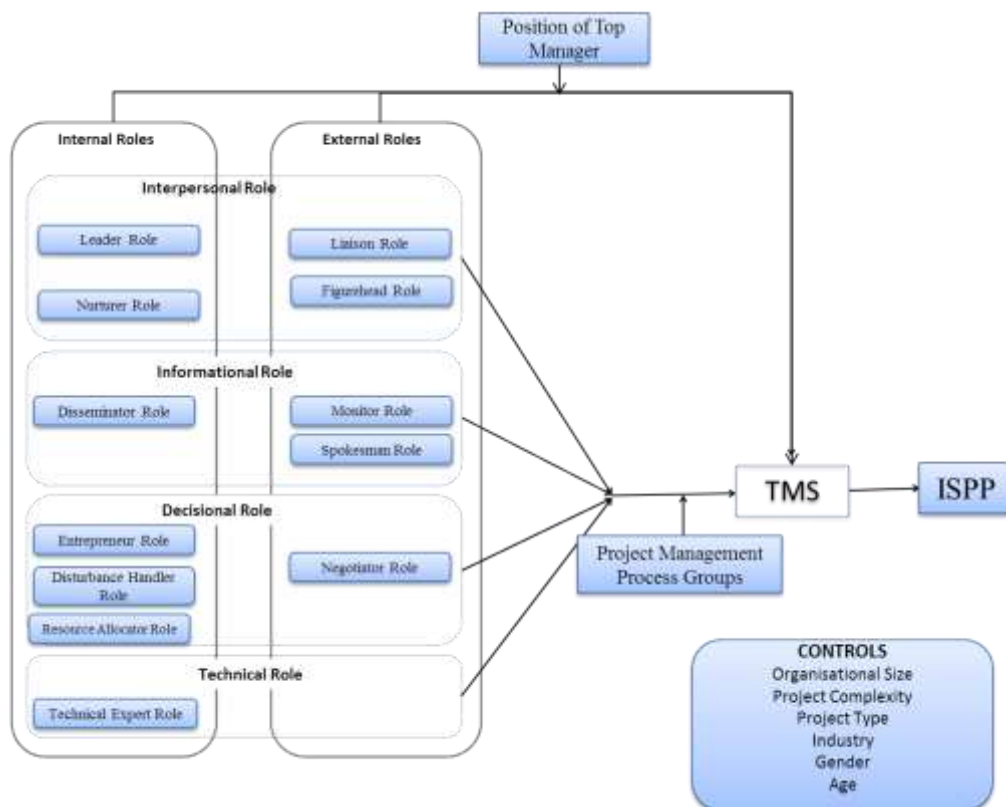


Figure 3.3: The constructs for which new definitions and measures were created

⁶ The Blue colour on the soft copy, may be seen as Grey if printed in black & white

3.4 Choices made on the Research Investigation

3.4.1 Research Study Participants

Separate participants were invited for each method in the mixed-method approach. The ideal scenario for all methods would have been to obtain IT/IS project managers with at least 1 year of experience as participants. However, in the real world, IT and IS projects are usually carried out by middle managers with diverse positions assigned to them based on their organisational hierarchy. The participants obtained for each method are as follows.

In the interview method, the researcher was successful in interviewing six IT and IS project managers, one for each project studied. Six top managers that were attending to the projects being discussed were also interviewed. This approach helped to iron out any biases brought on by interviewing just one participant per project. Interviewing top managers also helped to understand TMS from the point of view of the top manager. The interview participants were obtained from Sri Lanka, where the author was previously employed. The invitations to participate were initiated from Australia and were followed up in Sri Lanka. Since the underling theory being applied in the study is accepted as a universal doctrine (Chareanpunsirikul & Wood, 2002), no problems were identified with collecting data from overseas.

The focus group was carried out with five project managers that were engaged in IT/IS projects. In order to find these project managers, the author made a brief presentation on her research study at an event where IT/IS project managers attended. Four participants were obtained at this event. A fifth participant answered an e-mail advertisement sent out to the author's network of contacts.

The survey method demanded a much larger number of participants. Once again, the author turned to project management institutes in Australia as well as tapping in to her own network of professionals. The Sydney Chapters for both the Project Management Institute (PMI) and the Australian Institute of Project Managers (AIPM) answered the call. The Australian Computer Society (ACS) was also

responsive to the request. The number of valid responses for the survey method was 117.

3.4.2 The Unit of Study

An IT/IS project was selected as the unit of study. The author encouraged participants in all three methods (interviews, focus group and survey) to discuss and answer questions with regard to a project that has already been carried out and completed in the recent past. The author preferred the product of the project to have been handed over to the customer, rather than discussing a project that was abandoned. This was in order to revive the memories of TMS obtained and relate it to the project's performance (ISPP). Another reason for selecting completed projects was because this study investigated the need for TMS from across the project management process (Initiation, Planning, Executing, Monitoring & Control and Closure). As such, answering questions relating to an actual experience was expected to bring forth genuine information as opposed to answering questions superficially.

3.4.3 Data Formats and Storage

The raw data for each method were in different formats, for instance, the interviews were recorded. These audio files were then utilised to transcribe and compile transcripts. A short questionnaire with regard to the performance of the project being discussed was also handed out to participants. Answers to these questionnaires were entered into a Microsoft Excel file. The audio files, transcripts and the Excel file were sent to the principal supervisor for storage. The author has also kept a backup copy of the data on an external hard drive.

The focus group discussions were also recorded; however, they were not transcribed as closely as the interviews were. Instead, important points were noted. The Nominal Group Technique (NGT) allowed analysing and ranking of the top answers during the focus group meeting. The participants were handed out worksheets in order to write their answers and workings. These worksheets were collected and stored along with the audio file from the focus group discussion. A large white board which had

the capability to scan and print the contents on the board was used during the focus group meeting. This printout was collected and was sent with the other documents for storage. Once again, the principal supervisor was given the main copy for storage and the author has kept a backup copy.

The interviews were hosted online on www.surveymonkey.com, hence, the author had the choice of saving the data in multiple file formats. Some participants preferred to fill the questionnaire on paper. These paper based questionnaires were collected and answers were manually entered online on www.surveymonkey.com. This is a facility provided by the Survey Monkey web site to enable researchers to save all of the data in one file. The survey data were downloaded as a Microsoft Excel file and a copy was given to both the principal and the second supervisors. Additionally, the paper based questionnaires were handed over to the principal supervisor to be kept under lock and key as suggested by the Ethics Committee at the University of Wollongong. All of the data pertaining to the research study reported in this thesis will be kept up to five years following the submission of this thesis in July 2014.

3.5 Ethical Considerations for the Research

Stringent measures were implemented to protect the respondent rights and privacy abiding by the academic ethical procedure. According to the procedure followed by Australian Universities, the participants reserve the right to be anonymous, the right to not participate, the right to withdraw at any time during the research process and the right to access the contact person for any further details or concerns.

Each method in the mixed-method approach was carried out in adherence to the stringent procedures imposed by the relevant Ethics committee(s). Approval to conduct the interviews was obtained in December 2007. This protocol (2007/2282) was issued with a validity of up to five years (Appendix B.2). The interviews were carried out in January and February in the year 2008. The focus group method was scheduled for June 2009, and the Ethics committee was informed and the previously mentioned protocol was reopened. A new protocol was issued for the survey method

in July 2013. The protocol (HE13/291) was issued with one year of validity. Approval letter received with regard to the protocol is attached in Appendix C.4.

Prior to carrying out each method, i.e. the interviews, the focus group and the survey, participants were presented with an information sheet and a consent form. The information sheet carried details with regard to the participant rights, the research, the researchers and the method. The participants were advised to retain the information sheet for future reference. The consent form carried similar information, but participants were asked to sign and return them. The returned consent forms are now stored securely as explained in Section 3.4.3, and can be accessed if needed. No participants have expressed any concern with regard to the research or the use of the data they provided.

3.6 Data Analysis

3.6.1 Interview Data: A Qualitative Analysis

The interviews were recorded and were later transcribed. These transcripts were imported into software that has the capability of qualitative data analysis. This software used for the interview data analysis is NVivo Version 8.0. Previous researchers (Miles & Huberman, 1994; Bazeley, 2007) explain that the data analysis is a recursive process. This statement was found to be true and several steps of analysis had to be carried out before the data started making any contextual sense. The aim of the analysis was to identify top management actions that were deemed as TMS by the interviewed project managers. In the first instance *free nodes* were created and later when better understanding and insights were gained, data were structured into *tree nodes*. In the next step, some *tree nodes* were combined as they were harbouring similar information. The final result was a set of sixteen coded actions that were considered as TMS for IT/IS projects. The interview data analysis is discussed in detail in Chapter 4, Section 4.2.

3.6.2 Focus Group Data: A Qualitative Analysis

The Nominal Group Technique (NGT) introduced by Van de Ven & Delbecq (1974) was utilised at the focus group meeting. The NGT facilitates equal participation, effective idea generation, structured approach and the ability to carry out intergroup analysis during the focus group meeting (Boddy, 2012; Harvey & Holmes, 2012; De Ruyter, 1996). Hence, the first step of analysis took place during the focus group meeting. The answers generated by all participants were put forth to be evaluated by the participants themselves. Adhering to a ranking system, the top five answers were picked. The work sheets used by participants were collected and were used as a source of further information by the author during further analysis. The focus group discussion was recorded, although it was not fully transcribed, important information was noted. These notes were used as a source of additional information by the author during further analysis. Details with regard to the focus group method and the data analysis are further discussed in Chapter 4, Section 4.3

3.6.3 Questionnaire Survey Data: A Quantitative Analysis

The survey data needed some preparation prior to being subjected to the analysis. The preparation included identifying missing data, substituting values, and introducing coding where necessary (refer Chapter 7, Section 7.3). Preliminary tests were utilised to investigate the data for unengaged responses, skewness & kurtosis and normality. The author then carried out some further tests to get a general idea about the data (Coakes et al., 2010). Hence, the descriptive statistics technique was employed to explore the data regarding the project type, the budget, number of project employees, the industry, the project manager's age, experience, gender etc. These initial tests provided the author with a sense of familiarity with the data and confidence to press forward with more rigorous statistical analysis techniques.

The overall plan for the quantitative analysis was designed to identify with the network of theoretical concepts illustrated in the conceptual framework illustrated in Chapter 5, Section 5.3. Hence, a modelling technique for identifying causal effects was determined as necessary. Structural Equation Modelling (SEM) was selected as

the most suitable modelling technique since the data was found to meet the multivariate assumptions (refer Chapter 7, Section 7.10.2).

First however, the data were subjected to an Exploratory Factor Analysis (EFA). This procedure is a mechanism used by researchers to reduce the number of factors being studied. The software tool, SPSS Version 22.0 was utilised for this purpose. Care was taken not to be carried away with this statistical procedure in a manner that would contradict the theoretical conceptualisation of the research problem (Coakes et al., 2010). Then, utilising the output from the EFA, the data were subjected to a Confirmatory Factor Analysis (CFA). The CFA statistical procedure was utilised in two ways. Firstly, the CFA was used as a mechanism to validate the questionnaire. Secondly, the CFA was used as a prerequisite for SEM, and is explained below.

The literature recommends composite values to be imputed for latent variables when the structural model is multivariate with a large number of variables (Arbuckle, 2013). Such is the model reported in this thesis. Hence, the CFA based imputation function was used to impute values for the latent variables. Structural equation models were drawn with the software tool AMOS version 22.0. An array of findings was elicited from the statistical procedures mentioned above. Details on the quantitative analysis are presented in Chapter 7.

3.7 Robustness of the Research

Each method in the mixed method approach was subjected to validity and/or reliability tests as appropriate. The interview and the focus group methods were subjected to inter-coder and intra-coder tests to ensure the reliability of the findings (Miles & Huberman, 1994). In the survey method, prior to the data collection, the content and face validity tests were carried out. After the data collection, other reliability and analysis tests were also carried out. Tests carried out on the data that were collected from each of the methods are explained below.

The reliability tests carried out on the interview and the focus group method findings are discussed first in some detail.

3.7.1 Reliability Tests: The Interview and Focus Group Methods

The intra-coder test requires the same person that carried out the initial coding to repeat the analysis and state the agreement between the two attempts. There needs to be a lapse of time between the first and the second attempts. The inter-coder test requires a person other than the first person who analysed the data to follow a similar set of steps in analysing the data and state their findings.

In order to identify the intra-coder agreement on the interview data, the author carried out the analysis using the same transcripts used in the first instance. The same steps that were followed in the first instance were followed after three months. No major differences surfaced. Identifying the inter-coder agreement required a third party with the skills required to analyse qualitative data. An academic who is also a subject expert honoured the request made by the author and analysed the data. The inter-coder agreement for the interview method was 78%. The differences were considered and were used to enrich the findings.

The focus group findings were based on the material produced utilising the NGT. Hence, there was a very slim chance for the intra-coder findings to differ. The test however was carried out by the author of this thesis and as expected no differences surfaced. The inter-coder test was carried out by a subject expert who was not previously involved in this research. He was given the top ranked answers from the questions, participant worksheets, and notes made from the audio file. The inter-coder agreement was 86% and the differences were entertained when finalising the focus group findings.

3.7.2 Reliability and Validity Tests: The Survey Method

Content & Face Validity

These two validity tests were carried out prior to the data collection. Although separately carried out with different agendas, they also had common goals. Some of these include: making sure that the questions on the questionnaire means the same to all participants and minimising cosmetic errors (spelling, grammar, etc.).

Content validity is practised in research to sift the best measures from a pool for a particular construct (Cronbach & Meehal, 1995; Neuman, 2000). It is possible to carry out this exercise in two ways. First, it is possible with a large group, but without much in-depth discussions. With this method, an algorithm may be employed to pick the best measures (Lawshe, 1975). Secondly, it is also possible to carry out the content validity with a smaller group, but with in-depth discussions. It is a fact that the participants from these tests cannot be part of the actual survey. Hence, in order to preserve the participant numbers, the author chose to discuss the content in detail. Three senior academics and an IT manager participated spending their time generously to discuss and to suggest improvements. They selected the most suitable measures for each construct. These discussions were done separately with each participant and were independent of each other. A preliminary version of the questionnaire was prepared with the measures that were selected during the discussions.

The face validity was carried out with a different set of experts to that of the content validity. They corrected spelling and grammar and also suggested improvements on the formatting, grammar and wording to make the questionnaire more appealing to the participants. Six people in total, consisting of two academics, one IT manager and three IT project managers participated in the face validity tests.

Reliability Analysis

Cronbach's alpha tests (Cronbach, 1951) are usually employed on the questionnaire measures to analyse the internal consistency. In this study, several Cronbach's alpha tests were carried out using the software SPSS Version 22.0. In all attempts the tests obtained values higher than the threshold specified in the literature. That is, a value greater than 0.7 was obtained for measures in all tests. Hence, the reliability tests were sufficiently passed. Further details on the reliability analysis are available in Chapter 7, Section 7.6.3.

Convergent Validity

The convergent validity is a test designed to investigate if the measures used for the same construct belong together (Neuman, 2007). The questionnaire used in the research study reported in this thesis uses reflective measures for the main constructs. Hence, the latent constructs with reflective measures can be investigated for convergent validity using the average variance extracted (AVE). The literature prescribes a threshold value greater than .50 for the AVE (MacKenzie et al., 2011). The critical ratio (CR) for the same construct is expected to be greater than the AVE. In the convergent validity tests that were carried out for this research, both these criteria were met. Further information on the results obtained for the convergent validity test is available in Chapter 7, Section 7.9.1.

Discriminant Validity

Discriminant validity seeks to identify if associations between measures of two different constructs exist (Neuman, 2007). The existence of such associations is highly undesirable. An approach prescribed in the literature to determine discriminant validity is to find out if the square root of the AVE obtained for each construct is larger than the inter construct correlation values (Lowry et al., 2013; MacKenzie et al., 2011). As per this prescription, the current study meets the required criterion to avoid any problems. Further information on discriminant validity tests that were carried out in this study are available in Chapter 7, Section 7.9.2.

The Common Method Bias

The common method bias may cause the values obtained for the causal relationships to be confounded and may contribute towards measurement errors. *“Common method biases arise from having a common rater, a common measurement context, a common item context, or from the characteristics of the items themselves”* (Podsakoff et al., 2003, p. 885). This study uses the common latent factor technique to investigate common method bias (Bagozzi, 2011; Podsakoff et al., 2003). This technique specifies that the model needs to be investigated with, and without the common latent factor to detect any major differences. The results obtained illustrated that there are no significant differences between the standardised regression weights

obtained on the model, with and without the common latent factor. All differences are ≤ 0.1 . Common method bias tests carried out for this study are explained in detail in Chapter 7, Section 7.8.

3.8 Chapter Conclusions

This chapter discussed the research methodology utilised for the study reported in this thesis. The study used a mixed-method approach with a combination of qualitative and quantitative methods. Twelve interviews, a focus group discussion, and a questionnaire survey were carried out in adherence to the mixed method approach. The study was initiated with a single research inquiry. A conceptual framework was utilised to depict the network of connections between the constructs being studied. The interviews and the focus group findings assisted in refining the conceptual framework, and the construct operationalisation. Thereafter, the survey method was carried out. All methods were subjected to stringent ethical considerations to protect participant privacy.

This chapter also mentions that the preferred participants were middle managers (such as IT/IS project managers) who managed IT/IS projects. The selected unit of study is an IT/IS project, with preference being given to completed projects. Completed projects were selected with the intention of making the connection between TMS and ISPP, also, to investigate the spread of TMS across a project. The robustness of the research was ensured using various reliability and validity tests prescribed in the literature. The data analysis for each method was separately carried out with tools that assisted qualitative and quantitative methods.

The qualitative methods were carried out prior to the survey method, since they are known for their exploratory abilities. Hence, the details of the interview and the focus group methods are discussed below in Chapter 4.

CHAPTER 4

4 INTERVIEW & FOCUS GROUP METHODS

4.1 Chapter Introduction

Top management engagement in managerial roles leads to Top Management Support (TMS). A new notion was grounded in the literature and was presented in the form of a preliminary conceptual framework in Chapter 2. Carrying out various confirmative investigations on theoretically grounded notions is highly regarded in the literature (Hinkin, 1995; Hinkin, 1998; Fornaciari et al., 2005). Van de Ven (2007, p. 78) says that “*grounding a problem in reality entails an exploratory study into the nature, context and what is known about the problem*”. This chapter reports the design, participant selection, materials used, implementation, analysis and a discussion of two exploratory investigations using interview and focus group methods.

The interviews were carried out with twelve participants from five organisations from across six projects. They were carried out in January/February 2008, in Sri Lanka with six IT/IS project managers and six top managers from the same project environment. The interviews were assisted with semi-structured questions and a short questionnaire. The focus group method was carried out with five IT/IS project managers in June 2009, in Australia. The Nominal Group Technique was utilised to assist the focus group method. Ethical approval was obtained prior to carrying out both the interview and the focus group methods. Reliability of data analysis was determined for both these methods with inter-coder and intra-coder tests.

The organisation of this chapter is as follows. Section 4.2 presents the interview method and Section 4.3 presents the focus group method. A brief comparison of the two methods is presented in Section 4.4. Conclusions regarding the interview and focus group methods are stated in Section 4.5.

4.2 The Interview Method



The interviews were carried out with the aim of gathering perceptions from industry practitioners. The choice of participants was IT/IS project managers that required TMS to carry out their project work without interruption. The participants were subtly guided with semi-structured questions to find out which top management actions were considered as TMS. The interviews were recorded and were later transcribed and analysed to elicit the findings discussed later in this section. Details of the interview method undertaken are presented below.

4.2.1 Interview Method Design

Interviews were selected as the best method of data capture for the first exploratory investigation. Interviews allow direct contact with the informant, thereby making it possible to gather the data from the source of origin. Interviews are also known to provide the flexibility of working with semi-structured questions which lead to discussions that may reveal hidden perceptions (Neuman, 2007; Kvale & Brinkmann, 2009; Seidman, 2012).

This investigation was designed to facilitate qualitative data collection from IT/IS project managers. Key personnel from the same project environment were also planned to be contacted to clarify information and as supplementary sources of further information. The two participants from each project were to be contacted separately. The detailed nature of the interview data were expected to be helpful in verifying the notions brought forth in the conceptual framework grounded in the literature.

The unit of study was planned to be an IT/IS project. The questions were loosely based on the type of supportive actions needed during a project. Data were to be collected from projects that had completed the project's product and delivered it to the customer, (i.e. a completed project). This is in order to help participants relate receiving or not receiving TMS with the outcome of the project. A short questionnaire to aid the participants to remember the outcome of the project was also designed and was to be filled by the project manager prior to the interviews. The term 'top management' was defined as the *immediate manager consulted for support* on the project.

The data collection was planned to be from Sri Lanka where the author of this thesis worked as a project manager prior to commencing this research project. It was an informed decision to collect data from Sri Lanka with the following reasoning. Firstly, Mintzberg's *role-theory* is seen investigated internationally and is accepted as a universal doctrine (Chareanpunsirikul & Wood, 2002). Hence, little or no confounding effects were expected to creep in with the qualitative data. Secondly, it was expected that the author would have a better understanding of the organisations and better reception from the participants, having previously worked in the IT industry herself. A month and a half were allocated for the purpose of contacting the organisations, making appointments and conducting the interviews. The next section will describe the participant selection for the interview method.

4.2.2 Participant Selection for the Interviews

A variety of organisations involved in IT/IS projects were contacted on the phone requesting appointments for the interviews. If these initial contacts proved to be successful, a sample of the material used for the interviews was handed over to the management for a closer look (Section 4.2.3). Around eight such organisations provided consent for the interviews. From these eight consenting organisations, five were deliberately selected representing small, medium and large scale organisations. These organisations consented to provide the time and resources for the interviews. One large organisation promised information on two projects. In one of these projects the product was successfully installed with the customer and in the other

project the product was not well received. All other organisations consented to discuss projects where the product was successfully implemented with the customer.

Main informants were project managers of IT projects. A key person from the same project was also interviewed separately. Information about each project is identified by the term '*Case*' and a comparative view of participating organisations and projects can be found on Tables 4.1 and 4.2 respectively. Detailed information regarding these *Cases* is available in Appendix B.1. The materials used to supplement these interviews are explained in the section below.

Table 4.1: Comparative view of participating organisational attributes

Attributes	(Organisation 1) Case 1	(Organisation 2) Case 2	(Organisation 3) Case 3	(Organisation 4) Case 4	(Organisation 4) Case 5	(Organisation 5) Case 6
Organisation	University with separate software development centre	Software development centre with many specialised departments	Mobile service provider	Software development centre	Software development centre	Software development centre
Customers	External (both local and foreign)	External (both local and foreign)	Self and Local Mobile service recipients	External (both local and foreign)	External (both local and foreign)	External (both local and foreign)
Size	Small	Large	Medium	Large	Large	Medium
IT Staff	14	Around 1000	35	Over 3500	Over 3500	Around 50
Model/ Standard	Company standards	CMMI Level (L)4;ISO certified	Company standards	CMMI L4	CMMI L4	Working towards CMMI L3

Table 4.2: Comparative view of participating projects attributes

Attributes	Case1	Case2	Case3	Case4	Case5	Case6
Application System	Online Tea auctioning system	Insurance system	Provisioning system for changing mobile platform	Disaster recovery handling system	Document Retention System	Online stock trading system
Customer	Internal/External (local)	External (foreign), first international customer	Internal	External (foreign)	External (foreign)	External (foreign)
Developers in project	2	15	Internal 3-4, vendor 4	12	10	5
Prioritised?	Yes	Yes: first international project	Yes: but not in isolation. Process was prioritised	No	No	No
Experienced Project Manager?	Yes	Yes	No, new recruit	Yes	Yes	Yes
Separate QA team?	Yes: (1-2 when necessary)	Yes : 4	Thorough testing, both vendor and customer	Yes: 3	Yes: (2-3 as required)	No
Constraints met?	Time Revised Cost ✓ Scope ✓	Time ✓ Cost ✓ Scope ✓	Time ✓ Cost ✓ Scope ✓	Time ✓ Cost ✓ Scope ✓	Time ✓ Cost ✓ Scope ✓	Time ✓ Cost ✓ Scope ✓
Successful? Why?	Yes: Customer is satisfied	Yes: Customer is satisfied, more business given	Yes: customer satisfied, constraints were met.	Yes: Customer is satisfied	No: Customer is NOT satisfied and system is not in use.	Yes: Customer satisfied and gained multiple clientele
Secondary Participant	Senior Proj. Member	Department Manager	Department Manager	Senior Proj. Member	Senior Proj. Member	Director
Estimated Cost (approximately)	USD 6000	USD 100,000	Not provided	USD 277,000	USD 1.2 million	UDS 60,000
Estimated Project Duration	4 months	6 months	2 months	4.5 months	7 months	12 months
Actual Project Duration (approximately)	5.25 months	7 months	3 months	4 months	7 months	12 months
Product status	In use	In use	In use	In use	NOT in use	In use

4.2.3 Material used in the Interviews

Semi-structured questions were developed to assist in driving the interview process. These questions were not handed over to the participants in a printed form, but were with the author of this thesis who guided the participants through the interviews. These questions were purposely planned to be open-ended, to encourage the participants to discuss the subject presented by the interviewer. As the projects discussed may have been carried out sometime in the past, a questionnaire was used as a supporting tool to refresh participant memory and assist in the subsequent discussion. The questionnaire was used as a road map to tease out practical examples. In designing this questionnaire, the multidimensional project success/performance model by Shenhar, Levy and Dvir (1997) was used to drive the questions. The questionnaire employed a Likert scale which offered numerical values varying from 1-5 depending on the answer. The lowest mark offered on the scale was 1 and the highest was 5. The participants were also advised that they may leave out any questions they deemed inapplicable to their project. Samples of materials used during the interview process are attached in Appendix B.2. The implementation of the interview method is given in the next section.

4.2.4 Implementation of the Interview Method

The first step was to obtain ethical approval to carry out the interviews. Hence, all relevant documents (Section 4.2.3) were submitted to the Ethics committee. Following their review process, this research project was granted unconditional approval under the low risk, but conducted overseas category (Appendix B.2).

Prior to the interviews, the participants were introduced to the ethical procedure that was in place to protect their privacy. Hence, the participants signed and returned the consent form while keeping the information sheet for future reference. Participants were then presented with the short questionnaire, and were asked to answer in relation to a project which they wished to discuss where the project's product was delivered to the customer. This exercise lasted approximately ten-fifteen minutes. The aim of the questionnaire was to draw attention to the project that would be discussed in detail in the interview that followed. A comparative view compiled

using the Likert scale values on the project performance provided by the participants is presented in Table 4.3. Once the participant completed the questionnaire, the interviews were carried out.

In total, twelve interviews ranging from 55 minutes to 1 hour 10 minutes were carried out. Interviewees were encouraged to freely convey their perceptions. These discussions were recorded and later transcribed and sent to the participants, no concerns were communicated. The author followed up by contacting the respondents by phone and was informed that they were in agreement with what was recorded on the transcripts. These transcripts were used to analyse the collected data.

Table 4.3: A comparative view of ISPP using the responses on the Likert Scale

Questions	Case1	Case2	Case3	Case4	Case5	Case6
The project met the schedule baseline	4	5	4	4	4	5
The project was completed within the agreed budget	4	4	4	4	4	5
The product quality was approved by the quality assurance team/department	5	4	4	4	4	5
The team members displayed the required level of technical skills	5	5	4	4	4	5
The project Team members remained motivated during the project	5	5	3	4	2	5
Communication protocols were defined for the project	5	5	3	4	4	5
The use of the defined communication protocols by the project team was satisfactory	5	5	3	4	4	5
Conflict among team members were at an acceptable level	2	5	5	5	4	5
The functional specifications were successfully embedded into the product	5	5	5	4	2	5
The technical specifications were successfully met	5	5	5	4	4	5
Customer accepted the product	5	5	4	4	4	5
The customer has expressed satisfaction on using the product	5	5	4	3	3	5
The customer agrees that the product fulfils the purpose for which it was built	5	5	4	4	2	5
The customer has not requested changes to the product after implementation, based on the initially agreed product requirements	2	4	3	2	2	5
The customer has gained competitive advantage among competitors due to use of product	4	5	3	3	3	5
The project generated important revenue for your organisation	4	4	4	4	5	5
The organisation gained a large market share with the sale of the product	4	4	n/a	3	5	4
More business opportunities are opening up based on the project experience	4	5	4	2	5	5
The team values lessons learned from the project	5	5	5	4	5	5
The project could be used as a model for future projects	5	5	5	3	3	5
The variance between the planned and actual plans were accepted by top management	5	5	5	4	3	5
The project performance was at a satisfactory level to the top management	5	5	3	4	4	5
Total (calculated with only the ‘applicable’ statements)	98/110	105/110	84/105	81/110	80/110	109/110
Percentage	89%	95.4%	80%	73.6%	72.7%	99%

4.2.5 Interview Data Analysis

The aim of this data analysis was to derive top management actions needed for IT/IS projects by practising project managers. The data contained many facts such as: what was needed from top management, what could have been done better if the top management were supportive, what went wrong since the top management were not attentive and so on. This *raw* data needed to be interpreted to make sense of what were considered to be supportive top management actions. A computer aided analysis tool was used to improve clarity and preserve integrity. The remainder of this section describes the steps followed.

First, the transcripts were read multiple times in order to gain an understanding or a *feel* for the data. These transcripts were then imported into NVivo version 8.0, and a qualitative coding process was initiated. Since it was not clear what actions were important, a technique named *free nodes* (Bazeley, 2007) was used to code any action by the top management that was mentioned in the transcript. Data from across the twelve interviews were analysed and related information was brought together and categorised under the codes. Each of these codes represented a top management action. As previous studies point out (Bazeley, 2007; Miles & Huberman, 1994) coding is a recursive process and should be revisited before a final set of codes is achieved. Adhering to this advice, data on the free nodes were revisited a few more times and later, once the *positive* top management actions started to appear and make sense, *tree nodes* were created. Initially eighteen codes were identified and the actions were linked to these. On revisiting the data it was understood that a more concise set of codes could be created, and the data in some codes were fitted with related codes and the final result was a set of sixteen actions considered supportive actions offered by the top management. These actions are stated in the next section.

4.2.6 Interview Findings: Supportive Actions by the Top Management

The sixteen codes identified were interpreted into sixteen top management actions. It must be stressed that these actions arose purely from the data as was intended with the design of the interview method. These actions are given below, and to further deliberate the points, quotes from the interviewees are presented along with them.

1. Participate in (project) scope definitions

Scope definition is an important part of the project and needs the attention of the key stakeholders. Project managers (Cases 1 and 6) expected the top managers from both the client and the performing organisation to be involved in the definition of the project scope. Project managers said that this prevents conflicts regarding requirements during the life of a project. The project manager of Case 3 described the top managers as “*gate keepers that prevent scope creep*”.

2. Build support in the organisational model

Having preferred or standard methods has helped project managers to successfully carry out project activities. As one project manager (Case 2) put it, “*when the customer realises that we work with proven methods, they just fall in line*”. One major aspect of these methods (Cases 2, 4 5 and 6) is to ensure participation of the client’s management alongside the client.

3. Achieve a sustainable business model

Sustainability of the business model employed both in terms of revenue and workability was pronounced to be important by the project manager of Case 5. He said that his project’s product did not meet customer’s satisfaction and pointed the finger at the business model currently employed. He pointed out that in this particular project, three parallel software versions were simultaneously developed and released to the customer. He said the customer was billed accordingly, providing good revenue, but this model interfered with software developers’ work focus. He went on to say that, “*because of this model the developers had to be constantly pulled out and plugged in where necessary, making it difficult for them to*

concentrate, a sequential release mechanism would have been a more sustainable model, and the project would have had a better chance at success”.

4. Provide guidance

Providing guidance on an IT/IS projects was explained in two different ways. Firstly, the guidance given on work tasks and secondly the guidance given on professional growth. Quotations pertaining to both views are presented below.

Project managers, as mid-level managers, are consistently pressured by operational constraints. They are well aware that they carry the responsibility of the project on their shoulders. So, they expect and welcome guidance on work tasks (Cases 1, 3 and 4). As one project manager put it *“it is not just passive evaluation, but active participation. For instance they (the top managers) might say to fine-tune the resource allocation”*. More importantly one key team member (Case 4) pointed out that the top managers *“should not let projects be orphans, but a part of the whole organisation.”*

Project managers also expected the top managers to guide them (Case 1,2,3,4 & 6), not just in operational work but in their career as a form of professional growth. An example of such a situation may be where the top manager is assisting a newly appointed project manager to gain skills and experience on the job, at the same time being patient with the project manager until he/she come up to the expected skill level. In fact, such situations were found detailed in the data - Director from Case 6 said, *“it generally takes at least 2-3 years to get to that level. Sometimes we may give a very small project to someone who we feel has this interest and ability as a way of coaching them. For instance, we have overseas projects which have to be self-managed where only one or two people are involved. In those cases we utilise the skills and let them self-manage themselves.”*

5. Supply resources

Project managers saw as very important (Cases 1 and 6) that the top managers supplied the required quantity and quality of skilled resources when necessary. One project manager (Case 1) said that it was helpful that the top manager was able to get experts from different departments when they faced unforeseen technical issues. He said *“all in all we were able to get help from others when we needed it”*.

6. Boost employee morale

Top management attendance at team meetings, commending good work and offering opportunities to travel on project work was identified as having a positive effect on the morale and project managers welcomed such support (Cases 2 and 3). Project manager of Case 2, *“I got to travel abroad on this project, apart from learning new technologies, it’s good to see new places”*.

7. Balance project assignments

Multiple projects in a project manager’s account may sometimes get in the way of success of projects that are of lower priority (Cases 2 and 5). Project manager (Case 2) explaining a project which did not meet the desired level of success said, *“I was involved in another major project and could not give this project the attention it needed”*.

Explaining the chaotic and mammoth workload of a project manager, the project manager from Case 5 said that a normal working day for him lasted from twelve to sixteen hours, and that he felt overloaded since he had many projects in his account. He said that *“I would start with a stand up meeting and see what has to be done today, then I will attend to the mail which will take me up to lunch, by afternoon I would get feedback from the team about progress, I would then attend to any communication needs and then update the tracking documentation. In the evening I would get an update, when hiccups are shown then I have to liaise and facilitate, for example hardware problems, HR or admin problems”*.

8. Prioritise

Project managers (Cases 1 and 2) found that “*when a project is prioritised, it is much easier to receive required support from the organisation*”. They also explained that soft and hard resources flow in and top management is available for any further requests and escalations.

9. Watch status

Top managers are expected to remain vigilant in relation to the status of a project. This way, if the project does go off-track, the top manager’s attention could be summoned immediately without wasting precious time on explanations. According to the perceptions of participants from Case 3, this was expected from the top management of both the performing and client organisations.

10. Having clear business objectives and stating them

Project managers and in some cases key team members maintained that it was important for the top manager to have an understanding of what the company is hoping to achieve from the project and to communicate the objectives to the project team (Cases 3 and 5). Project manager of Case 6 was very happy with the top manager contribution in this area, he said, “*this helped us a lot in order to get our technical designs right*”, he went on to say that top manager participation was crucial in *clinching* the business deal and that the top manager sat with them at times during the project.

11. Make necessary information available

Having necessary information regarding the work readily available was seen as a kind of support rendered by the top management. According to one key team member (Case 4), it would have been easier to work with better knowledge/information than what was specified. He said “*this would have prevented ambiguity of tasks and would have helped promote the success of the project*”. This action and point 10 above seem to be somewhat related. However they are elaborating on two different levels, i.e. the project level (action 10) and task level (action 11).

12. Provide challenging work

Project managers of Cases 2, 3 and 6 brought out the fact that the top manager was expected to provide challenging work. This motivated staff and was also mentioned to be the key to retaining skilled employees in the long term. Project manager of Case 6, *“when the work is routine, people lose interest and look elsewhere, you know”*.

13. Retention of key employees

Project managers indicated that they value and depend largely on capable, skilled resources. The following two factors were stated as detrimental to the performance of a project. The first is removing skilled resources from the project when they are currently being utilised. The second is failing to retain skilled resources in the organisation. As one project manager (Case 5) put it, *“I felt some attrition, for example, when I wanted to retain some personnel the management was not supportive”*.

14. Review project plans

Project managers expected top managers to review and formally accept project plans. Some project managers pointed out that this was beneficial in a number of ways. These included securing top manager buy-in and top manager ownership for the project (Cases 1, 2 and 3). It was also maintained by the project manager of Case 3, *“when revision of time or other constraint is needed, it is helpful to have top management involved in communicating the revisions to the client”*.

15. Liaise with customer

Involvement of the customer, which is known to be a required ingredient for project success, (Standish, 2009; Barki & Hartwick, 1994) is greatly enhanced if the top management from both performing and the client organisations facilitate such meetings. Project managers reported that they escalate matters to the top management if the client is slowing the project down. Project managers praised the top management for picking up such matters and liaising with the client top management to resolve matters (Cases 1, 4 and 6). Project manager of Case 6, *“when*

things are not moving from the client's side and we don't get the information, I escalate to my manager, and she then picks it up with the client manager". In some cases top management was reported to have had close business relationships with the client prior to obtaining the project (Case 2 and 6), and this relationship had been beneficial in executing project tasks.

16. Accept ownership and gain better understanding of project work

Case 2 brought out the fact that *"when top managers from both the performing and the client organisations take ownership interest in the project, it helps project success"*. In some organisations the top manager had a technical background and the project managers said that this was immensely helpful. Table 4.4 below illustrates the supportive top management actions alongside the cases where these actions were suggested.

Table 4.4: List of supportive top management actions and the supporting cases

	Actions	Cases
1	Participate in scope definitions	1,3,6
2	Build support in the organisational model	2,4,5,6
3	Achieve a sustainable business model	5
4	Provide guidance	1,2,3,4,6
5	Supply resources	1,6
6	Boost employee morale	2,3
7	Balance project assignments	2,5
8	Prioritise	1,2
9	Watch status	3
10	Having clear business objectives and stating them	3,5,6
11	Make necessary information available	4
12	Provide challenging work	2,3
13	Retention of key employees	5
14	Review project plans	1,2,3,6
15	Liaise with customer	1,2,4,6
16	Accept ownership and gain better understanding of project work	2

4.2.7 Discussion: Comparing Interview Findings with Theory

The preliminary conceptual framework presented in Chapter 2, Section 2.8, proposed that top management carrying out their managerial roles leads to TMS. This proposition was stated following careful comparison (Chapter 2, Section 2.6) of behaviour based TMS definitions from the literature with the descriptions of managerial roles (Mintzberg, 1973; Lau et al., 1980). Descriptions for managerial roles and TMS definitions both constitute of top management actions, hence, was the common ground for the comparison. The purpose of the exploratory studies reported in this chapter was to verify the notion brought forth in Chapter 2. Therefore, a similar approach comparing the actions elicited from the interview data with the ten managerial roles by Mintzberg (1973) and the Technical Expert (Lau et al., 1980) were carried out (details in Appendix B.2). The Table 4.5 presents the findings.

The roles Leader, Liaison, Monitor, Disseminator, Entrepreneur, Disturbance Handler, Resource Allocator, Negotiator and Technical Expert were all supported by the actions elicited by the interviews. A new managerial role emerged entirely from the interview findings. This is due to the action, *provide guidance for professional growth*. Project managers and key team members from Cases 1,2,3,4 and 6 stressed the importance of top manager's ability to nurture subordinates, bringing them up to speed, giving them confidence to achieve tasks etc. Therefore, a new role named the Nurturer was brought to surface.

The Figurehead role and the Spokesman roles were not supported by the findings. It is possible that both these roles are redundant in an IT/IS project environment. Some actions appear to overlap, for instance the action, *liaise with customer* could be matched with the descriptions of both Liaison and Negotiator roles, the latter is with the stronger arguments with multiple actions. Not surprisingly, similar findings were observed during the literature review (Chapter 2, Section 2.6, Table 2.3). A similar effect was observed with both Monitor and Disseminator roles. Although careful placement of actions avoided overlapping, both roles are related to communication activities and for this reason, one role may be redundant. A final decision however, cannot be taken on any of these roles without further qualitative and quantitative investigations.

Table 4.5: Comparison of Mintzberg's (1973) roles with interview findings

Mintzberg's Roles	Coded Actions Identified with the Role Description ⁷		Cases
Interpersonal Role Category			
Figurehead	-----		None
Leader	Provide challenging work [2,3] Balance project assignments [2,5] Prioritise [1,2]	Boost employee morale [2,3] Accept ownership and gain understanding of project work [2] Provide guidance: work tasks [1,3,4]	1,2,3,4,5
Liaison	Liaise with customer [1,2,4,6]		1,2,4,6
Nurturer	Provide guidance : professional growth [1,2,3,4,6] (A new addition from the interviews)		1,2,3,4,6
Informational Role Category			
Monitor	Review project plans [1,2,3,6]	Watch status [3]	1,2,3,6
Disseminator	Make necessary information available [4]	Clear business objectives and stating them [3,5,6]	3,4, 5,6
Spokesman	-----		None
Decisional Role Category			
Entrepreneur	Achieve a sustainable business model [5]	Build support in the organisational model [2,4,5,6]	2,4,5,6
Disturbance Handler	Provide challenging work [2,3]	Balance project assignments [2,5]	2,3,5
Resource Allocator	Supply resources [1,6]	Retention of key employees [5]	1,5,6
Negotiator	Liaise with customer [1,2,4,6]	Participate in scope definitions [1,3,6]	1,2,4,6
Technical Role Category			
Technical Expert	Provide guidance : work tasks [2,3]	Review project plans [2,3,6]	2,3,6

⁷ each Case that reported the action is given in brackets

An illustration of the points discussed and noted above with regard to managerial roles is presented below (see Figure 4.1).

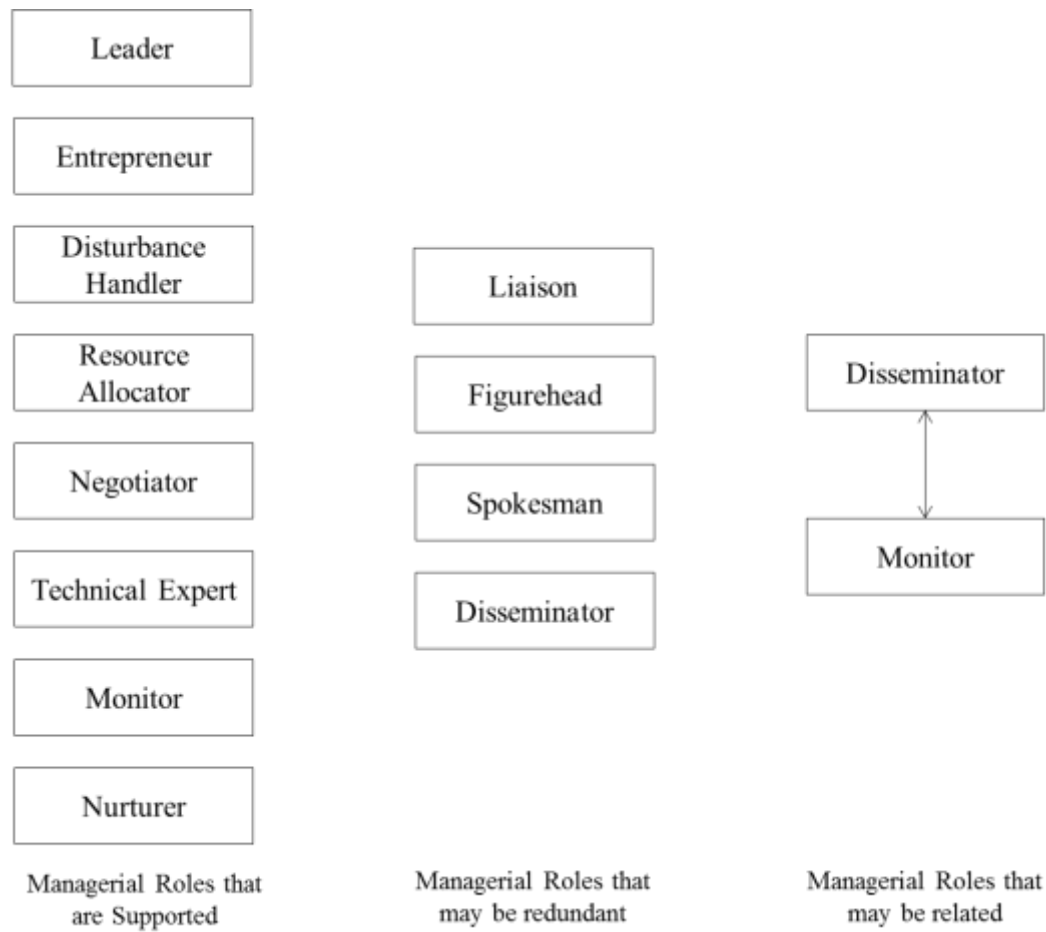


Figure 4.1: An illustration on the points noted in the discussion – Interview Data

4.2.8 Reliability Analysis for the Interview Method

The reliability of the codes was checked using both intra-coder and inter-coder tests (Miles & Huberman, 1994). The same Version (8.0) of the computerised qualitative data analysis tool NVivo that was used in the analysis process was utilised to determine reliability.

Intra-coder test involves re-coding of the data by the same person following a lapse of time, to see if there are any major differences. In adherence with these guidelines on Intra-coder analysis, the researcher revisited the transcripts three months after conducting the first data analysis. The same process carried out in the first round of analysis to elicit top management actions was replicated. In addition, the author followed up with identifying similarities between the management actions found in the reliability analysis with Mintzberg's managerial roles. The second round of analysis conducted by the researcher derived very similar results and no major differences surfaced.

Inter-coder analysis test requires a second person to analyse the data independently of the first researcher. In adherence with this requirement the researcher invited an academic expert to analyse the transcripts. The expert offered to carry out the reliability analysis randomly through several segments from the transcripts. Since there was a large volume of data, this offer was readily accepted by the author. The steps needed on the analysis however, were not compromised. Some differences between the results surfaced at this stage. These included naming of some codes and/or actions, the placement of certain quotes from the data with relevant actions etc. The inter-coder agreement was around 78% (Miles & Huberman, 1994, p. 64).

These differences were taken into account and were used as input in the recursive process of coding. Inclusion of this advice from the reliability analysis was accepted to enrich the findings and overall understanding of the research undertaken.

4.3 The Focus Group Method with Nominal Group Technique



The focus group was carried out with the aim of gathering *further* insight as to what actions were considered to be TMS by IT/IS project managers. This is the second exploratory investigation in this research, following the interview method explained in Section 4.2. Project Managers were invited for a formal gathering and utilising the Nominal Group Technique (NGT), ideas were discussed and perceptions were recorded. These recorded ideas, both print and voice media were used to elicit the results discussed later in this section. Details of the focus group method undertaken are presented below.

4.3.1 Focus Group Design

Focus group method was selected for this study since this would enable the possibility of obtaining multiple participants to sit together and create a synergy of ideas (Kitzinger, 1995). The nominal group technique (NGT) which surfaced in the 1970's (Delbecq et al., 1975; Delbecq & Van de Ven, 1974) was selected to be utilised in operating the focus group. This decision was due to superior reviews on NGT in the literature, such as enhancing equal participation, being more effective in idea generation, bringing in a structured approach and the ability of carrying out intergroup analysis during the focus group (Boddy, 2012; Harvey & Holmes, 2012; De Ruyter, 1996).

In this research, the focus group method is employed as a follow up of the interview method (Sutton & Arnold, 2013), and is attempting to further clarify notions brought forth. Primary participants of the interview method were IT/IS project managers. Hence, professionals of similar capacity were invited as primary participants for the focus group also. By employing professionals of the same status at the focus group

the author expected to avoid problems such as members wanting to conform with other members of higher status (Van de Ven & Delbecq, 1974).

4.3.2 Focus Group Participant Selection

The author of this thesis attended events held by several Chapters of the Project Management Institute (PMI) in Australia in an effort to gain support. She advertised the focus group discussion by presenting information regarding this research study. At the end of the presentation, an invitation was extended to IT/IS project managers to participate in the focus group. The number of respondents who agreed to participate was five and they belonged to various public and private organisations in Australia.

4.3.3 Material used for the Focus Group

Two questions were intended for discussion at the focus group. The documents provided therefore were developed in support of these two questions. First, an agenda for the meeting was compiled. The agenda listed each step that was to be carried out in a chronological manner. A work sheet was also given to the participants as they may need to scribble workings for their answers. The third document prepared for the focus group was to be used to rank the final answers for each question. Samples of each of these documents can be found in Appendix B.2.

4.3.4 Implementation of the Focus Group Method

The ethical considerations required for the data collection were addressed first. The ethics protocol that was used for the interview method was reopened and extended for the purpose of the focus group. At the focus group meeting, each participant was offered a pack of documents which included an information sheet and a consent form along with the agenda, work sheet and the answer rank sheet. The participants were first introduced to the ethics procedure set in place to protect their privacy and were asked to sign the consent form. They were asked to retain the information sheet if any clarifications were needed in the future.

The next item on the agenda was to carry out the introductions. The author acted as the moderator and introduced self and invited the participants to introduce themselves. This was followed by the introduction of the research topic. The research topic was introduced with the following statement. *“One main Critical Success Factor (CSF) that is associated with project success is Top Management Support (TMS). Although many studies indicate the importance of TMS, not much depth has been covered in this area and there is a lack of consensus as to what constitutes TMS. We are hoping that our discussions today will shed some light on this issue”*. Participants were also notified that the technique being used at the focus group meeting was the nominal group technique, and a brief introduction was offered. It was also indicated to them that two questions would be discussed during the focus group meeting.

The first question put forward to the participants by the moderator was, *“What is evidence of top management support?”* The participants were then prompted to ask any clarification questions and were given 8-10 minutes to work individually and list their answers for this question. In presenting this question, the author took care not to mention or answer any clarification questions in a manner which would be leading or biased toward what was currently established with the literature and the interview method. The answers were to be written on the work sheet provided. This step is called the silent idea generation. The next step was to gather all ideas generated by the participants and is called the round robin recording of ideas. In this step, the moderator prompted each participant to start listing from their most important answer to the least important. The moderator wrote them on a white board made visible to all participants. This exercise collected one answer from each participant at a time until all answers from all participants were listed on the board. The next step was to discuss the collected answers in detail. Participants were encouraged to freely discuss and point out any details which may be of importance. Participants were asked to vote and pick the five most important answers from the list. A scoring system which ranged from 1 to 5 was used for the vote. Participants were asked to use their rank sheets for ranking the answers listed on the board from 1-5. In the step that followed any clarifications regarding the answers and the scores achieved were discussed. As

no concerns were communicated by the participants, the second question was put forward to the focus group.

The second question, “*What enables top management support?*” was introduced by the moderator and the same procedure mentioned above was employed. Similar to the first question, the answers that scored the highest were picked. The worksheets and rank sheets from the participants were collected and filed by the author. A sample is available in Appendix B.2.

As a follow up mechanism, an e-mail was sent to each participant from the focus group discussion. They were reminded of the five most important answers identified for each question. This e-mail also invited these participants to voice any concerns. No concerns were communicated. The following sections discuss the findings and further analysis using these findings.

4.3.5 Discussion: Utilising Focus Group Findings for Further Analysis

An intergroup analysis was carried out during the focus group and the most voted answers were identified. The aim of the further analysis reported in this section is to determine if the findings provided by the focus group could be identified with the descriptions of the managerial roles (Mintzberg, 1973; Lau et al., 1980). For the purpose of this analysis, apart from the answers, the work sheets, rank sheets and the recorded media were referred to multiple times. During the analysis, mind maps were drawn utilising the first five answers as nodes. This was done separately for the two questions. Additional information that appeared on the work sheets and the rank sheets pertaining to each answer was written down next to the answer (node) on the mind map. This was in order to elaborate the answer to find key words that may match managerial role descriptions (Mintzberg, 1973; Lau et al., 1980). Arranging the answers in this manner also made it possible to see if there was any overlapping of information on the answers.

Analysing Question 1: What is evidence of top management support?

Table (4.6) below illustrates the five most important answers derived for the first question. They are presented in the descending order of scores acquired at the focus group meeting.

Table 4.6: Results derived from the focus group participants for the first question

Question 1: What is evidence of top management support?	
<i>Answer</i>	<i>Description</i>
1	Strategic view of/from the top management
2	Roles played (successfully) by the top management
3	Well structured business case and top manager as a sponsor
4	Communication
5	Decision making / Authority at high level

1. Strategic view of the top management

Participants mentioned that top management collecting required information and maintaining the strategic view as evidence of having a proper strategic understanding regarding the project. This strategic understanding, according to the focus group participants was important for project performance. Mintzberg (1973) in his description of the Monitor role states that the top manager, “*emerges as nerve centre of internal and external information of the organization, by seeking and receiving a wide variety of special information and by understanding the organization and its environment*” (pp. 92-93). This indicates that the top manager may form a strategic view based on the information that he/she processes. Therefore, the first answer by the focus group, *maintaining the strategic view*, indicates relations to Mintzberg’s Monitor role.

2. Roles played by the top management

It is interesting to note that *roles played successfully by the top management* have come up as evidence of TMS. Especially, as this research is concentrating on determining if and what managerial roles lead to TMS. However, for the purpose of this particular analysis, further information from supporting work and rank sheets was referred. Participants describe, *commitment, understanding and embracing the project idea helped the top managers to execute needed actions*. This description appears to specify an all-encompassing state. An action which specified a similar requirement of the top manager was found in the interview data. This action is, *Accept ownership and gain better understanding of project work*. This action was mapped to the Leader role in Section 4.2.7, with reference to Mintzberg's (1973) managerial role description of the Leader role, where he mentions the top manager as being "*responsible for motivation and activation of subordinates, responsible for staffing, training, and social duties (pp.92-93)*".

Roles played by the top management, with its all-encompassing nature, is also identified as closely fitting the descriptions of the Leader role by Mintzberg (1973).

3. Well-structured business case and top manager as a sponsor

Participants pointed out that having a well-structured business case for the project and having the top manager as the project sponsor is evidence of TMS. This point appears to be related to the two actions elicited from the interview data. These two actions are *Achieve a sustainable business model* and *Build support in the organisational model*. These two actions were later identified with the description of the Entrepreneur role, where top manager, "*searches organization and its environment for opportunities and initiates 'improvement projects' to bring about change; supervises design of certain projects as well*" (Mintzberg, 1973, pp. 92-93). Hence, this third answer by the focus group participants is identified as having relevance to the Entrepreneur role.

4. Communication

Communication was found by the focus group to be an important piece of evidence for the presence of TMS. Participants stated that, managers wandering about talking to people inquiring about the project, was important. This statement relates to the Monitoring role of the top manager (by Mintzberg, 1973) where he/she seeks to receive information from both internal and external sources (Mintzberg 1973). Participants also said that information should be flowing from top to bottom without any blockage to the middle management, indicating that information should be disseminated by the top manager. Top manager's availability for consultation was also seen as enabling communication. This information is in line with the descriptions of the Disseminator role (Mintzberg, 1973). With the information given for this answer by the focus group, both Monitor and Disseminator roles seem relevant. According to Mintzberg's descriptions of managerial roles, both Monitor role and Disseminator role are related to communication activities. The findings from the focus group therefore, are consistent with Mintzberg's findings.

5. Decision making / Authority at high level

Making timely decisions to enable the smooth flow of the project work was seen as important by project managers. Participants said that top management endorsement or sign off on high level decisions and facilitating resources on a project were evidence that TMS was available for that particular project. In this description by the focus group, two of Mintzberg's roles appear to be embedded. They seem to be consistent with Mintzberg's descriptions of the roles, Resource Allocator and Disturbance Handler. Mintzberg (1973, pp. 92-93) referring to the Resource Allocator says that "*a top manager is responsible for the allocation of organizational resources of all kinds-in effect the making or approval of all sufficient organizational decisions*". Mintzberg (1973, pp. 92-93) mentions that the Disturbance handler "*ensures decisions on corrective action*" for the uninterrupted flow of work.

The qualitative analysis of the top five answers provided by the focus group participants for question 1 were found closely related to six managerial roles from

Mintzberg's *role-theory* (1973). These roles are Leader, Monitor, Disseminator, Entrepreneur, Resource allocator and Disturbance Handler. In the next section the answers given to the second question will be examined.

Analysing Question 2: What enables top management support?

The second question was a follow up on the first question, i.e. a question similar to question 1 was compiled, but with different wordings. The aim was to further analyse the answers to see if they would map against similar managerial roles. The answers from the focus group are given in Table 4.7.

Table 4.7: Results derived from the focus group for the second question

Question 2: What enables top management support ?	
<i>Answer</i>	<i>Description</i>
1	Communication
2	Relationships
3	Achieving Success on projects/tasks
4	Keeping the fun in the job
5	Broader organisational imperative

1. Communication

Top manager communicating with the stakeholders was identified as enabling TMS on a project. Communication is a two way process, and the participants mentioned that the top managers should “*communicate benefits, requirements, achievements while receiving information and issuing decisions without delay*”. Participants noted that if such activities were adequately attended to by the top management, it would be much easier on them (the participants) in managing the projects. A similar answer was received for question 1 and was identified with Monitor and Disseminator roles as per the descriptions given (Mintzberg, 1973). This answer being similar is also identified with Monitor and Disseminator roles.

2. Relationships

Participants pointed out that the top managers should *initiate good relations* with the staff and client as part of TMS. Participants indicated that an inaccessible top manager was a problem as subordinates (the participants) were apprehensive to take the first step in building a good work relationship. The participants went on to say that apart from *enabling vertical relationships* for the subordinates to contact the top managers, *relationships among the peers within the team should also be facilitated*. The description of the Leader role (“*Responsible for the motivation and activation of subordinates, responsible for staffing, training, and social duties*”, Mintzberg 1973, pp. 92-93) closely match the second answer for the question 2. Hence, this answer is identified with the Leader role.

3. Focus on Project Success

One participant mentioned that *success builds on success*. This participant further indicated that when top managers are focused on achieving success, they look for opportunities to provide support for the project. Other participants said that project managers acting on such visions of success, look for opportunities to *improve staff and processes*. This information is fairly matching the description of the Entrepreneur role that says the top manager, “*searches organisation and its environment for opportunities and initiates ‘improvement projects’ to bring about change....*” (Mintzberg, 1973, pp. 92-93).

4. Keeping the fun in the job

“*What do you think about pixie dust to spread happiness?*”. This was a question put forward during the discussion by one focus group participant. He said that his top manager makes sure to organise “*recreational activities*” periodically, as a way of keeping the “*morale and motivation*” of the staff high. Explaining the pixie dust, he said that their top manager wore glitter and passed some around “*spreading the fun*”,

during project functions. Participants pointed out that, supportive top managers can be seen “*ensuring the job satisfaction of the staff, pushing staff ideas, giving just and timely feedback, and helping with team building*”. Additionally, *job assignments were based on what appealed to staff*.

The above information spans across two managerial roles from Mintzberg, i.e. the Leader role and the Disturbance Handler role. While the Leader keeps the fun in the job pushing and motivating, the Disturbance Handler takes proactive actions to lessen attrition, and staff turnover.

5. Broader organisational imperative

Participants explained that the project should have broader interests than support from just one manager. *The organisation itself should be supportive of the work that is being carried out on projects*. This answer was named as the *broader organisational imperative*. Participants went on to say that a project cannot succeed as an orphan, but needed a strong guardian, in business terms, a sponsor that would incorporate the project into the organisational family. Participants agreed that by doing this, the top manager enables support in to the project. Hence, the installed standards and governing mechanisms in the organisation would be instrumental in achieving better project performance. The information given for this answer is fairly consistent with what is expected of both the Leader, who is “*Responsible for the motivation and activation of subordinates, responsible for staffing, training, and social duties*” (Mintzberg 1973, pp. 92-93) and the Entrepreneur that “*Searches organization and its environment for opportunities and initiates ‘improvement projects’ to bring about change....*” (Mintzberg 1973, pp. 92-93).

The qualitative analysis of the top five answers provided by the focus group participants for question 2 were found closely related to five managerial roles from Mintzberg (1973). These roles are Leader, Monitor, Disseminator, Entrepreneur, and Disturbance Handler.

4.3.6 Reliability Analysis for the Focus Group Method

In the above sections, the focus group's answers to two questions were analysed to identify any evidence of top management roles. This section discusses the Intra-coder and Inter-coder tests⁸ employed to assess the reliability of the analysis.

In order to carry out the intra-coder analysis, the researcher revisited the data 4 months following the first round of analysis and re-analysed in order to find any discrepancies. None were found in this instance, the materials used were the first five answers for each question along with the work and rank sheets. The information was clearly specified on paper and therefore, the chances for a variation during Intra-coder analysis was in fact slim.

Adhering to the requirements of the Inter-coder analysis, the same material used by the researcher was provided to a subject expert. He was briefed on the steps used by the author. The researcher analysed the data and organised the data into six general management roles. The subject expert placed the data in to five managerial roles. These two separate analyses suggested an agreement of (83%) between the two coders (Mile & Huberman, 1994, p. 64).

The author discussed the differences with the subject expert and explained reasons for the sixth role. After some thought, both parties agreed that the sixth role identified by the author may be of relevance. Hence, no major changes resulted following the reliability analysis.

⁸ These reliability tests should not be confused with the intergroup analysis carried out during the focus group. They were completed by the participants and are not expected to be replicated.

4.4 A Comparative View of the Findings: Interviews vs Focus Group

The findings from the two exploratory investigations using the interview method and the focus group method indicate some similarities and certain differences. The roles Leader, Monitor, Disseminator, Entrepreneur, Disturbance Handler and Resource Allocator were identified as roles leading to TMS by both methods. The Spokesman and the Figurehead roles appear to be irrelevant for TMS. Given below (Figure 4.2) is an illustration of managerial roles that were found to be important for TMS from each method.



Figure 4.2: A comparative view of the roles found to be important for TMS

The findings from the interview and the focus group methods were channelled towards refining the conceptual framework.

4.5 Chapter Conclusions

This chapter reported two exploratory studies carried out using interview and focus group methods. These two methods were utilised to collect qualitative data to elicit actions that were considered as TMS by IT/IS project professionals. The Figure 4.3 below summarises the work carried out for interview and focus group methods.



Figure 4.3: A summarised view of work carried out for interview and focus group methods

The interview method was carried out on six IT/IS projects with twelve participants. The unit of analysis was a project and the primary participants were project managers. One key person from each project was also contacted to avoid bias. The interviews were recorded and transcribed. The transcripts were analysed using NVivo Version 8 to identify sixteen top management actions that were considered as TMS for IT/IS projects. These actions were compared with the descriptions from the managerial roles to identify similarities. The roles: Leader, Liaison, Monitor, Disseminator, Entrepreneur, Disturbance Handler, Resource Allocator, Negotiator, Nurturer and Technical Expert were satisfactorily identified as comparable to the actions elicited from the interview method.

The focus group method was carried out with the attendance of five participants. The meeting was facilitated with the NGT. Two questions were put forward to the participants, and for each question, 5 answers were selected using a ranking system. These answers, together with the participants' work and rank sheets and the voice recording from the event were explored to find similarities with managerial roles. Six roles were identified as comparable with the focus group findings. The roles identified are: Leader, Monitor, Disseminator, Entrepreneur, Disturbance Handler and Resource Allocator.

The actions considered as TMS were identified with the descriptions of the managerial roles. Thus, there is adequate evidence to state that the top management engagement in managerial roles leads to TMS. However, as the findings from the two exploratory methods differ, further investigations with quantitative methods for more definitive findings are deemed necessary. Findings from the interview and focus group methods were instrumental in refining the conceptual framework and the new definition for the concept of TMS. This information is discussed in Chapter 5.

CHAPTER 5

5 REFINED CONCEPT DEFINITION & RESEARCH CONCEPTUALISATION

5.1 Chapter Introduction

This chapter discusses and compares the findings from the literature review, the interview and the focus group methods. The findings from these investigations are used to refine and present the proposed new concept definition and the research conceptualisation. Prior to introducing the work presented in this chapter, work carried out in Chapters 2 and 4 are mentioned in brief.

The body of literature reviewed and presented in Chapter 2 fell short of providing a definition for the concept of top management support (TMS) that followed adequate academic guidelines. A novel concept definition for TMS, from a managerial role perspective was proposed to fill this gap. The research conceptualisation in Chapter 2 consists of the main research question and the preliminary conceptual framework. These three preliminary notions presented in Chapter 2 were investigated using interview and focus group methods (Chapter 4) to introduce empirical rigour to the research process. This chapter reflects on the previous findings and prepares for the next stage in the mixed-method research approach.

Section 5.2 discusses the changes that were incorporated into the preliminary concept definition for TMS. Despite these changes being made, the differences between the findings from across the different investigations were noted. Hence, further investigations using quantitative methods were deemed necessary for a more conclusive outcome. Therefore, only additions to the preliminary concept definition were made, no deletions were attempted. The Nurturer role that surfaced during the interviews was included as an attribute in the refined concept definition for TMS.

Section 5.3 discusses the changes to the preliminary conceptual framework. Similar to that of the concept definition, the differences among the investigations were noted, but, no managerial roles were deleted. Instead, the Nurturer role was added and the refined conceptual framework is presented. Section 5.4 that follows presents the hypotheses in light of the findings obtained so far. The research question is revisited for further elaboration in Section 5.5 and the chapter conclusions are presented in Section 5.6.

5.2 Refined New Concept Definition for Top Management Support

Findings from the interview and focus group methods support the preliminary concept definition presented in Chapter 2. Findings from these methods illustrate that actions, resulting from supportive behaviour of the top management, identify with the descriptions given in managerial roles authored by Mintzberg (1973). Hence, there is a relationship between the actions considered as TMS and Mintzberg's managerial roles. This information provides further support for the notion stated in Chapter 2, i.e. the managerial roles being a suitable foundation for placing the new concept definition for TMS.

The literature review and the interview and focus group methods produced a list of managerial roles that may potentially lead to TMS in an IT/IS project context. However, a consensus from all investigations was reached only on six managerial roles as shown in Table 5.1. These roles are: Leader, Monitor, Disseminator, Entrepreneur, Disturbance Handler and Resource Allocator. Due to the differences among the findings from across the investigations, no roles were ruled out. Hence, at this stage of the research, all managerial roles were assumed to be significant towards TMS, and therefore, Information Technology/Systems Project Performance (ISPP).

A new role emerged entirely from the interview data, and was named as the Nurturer role. Previously suggested definition for the concept of TMS was refined with the inclusion of the Nurturer role into the Interpersonal role category. The rationale for this decision is that the Nurturer is predominantly a role that deals with staff,

assisting with improving staff skills that aid the IT/IS project. Hence, it was decided that the Nurturer role largely resembles the description of the interpersonal role category. The refined definition for the concept of TMS which now has the new Nurturer role as an attribute is illustrated below (Figure 5.1).

Table 5.1: A comparative view of the findings obtained so far

Results	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12
Literature Review	X	√	X	√	√	X	√	√	√	√	√	X
Interviews	X	√	√	√	√	X	√	√	√	√	√	√
Focus Group	X	√	X	√	√	X	√	√	√	X	X	X
Consensus on importance?	X	√	X	√	√	X	√	√	√	X	X	X

R1 = Figurehead, R2= Leader, R3= Liaison, R4= Monitor, R5= Disseminator, R6= Spokesman, R7= Entrepreneur, R8= Disturbance Handler, R9= Resource Allocator, R10= Negotiator, R11=Technical, R12=Nurturer

In order to designate a novel definition for the concept of TMS, consensus on the managerial roles from among the investigations (literature review, interviews, focus group) is considered necessary. This however, was not attainable as yet. Hence, all ten roles from Mintzberg (1973) along with the Technical Expert role found in the literature and the Nurturer role elicited from the interview method are to be subjected to further scrutiny using a questionnaire survey (Chapter 6). The survey data were subjected to rigours statistical analysis and the final conclusions with regard to the novel definition for the concept of TMS are presented in Chapter 8.

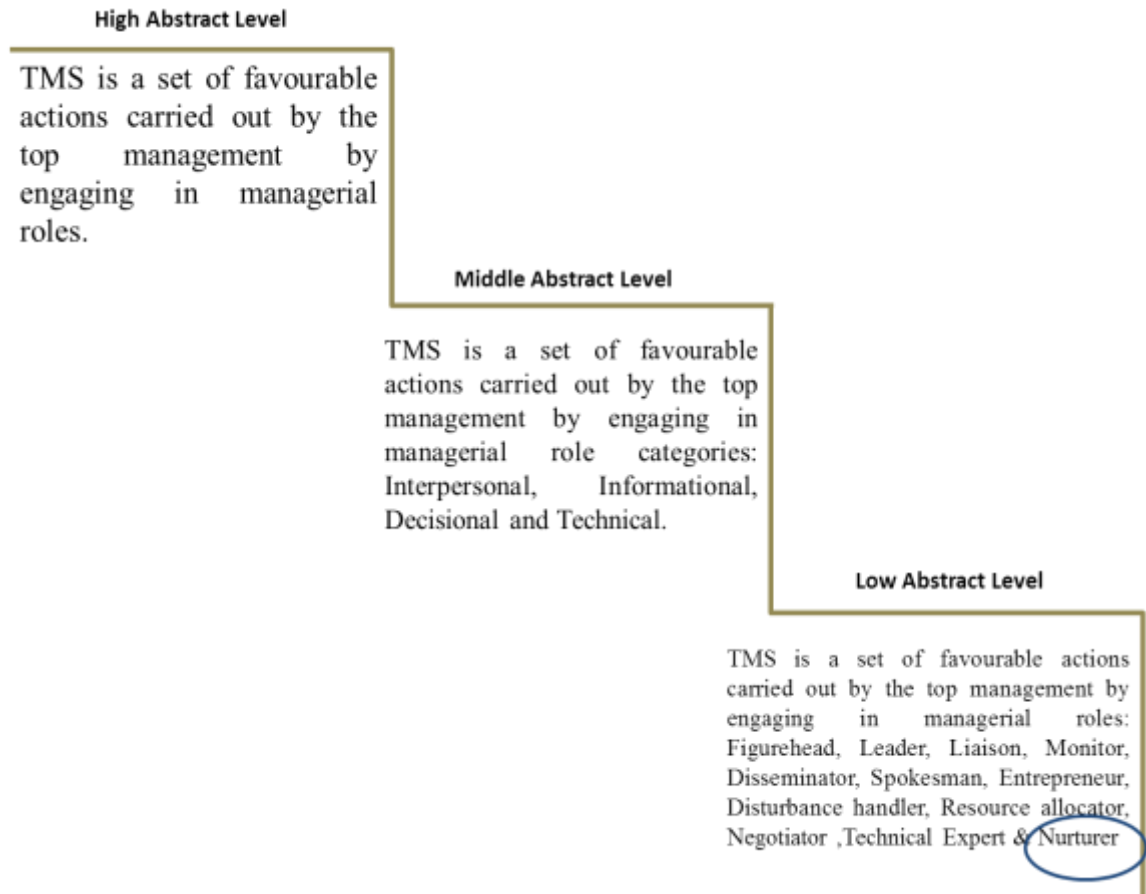


Figure 5.1: Refined definition for the concept of Top Management Support

5.3 Refined Conceptual Framework

The preliminary conceptual framework was refined and is presented in this Section. Findings from two qualitative methods, interviews and focus group (Chapter 4) were utilised for refining the conceptual framework, which was initially presented in Chapter 2, Section 2.8. The changes discovered and applied on the conceptual framework are not radical and hence, the flow of the framework did not change. Prior to introducing the refined conceptual framework, the claims made on the preliminary conceptual framework are reiterated below:

1. Top Management engagement in managerial roles leads to TMS

The research reported in this thesis referred to notions of TMS and identified that previous studies refer to three views⁹. The most popular view is with regard to supportive actions brought about by top managers' behaviour. The second view is with regard to top managers' perception. The third view is the least popular and comprises both behaviour and perception. Due to its popularity and close relationships identified with the actions from the established *role-theory* from the discipline of management, top management behaviour based TMS was selected as the choice of study for this thesis.

Based on the findings from the literature, the roles: Leader, Figurehead, Liaison, Entrepreneur, Disturbance Handler, Resource Allocator, Negotiator, Monitor, Disseminator, Spokesman (Mintzberg,1973) and Technical Expert (Dierdorff et al., 2009; Mclean & Smits, 2003; Pavett,1984; Lau et al., 1980) were selected to be included in the preliminary conceptual framework. Hence, in the first step of the conceptual framework, it was proposed that the top management engagement in these managerial roles leads to TMS.

2. Top Management Support will lead to IT/IS project performance

The conceptual framework also claims that managerial role based TMS is important in achieving higher levels of ISPP.

3. Top management role engagement is moderated by the position of the top manager.

The literature presented in Chapter 2, Section 2.5 refers to multiple levels within the top management. These levels are dependent on the organisation and its management hierarchy. Each level of management has authority to carry out certain tasks and hence, each level may be able to engage in certain roles more successfully than the others. The conceptual framework therefore, proposes that the position of the top

⁹ Refer Chapter 2, Section 2.6.2

manager has a moderating effect on the relationship between managerial role engagement and TMS.

4. Top management role engagement is moderated by the project management processes.

Top management support is a Critical Success Factor (CSF) for ISPP. Hence, needs further investigation to understand its dynamics in order to better manage and achieve desirable levels of ISPP. One of the dynamics of a CSF is that they may not be required in equal levels throughout the project (Elbanna, 2013; Butler & Fitzgerald, 1999). This gave rise to the argument that the project management processes, Initiation, Planning, Execution, Monitoring & Control and Closure, moderate the relationship between managerial roles and TMS (Chapter 2, Section 2.8.2).

5. Controlling effects by other variables

The literature advises that apart from TMS, there are other variables that influence ISPP. These variables are discussed in Chapter 2, Section 2.8.2. The following variables therefore were controlled to minimise any confounding effects. These variables are the Organisation Size, Industry, Project Type, Project Complexity and project manager's Gender and Age.

The interview and the focus group methods carried out were instrumental in strengthening the theoretical arguments brought forth in Chapter 2. One new managerial role was elicited from the interviews. This role was named as the Nurturer and was added to the Interpersonal role category¹⁰. The refined conceptual framework is presented below (Figure 5.2).

¹⁰ The rationale was explained in Section 5.2

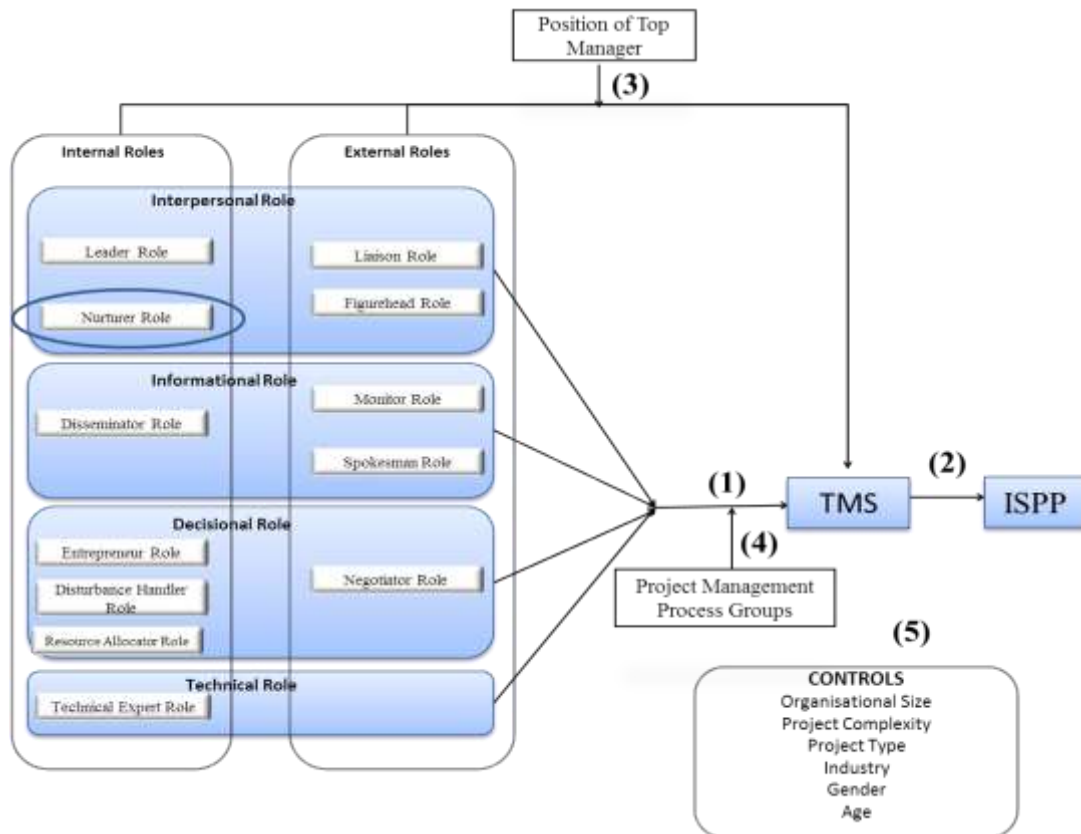


Figure 5.2: Claims made on the conceptual framework

Also note the inclusion of the Nurturer role

5.4 Hypotheses Development

The hypotheses were developed in close consultation with the information elicited from the literature review, and the interview and focus group methods. Each of these investigations carried out in the research study so far provided their own view on which top management actions were related with the descriptions of the managerial roles in the literature (Mintzberg, 1973; Lau et al., 1980). When actions fitting the descriptions of the managerial roles were found, this was taken as evidence that the theoretically described roles corresponded to the real world.

These actions from each investigation were noted and were presented against each corresponding theoretical role. These exercises are presented in Chapter 2 and Chapter 4 in detail. The Table 5.1 presented in Section 5.2 brought together a comparative view of the managerial roles that were found from across the investigations discussed so far. This section presents the hypotheses with reference to the findings from the literature review and the interview and focus group methods.

The Figure (5.3) presented below depicts the steps incorporated in compiling the hypotheses.

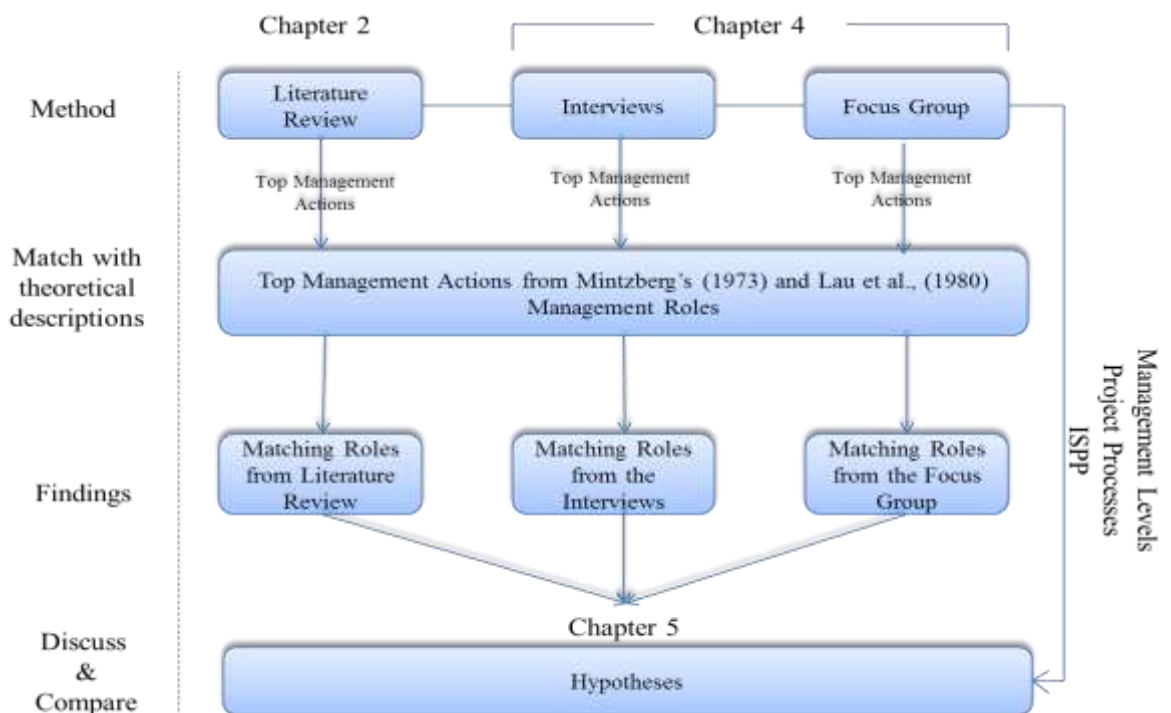


Figure 5.3: An illustration of the steps followed up to hypothesis development

5.4.1 Relationship between the Interpersonal Roles and TMS

“Three roles relate to the manager's behaviour that focuses on interpersonal contact. These roles derive directly from the authority and status associated with holding managerial office” (Mintzberg, 1971, p. 103). Successful engagement in Interpersonal roles relates to the top management engaging in actions associated with *social or legal nature, staff development and staff motivation, work relationships with external parties and developing staff skills* (Mintzberg, 1973). The initial three roles suggested to be incorporated as *Interpersonal* roles are *Figurehead*, *Leader*, and *Liaison* roles (Mintzberg, 1973). The relevance of these roles as means of providing TMS for IT/IS projects was investigated in the literature (Chapter 2) and in practice (Chapter 4).

The literature illustrates the actions from the Leader role as being very widely mentioned as TMS that is needed for IT/IS projects (Garrett & Neubaum, 2013; Young & Jordan, 2008; Zwikaël et al., 2008; Sharma & Yetton, 2003; Thomas et al., 2002; Correll, 1994; Mintzberg, 1994; Levinson et al., 1993; McLagan, 1988). However, the absence of evidence for actions for the Figurehead (Grover, et al., 1993; McCall & Segrist, 1980) and Liaison roles warns that these roles in the Interpersonal role category may be redundant or less important when it comes to providing support for IT/IS projects.

Both qualitative studies follow a similar trend on the Figurehead role to that of the literature review findings. Neither the interviews nor the focus group findings illustrated a preference for actions from the Figurehead role. However, actions from the Liaison role were found to be important for the participants in the interview method. Participants from Cases [1,2,4,6] agreed that the action, *Liaise with customer*, to be an important supportive action that was expected of the top management.

A new role, the Nurturer, rose to surface during the interviews. The action, *top management providing guidance for professional growth*, from the Nurturer role was constantly referred to by participants from Cases [1,2,3,4 and 6] as a supportive top management action.

With reference to the information provided above, the first hypothesis is stated as follows:

H1: Top management carrying out Interpersonal roles leads to top management support

5.4.2 Relationship between the Informational Roles and TMS

Engaging in Informational roles is, “*the degree to which the top management involve in activities that relate to processing of information with regard to IT/IS projects*” (adapted from Mintzberg 1971). According to Mintzberg (1973, pp. 92-93), successful engagement in Informational roles relate to top management practising actions such as, *seeking and receiving information, transmitting information to the organisational members and communicating information to interested stakeholders*. Mintzberg suggests three roles for this category: *Disseminator, Monitor and Spokesman*. The relevance of these roles as means of providing TMS for IT/IS projects was investigated in theory (Chapter 2) and in practice (Chapter 4).

Actions matching the ones mentioned in the Disseminator and Monitor role descriptions were found to be commonly available in the TMS literature. Actions such as, *grant rights to the project, provide vision, specify statement of work, providing feedback* (Ngwenyama & Nørbjerg, 2010, Kerzner, 2006; Rockart, 1988) support both Disseminator and Monitor roles. However, actions that relate to the Spokesman role were seldom mentioned in the TMS literature and could not be placed with the descriptions given by Mintzberg (1973). It is thought that further quantitative investigations are necessary for a final decision. Hence, the Spokesman role was also made available with the Disseminator and Monitor roles for future investigations.

The interview and focus group methods followed suit and provided evidence of supportive top management actions that were identified with both Disseminator and Monitor roles, but not with the Spokesman role. The supportive actions, *review project plans* [Cases 1,2,3,6] and *watch project status* [Case 3], specified by the

interview participants supported the Monitor role. The Disseminator role was also supported, the actions, *make necessary information available* [Case 4] and *making business objectives clear and stating them* [Cases 3,5] were identified with the Disseminator role description. However, it appears that the Spokesman role is redundant in an IT/IS project context as there was no mention of matching top management actions by the participants. It was also noted that either the Disseminator or the Monitor role may be redundant as they display close similarities. Further investigations are deemed necessary for making more informed decisions. Therefore, all roles from the Informational role category are put forward for further investigation and the following hypothesis is stated.

H2: Top management carrying out Informational roles leads to top management support

5.4.3 Relationship between the Decisional Roles and TMS

Engaging in the Decisional roles is, *“the degree to which the top management involve in activities that are related to making and integrating all significant decisions with regard to IT/IS projects”* (adapted from Mintzberg, 1971). The following are examples of actions (Mintzberg, 1973) that may be carried out when the top management engage in the Decisional role category: *initiating and designing controlled change, applying corrective actions during unexpected crises, allocating resource and participating in negotiations*. Mintzberg (1973) suggests four *Decisional* roles that carry out such actions: *Entrepreneur, Disturbance Handler, Resource Allocator and Negotiator*. The relevance of these roles as means of providing TMS for IT/IS projects were investigated in theory (Chapter 2) and practice (Chapter 4).

Actions mentioned in the TMS literature that were found to relate to the actions from the Entrepreneur role are, *promote the project* (Elbanna, 2013), *establish project management as a strategic capability* (Thomas et al., 2002), *organise interactive inter departmental project groups* (Zwikael, 2008a-b), *follow up on results*, and *integrate ICT with the business management* (Carbonell & Rodríguez-Escudero,

2009; McLagan & Patricia, 1988). Actions that identified with the Disturbance role were also found, *conflict resolution* (Garrett & Neubaum, 2013) and *continuous feedback* (Kerzner, 2006) are just a few mentioned from the many studies that had embraced this role. The actions from the Resource Allocator role (Mintzberg, 1973) were a good match for actions specified in TMS descriptions from many past studies, particularly the action, *provide resources* (Boonstra, 2013; Hwang & Schmidt, 2011; Belout & Gauvreau, 2004). Although not as much support for the above mentioned roles, some studies with actions matching the description of the Negotiator role were also found, for example, *effect changes needed for implementation* (Rockart, 1988). Hence, supporting actions for all Decisional roles were found in the literature.

The interview participants also mentioned actions that they considered as TMS which were identified with actions from the Decisional role category. The actions, *achieve a sustainable business model* [Case 5] and *build support in the organisational model* [Cases 2,4,5,6] were matched with the description of the Entrepreneur role. The actions from the description for the Resource Allocator role were matched with, *provide challenging work* [Cases 2,3] and *balance project assignments* [Cases 2,5]. The actions, *supply resources* [Cases 1,6] and *retention of key employees* [Case 5] were identified with the actions specified in the Resource Allocator role, whilst the actions, *Liaise with customer* [Cases 1,2,4,6] and *participate in scope definitions* [Cases 1,3,6], were identified with the Negotiator role.

The focus group participants also listed actions that were matched with the Entrepreneur, Disturbance Handler and the Resource Allocator roles. However, actions pertaining to the Negotiator role were not mentioned. Although there are discrepancies between the findings of the investigations carried out so far, all roles were incorporated into the refined conceptual framework with the intention of further testing using quantitative methods. Hence, the third hypothesis is stated as follows:

H3: Top management carrying out Decisional roles leads to top management support

5.4.4 Relationship between the Technical Role and TMS

A new addition to Mintzberg's (1973) traditional managerial roles was found in the literature, namely, the Technical Expert role. Since the description of this role did not match any existing role categories, a new one was introduced and was named the *Technical Role Category*. Some actions that are committed by the top management when engaging in the Technical role are: *reviewing technical plans, providing guidance for technical issues and evaluating technological options*. For the purpose of this research, a definition for the Technical role category is proposed. Therefore, engaging in the Technical role is, "*the degree to which the top management involve in activities that are technical in nature with regard to both the (IT/IS) project and the project's product*".

The Technical Expert was introduced by (Lau et al., 1980) and has been recognised by subsequent studies (Dierdorff et al., 2009; Mclean & Smits, 2003; Pavett, 1984; Pavett & Lau, 1983; Lau & Pavett, 1980). The relevance of this role as means of providing TMS for IT/IS projects was investigated in practice (Chapter 4).

Actions that are related to the description of the Technical Expert (Lau et al., 1980) role were mentioned during the interviews. The interview participants pointed out that top management *providing guidance for work tasks* [Cases 2,3] and *reviewing project plans* [Cases 2,3,6] were considered as TMS. While actions that supported the Technical Expert role were clearly found with the interview data, the focus group participants did not provide adequate evidence to support the Technical Expert role. However, the Technical Expert role is worthy of further investigations as it was found in the literature and the interview data. Therefore, the Technical Expert role is included in the refined conceptual framework for further study. The proposed hypothesis is:

H4: Top management carrying out the Technical role leads to top management support

5.4.5 Moderating Effects of the Position of the Top Manager

Discussing the subject of TMS, the literature mentions different levels/positions within the top management (Lim et al., 2013) and how this position would influence the work being carried out by the top manager (Al-Taie et al., 2013; Li & Harrison, 2008). Many studies have their own notion of the constitution of the top management. In Chapter 2, Section 2.5.1 of this thesis, a detailed exercise carried out by the author to investigate the top management positions is reported. It was revealed through this exercise that chief level managers, board of directors and senior managers may all be addressed as the top management. Mintzberg (1973) himself favours two top management positions, namely the *Internal Manager* and *External Manager*.

According to Mintzberg, the Internal managers are bent more on organisational tasks while the External managers look beyond the organisation to manage and acquire customers etc. Mintzberg specifies certain managerial roles as internal roles (Leader, Nurturer, Disseminator, Entrepreneur, Disturbance Handler, Resource Allocator and Technical Expert) and the others as external roles (Liaison, Figurehead, Monitor, Spokesman and Negotiator). This indicates that the Internal managers may engage in internal roles better than the External managers and *vice versa*. Project managers from the interviews indicated that they were aware that the type of support conceivable from each top manager is dependent on the top manager's position in the organisation.

The information presented above suggests that the management position is deemed important in order to successfully engage in particular managerial roles. Hence, the top manager's position introduces a moderating effect on top management engagement of roles that results in actions that are identified as TMS in this research. The hypothesis for this scenario is stated as follows:

H5: The positive association between top managers carrying out managerial roles and TMS is moderated by the position of the top manager.

5.4.6 Moderating Effects of the Project Management Processes

A project is usually known to traverse through five project management processes (PMBOK®Guide, 2008): Initiation, Planning, Execution, Controlling & Monitoring and Closure. Top management support, which is identified as an important CSF, is required throughout the project for better ISPP. Scholars question the varying need of CSFs such as TMS (Butler & Fitzgerald, 1999) over the length of a project. Subsequent studies have responded indicating that there is in fact a varying need for TMS during the life of a project (Elbanna, 2013; Somers & Nelson, 2004).

When asked during the interviews, participants stated that the need and the type of TMS required varied during a project. Project managers indicated that particular tasks needed more TMS than the others. Project manager from project 3 stated that he needed TMS during *project scoping*, for *project budgeting* and during *customer communication*. Another project manager added that he would like support during *project sign-off*. An exercise was carried out with the 16 actions elicited from the interviews. These sixteen actions were matched against the type of work that is carried out in each project management process (PMBOK ® Guide, 2008, p. 43, Table 3.1). It was possible to distribute the sixteen actions among the project management processes (Table 5.2). Some of these actions were specifically mentioned as more important for TMS than the other actions by project managers during the interviews. Hence, a project management process where a particularly important action takes place, may demand TMS more than the other project management processes. As such, variations regarding the need for TMS may exist from among the project management processes. It is therefore hypothesised that the project management processes moderate the relationship between top management role engagement and TMS.

H6: The positive association between top managers carrying out managerial roles and TMS is moderated by the project management processes.

Table 5.2: Actions identified from the interviews spread across Project Management Processes

Initiation	Planning	Executing	M & C	Closure
10. Having and stating clear business objectives, 16. Accept ownership and gain better understanding of project work	1. Participate in scope definitions 7. Balance project assignments, 3. Achieve a sustainable business model, 8. Prioritise	5. Supply resources, 6. Boost employee morale, 13. Retention of key employees, 15. Liaise with customer, 12. Provide challenging work, 11. Make necessary information available, 4. Provide guidance (for both professional growth and work tasks), 2. Build support in the organisational model	9. Watch status, 14. Review project plans, 2. Build support in the organisational model	15. Liaise with customer, 2. Build support in the organisational model

5.4.7 Relationship between TMS and ISPP

Many studies have reported TMS as one of the most important CSFs for ISPP (Elbanna, 2013; Alsudiri et al., 2013; Boonstra, 2013; Akgün et al., 2007). Certain other researchers go one step further. They claim that TMS by itself is sufficient for obtaining a higher level of ISPP (Young & Poon, 2013; Young & Jordan, 2008).

Interview participants all agreed that TMS was highly necessary for their projects to achieve higher levels of performance. Participants from both interview and focus group methods maintained TMS to be an organisational resource, which should be explicitly made available for projects. For example, project manager from project 2 from the interviews stated, “*we are a CMMI level 4 certified organisation, so there is always top management support for our projects.*” Project managers from the focus group appear to hold the same view. They listed among the top 5 answers, the fact that TMS should be made readily available as a result of the *broader organisational imperative*.

Noting the overwhelming support for this argument, the final hypothesis is stated.

H7: Top management support is important for information technology/systems project performance

5.4.8 Refined Conceptual Framework with the Hypotheses

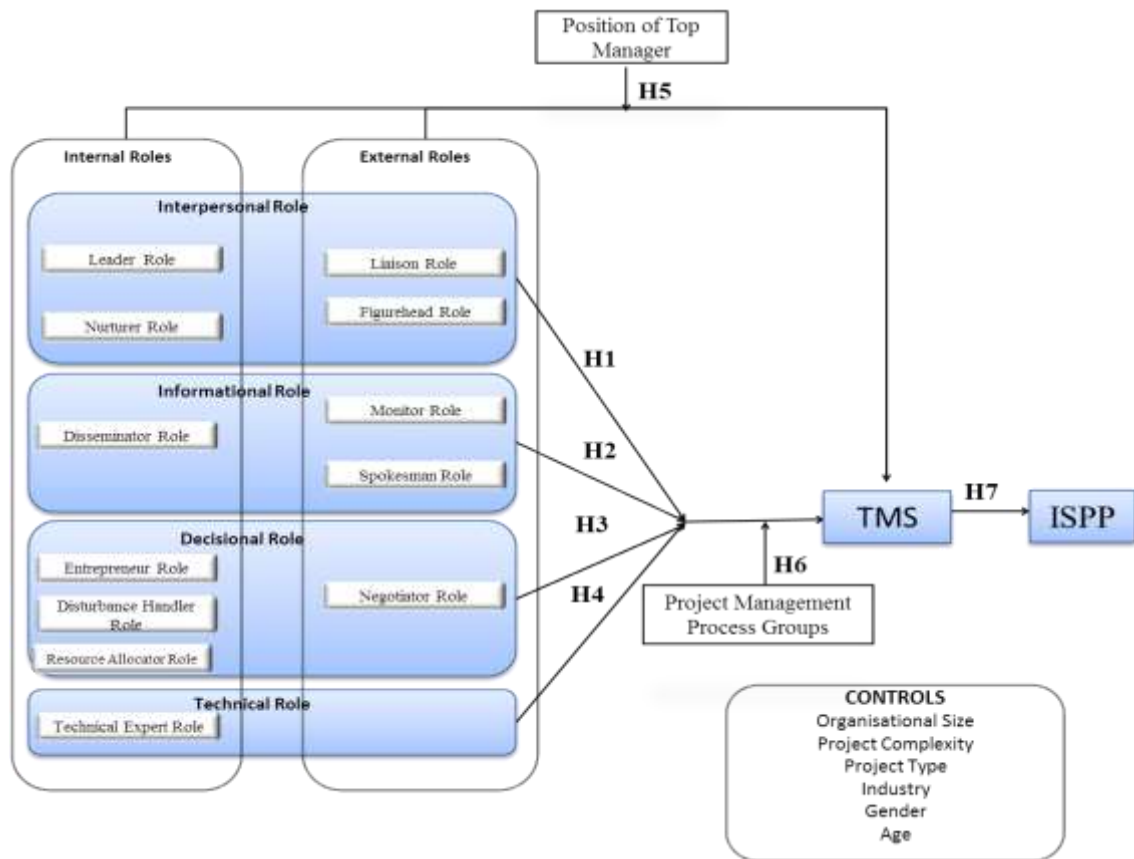


Figure 5.4: The refined conceptual framework

The Hypotheses

H1: Top management carrying out Interpersonal roles leads to top management support

H2: Top management carrying out Informational roles leads to top management support

H3: Top management carrying out Decisional roles leads to top management support

H4: Top managers carrying out the Technical role leads to top management support

H5: The positive association between top managers carrying out managerial roles and TMS is moderated by the position of the top manager.

H6: The positive association between top managers carrying out managerial roles and TMS is moderated by the project management processes.

H7: Top management support is important for information technology/systems project performance

5.5 Revisiting the Research Question

The research question was first stated in the research conceptualisation presented in Chapter 2, Section 2.8. In order to further investigate and refine the research conceptualisation, interview and focus group methods were employed. The findings from the literature review were compared with the findings from these two qualitative methods. The agreements and disagreements were observed and were stated in Sections 5.3 and 5.4. Scholars advise that developing and further refining a research question is an important aspect of a research study (Maxwell, 2012).

With the additional information obtained from the methods described above, the main research question was complemented with four sub-questions (Creswell, 2003). These sub-questions inquire into subtle areas with regard to managerial role engagement and TMS. Answers to these sub-questions are expected to shed light into these areas that have not yet been explored.

The main research question for the research reported in this thesis is:

“Does top management engagement in managerial roles help to achieve top management support, which in turn helps to improve the performance of IT/IS projects?”

The four sub-questions developed to further investigate managerial role engagement and TMS are:

1. How does top management engagement in managerial roles relate to top management support in IT/IS projects?
2. Which top management roles contribute largely towards top management support?
3. How is managerial role engagement spread across project management processes?
4. Are certain roles more effectively carried out by certain top managers than by the others?

5.6 Chapter Conclusions

This chapter brings together the findings from all investigations utilised out so far to refine the research conceptualisation and the proposed new concept definition for TMS. Some findings between the literature review and the interview and focus group methods complemented each other, while some did not. The inconsistencies between the findings from different investigations were noted and further investigations were deemed necessary. As the findings so far were not conclusive, no roles were removed from being further investigated. Instead, a new role was added to the list of roles to be investigated.

The Nurturer role was elicited from the interview data and commanded a strong presence. Hence, this role was included in the refined concept definition for TMS. Nurturer role was introduced to the conceptual framework also as an Interpersonal role. The conceptual framework was refined and the hypotheses were stated. The research question was revisited and was elaborated with four sub-questions. Hence, this chapter sets the stage for the next step planned in the research study. The final method proposed for this study is a questionnaire survey. Chapter 6 below will explain the survey method in detail.

CHAPTER 6

6 QUESTIONNAIRE SURVEY METHOD

6.1 Chapter Introduction

This chapter discusses the use of the survey method in the research study reported in this thesis. Section 6.2 explains the reasons for selecting the survey method. Section 6.3 presents the operational definitions for the constructs identified for further study. In Section 6.4, the process of determining measures for the survey is explained. This involves assessing the suitability of measures currently available in the literature. In this instance however, the type of measures available in the literature are recently criticised. Therefore, new measures were created and section (6.4) explains this process. The design of the questionnaire and accompanying documents are explained in Section 6.5. This is followed by Section 6.6 that discusses the questionnaire implementation which explains the participant selection, sampling and the means by which the questionnaire was advertised and circulated. Section 6.7 provides details with regard to the steps followed and the information exchanged in order to obtain ethical approval for the survey method by the ethics committee at the University of Wollongong. Chapter conclusions are stated in Section 6.8.

6.2 Relevance of the Questionnaire Survey Method for the Current Study

The questionnaire survey is the third and final method in the mixed-method approach adhered to in this study. The findings from the survey method are expected to supplement/verify the findings from the interview and focus group methods detailed in Chapter 4. Details pertaining to the choice of the survey method are explained in this section.

“A survey design provides a quantitative or numeric description of trends, attitudes or opinions of a population by studying a sample of that population. From sample results, the researcher generalizes or makes claims about the population” (Creswell, 2003, p. 153). This quote succinctly explains the possible uses of the questionnaire survey method. Further details of benefits and limitations of the survey method are mentioned below (Fowler, 2009; Gable, 1994, Neuman, 2000; Dillman, 2000).

Questionnaire surveys can be posted online or sent via e-mail/post. Hence, the questionnaire could be completed by the respondent at his or her own convenience. This is expected to improve the number of willing respondents and possibilities of obtaining unbiased responses. Questionnaire surveys also have the ability to reach out to a large number of subjects from different geographic locations. Thus, the survey method saves time (Creswell, 2003) and money that may have to be spent if these locations were to be visited.

Questionnaire surveys enable researchers’ access to a sample of subjects where the population is too large to observe directly. Questionnaire surveys are comparatively inexpensive with a fast turnaround time, and are presented in a highly standardised format which makes it easier for both the respondent when answering questions, and the researcher when analysing the data (Fowler, 2009, Dillman, 2000, Neuman, 2000, Creswell, 2003).

Survey method is said to highly complement other research methods (Gable, 1994) and therefore, is ideal for the mixed-method approach utilised in this thesis. The data collected from the survey can be subjected to statistical analysis to draw conclusions on the research questions. Neuman (2000, p. 247) says that a questionnaire survey is best suited to find the following: behaviour, attitudes/beliefs/opinions, characteristics, expectations, self-classification and knowledge.

The author of this thesis chose to let participants self-administer the questionnaire. The participants of this study are knowledgeable mid-level managers who managed IT/IS projects. Hence, a good way to encourage optimal and unbiased participation

would be to offer them the required information and the facility to attempt the questionnaire by themselves at a suitable time, with minimal interruptions.

Having selected the questionnaire survey method, it is also important to have a fair idea of the shortcomings of this method. The downside of the survey method is that data collected via the survey method provide only a partial view or a snapshot of the entire population. This leaves space for critics to argue as regards the generalisation of the results. There is also the fact that once constructed, questionnaire surveys are inflexible because they follow a common standard. Therefore, some argue that questionnaires do not capture the subtle contextual differences very well. The belief that the sample of respondents needs to be large in order to derive viable conclusions is yet another concern regarding the survey method (Dillman, 2000, Creswell, 2003). While these points were noted, the survey method was decided as the best suited method for the final investigation as the advantages outsmart the disadvantages.

A questionnaire needs to be designed in order to administer the survey. The first steps involve construct identification and operationalisation (Sethi & King, 1991; Churchill, 1979). Sections 6.3 and 6.4 below discuss the process of operationalisation carried out in the research study reported in this thesis.

6.3 Operationalisation: Constructs and their Operational Definitions

Operationalisation of a construct is to identify how a construct is measured (Sethi & King, 1991; Byrd & Turner, 2000; Bacharach 1989). This process requires stringent methods for construct identification and a clear definition. “*A construct is an abstract representation of a phenomenon of interest to researchers*” (Byrd, & Turner, 2000, p. 171) and cannot be directly measured (Bacharach 1989). It is therefore necessary to meticulously define constructs that will help determine the variables that can be measured (Bacharach, 1989). First, however, the constructs need to be clearly identified.

Prior literature describes two approaches that could be used to identify constructs for further investigation. These two approaches are the *inductive* and the *deductive*

methods (Hinkin, 1995; Hinkin, 1998; Fornaciari et al., 2005). In theory they stand out as two separate methods. The inductive method involves the researcher relying mostly on his or her empirical research abilities to derive constructs. The deductive method involves the researcher relying on theory to derive constructs. Scholars (Gable et al., 2008; Burton-Jones & Straub 2006) advise that defining a conceptual (a-priori) framework with only theoretical arguments is insufficient and therefore suggest further construct identification studies. Taking this advice on board, both inductive and deductive methods were combined for the research study reported in this thesis. Hence, potential constructs were first identified in theory (Chapter 2). These constructs were then further investigated using empirical methods (Chapter 4) to select the most suitable constructs for further study. Investigations that were carried out in order to define and refine the conceptual framework are summarised in Table 6.1 below.

Table 6.1: Investigations carried out to compile/refine the conceptual framework

Investigation	Purpose	Type of study	Participants
Literature Review	Identify constructs for the conceptual framework	Theoretical	n/a
Construct Identification Method 1	Investigate constructs identified and recognise any further constructs worthy of study.	Empirical (Interviews)	12
Construct Identification Method 2	Further investigate constructs identified and recognise any further constructs worthy of study.	Empirical (Focus Group)	5

As the next step, clear and unambiguous operational definitions for the constructs were determined. In doing so, information gathered from the literature and the findings from the interview and the focus group methods were utilised. The operational definition draws the boundary of investigation for the construct. The measurable units (variables), and activities and operations needed to measure these units were then identified (Sethi & King, 1991).

Tables (6.2 thru to 6.5) below provides a list of constructs selected for further study and their respective operational definitions. Section 6.4 that follows will address the remainder of the process of operationalisation in determining the best measures for these constructs.

Table 6.2: Operational definitions for Managerial Roles and TMS

Interpersonal Role Category	
Leader Role	The degree to which the top management promotes staff development (staffing, training, motivating and other associated duties) in relation to the IT/IS project (Adapted from Grover et al., 1993; verified with qualitative methods ¹¹)
Liaison Role	The degree to which the top management seeks to establish external relationships with regard to the IT/IS project (Adapted from Grover et al., 1993; verified with qualitative methods)
Figurehead Role	The degree to which the top management carry out duties of social nature in relation to the IT/IS project (Adapted from Mintzberg, 1973; verified with qualitative methods)
Nurturer Role	The degree to which the top management assists the staff with sharpening skills used in the IT/IS project (ref: qualitative methods)
Informational Role Category	
Disseminator Role	The degree to which the top management transmits information to organisational members regarding the IT/IS project (Adapted from Grover et al., 1993; verified with qualitative methods)
Monitor Role	The degree to which the top management seeks to receive information to understand the IT/IS project (Adapted from Grover et al., 1993; verified with qualitative methods)
Spokesman Role	The degree to which the top management is involved in communicating IT/IS project information to interested outside parties (Adapted from Mintzberg, 1973; verified with qualitative methods)

¹¹ Interviews and focus group

Decisional Role Category	
Entrepreneur Role	The degree to which the top management initiates and designs positive change for/in the IT/IS project (Adapted from Grover et al., 1993; verified with qualitative methods)
Disturbance Handler Role	The degree to which the top management applies corrective action during unexpected crises in the IT/IS project (Adapted from Grover et al., 1993; verified with qualitative methods)
Resource Allocator Role	The degree to which the top management engages in allocating resources for the IT/IS project (Adapted from Grover et al., 1993; verified with qualitative methods)
Negotiator Role	The degree to which the top management participates in negotiations with regard to the IS/IT project (Adapted from Grover et al., 1993; verified with qualitative methods)
Technical Role Category	
Technical Role	Degree to which the top management provides technical guidance with regard to the IS/IT project (Adapted from Lau et al 1980; verified with qualitative methods)
Top Management Support (TMS)	
TMS ¹²	<i>“The degree to which the top management creates a facilitative climate of support, trust, and helpfulness on performance”</i> (Akgün, Byrne, Lynn, & Keskin, 2007, p. 630)

¹² This should not be confused with the novel definition for the concept of TMS presented as a contribution from this study in Chapter 8. The new definition is still being investigated at this stage, and if used prematurely will result in tautology.

Table 6.3: Operational definitions for ISPP

Information Technology/Systems Project Performance (ISPP)	
Learning	The degree to which the project helped with acquiring knowledge for the organisation that developed the product. (Adapted from Nidumolu et al., 1995)
Control	The extent to which the product development was adequately managed. (Adapted from Nidumolu et al., 1995)
Interaction Quality	The quality of interaction between the staff and users during product the development. (Adapted from Nidumolu et al., 1995)
Flexibility	The degree to which the project's product could adapt to changing needs. (Adapted from Nidumolu et al., 1995)
Operational Efficiency	The degree to which the project's product met the required technical performance. (Adapted from Nidumolu et al., 1995)
Financial Performance	The degree to which the project was financially beneficial. (Adapted from Shenhar et al., 2001)

Table 6.4: Operational definitions for Project Management Processes and the position of the Top Manager

Project Management Processes	
Initiation	<i>“Processes involved in defining a new project or a project phase by obtaining necessary authorization”.</i> (Adapted from PMBOK ® Guide, 2008, p. 39)
Planning	<i>“Process involved in defining the course of action to attain project objectives”.</i> (Adapted from PMBOK ® Guide, 2008, p. 39)
Executing	<i>“Processes that are carried out to successfully complete the project work defined in the project management plan”.</i> (Adapted from PMBOK ® Guide, 2008, p. 39)
Monitoring & Controlling	<i>“Processes needed to track, review and regulate the progress and performance of the project, while successfully managing change”.</i> (Adapted from PMBOK ® Guide, 2008, p. 39)
Closing	<i>“The processes carried out to formally close the project or a project phase”.</i> (Adapted from PMBOK ® Guide, 2008, p. 39)
Position of Top Manager	
Top Manager Position	The organisation specific title that is assigned to the top management based on the organisation’s definition of the management hierarchy.

Table 6.5: Operational definitions for the Controls variables

Constructs selected as Controls	
Industry	The competitive industry in which the organisation competes. Note: Classifications from ANZSIC (2006) were adapted.
Organisation Size	Total number of organisational employees, including number of IT functional employees.
Project Type	The nature of the IS/IT project e.g. software development, infrastructure, digital etc.
Project Complexity	Measured with project budget, number of project employees and project duration
Project Manager Age	The project manager's age, expected range is between 18-80
Project Manager Gender	Gender is acknowledged as either Male or Female

6.4 Operationalisation: Determining Suitable Measures

Determining suitable measure for the constructs involves seeking out existing measures and adapting them to the current research context. If for some reason, available measures are not suitable or measures don't exist, then new measures need to be compiled. Measures by McCall & Segrist (1980) are currently available in the literature. However, during the time when this thesis work was carried out, an unresolved academic debate was taking place. In a nutshell, scholars argue that research carried out with formative measures were flawed (MacKenzie et al., 2011; Kim et al., 2010; Petter et al., 2007). They argue that their investigations proved formative measures to be unsuitable for advanced studies. Therefore, in light of the apparent superiority of the reflective measure, a decision was taken to utilise reflective measures for all of the main constructs in the conceptual framework. Current literature however is not abundantly rich with reflective measures as regards the constructs used in this study. Hence, reflective measures were created for the managerial roles and Information Technology and Systems Project Performance (ISPP). The section below first presents the measures currently available in the literature. Also presented are the new reflective measures that were created to be used in place of formative measures.

6.4.1 Selection of Previously Validated Measures

It is an accepted notion to use previously validated instruments for research (Looney et al., 2006). Therefore, the first attempt was to find instruments that may exist for the constructs included in the conceptual framework. Databases of journals such as Proquest, JSTOR, Science Direct, IEEE, ABI/INFORM were searched with related key words (e.g. “(survey) + managerial roles, project performance, top management support”). Different disciplines were searched for existing measures using such key words.

Six of Mintzberg’s managerial roles (Leader, Liaison, Monitor, Spokesman, Entrepreneur, Resource Allocator) were frequently investigated with a previously validated questionnaire. The origin of this questionnaire (McCall & Sergist, 1980) is in 1980, but has been adapted and used until recently (Milliron, 2008). It has been used in many disciplines such as IS/IT (Grover et al, 1993), Academic (Mech, 1997), hospitality (Chareanpunsirikul & Wood, 2002; Mount & Bartlett, 1999) and health care (Guo, 2009). This questionnaire was first adapted into the IS/IT discipline by Grover et al., (1993) and has been subsequently used by other IT/IS researchers (Gottschalk, 2002; Karlsen et al., 2002; Gottschalk & Karlsen, 2005). However, a validated instrument for Mintzberg’s remaining roles (Negotiator, Disseminator, Figurehead, Disturbance handler) could not be found. The Technical expert role which was an add-on to Mintzberg’s roles had been previously investigated by Lau et al., (1980). The Nurturer role did not have any existing measures since it is newly introduced in this thesis (Chapter 4). Having found the above information, attention was then given to other main constructs in the conceptual framework.

The construct considered next was TMS, which had been tested previously in the IT/IS discipline and many others. However, as brought to attention (Chapter 2), there is no consensus on what really constitutes TMS. This research is about management behaviour based TMS. Hence, a definition for TMS that has investigated top management behaviour was selected (Akgün, Byrne, Lynn, & Keskin, 2007). This definition closely reflects certain actions that a top manager carries out as part of his or her job. It was also noted that Akgün et al., (2007) have defined and validated reflective measures for TMS.

The dependent variable for the study is ISPP. Nidumolu (1995) suggests measures for ISPP and these have been adapted by subsequent researchers (Na et al., 2004; Na et al., 2007; Liang et al., 2007; Barclay, 2008; Rai et al., 2009; Lee et al., 2010). Hence, these measures are seen as current and well validated. It is also noted that control variables used in the study reported in this thesis, such as organisational size, project type and industry (ANZSIC, 2006), age and gender are placed in the demographics section in previously validated questionnaires.

The Tables 6.6 and 6.7 below illustrates measures identified in the literature, and discussed above.

Table 6.6 : Literature with validated measures for the main constructs

Constructs	Past Literature	Type of Measure
Figurehead	None	N/A
Leader	McCall & Sergist, (1980) Note: These are the authors of the original questionnaire. The questionnaire has been subsequently adapted and used in many contexts.	Formative
Liaison	McCall & Sergist, (1980)	Formative
Nurturer	None	N/A
Monitor	McCall & Sergist, (1980)	Formative
Disseminator	None	N/A
Spokesman	McCall & Sergist, (1980)	Formative
Entrepreneur	McCall & Sergist, (1980)	Formative
Disturbance Handler	None	N/A
Resource Allocator	McCall & Sergist, (1980)	Formative
Negotiator	None	N/A
Technical Expert	Lau et al., (1980)	Formative
Top Management Support	Akgün, Byrne., Lynn, & Keskin, (2007)	Reflective
Learning	Nidumolu, (1995)	Formative
Control	Nidumolu, (1995)	Formative
Interaction Quality	Nidumolu, (1995)	Formative
Flexibility	Nidumolu, (1995)	Formative
Operational Efficiency	Nidumolu, (1995)	Formative
Financial Performance	Shenhar et al., (2001)	Formative

Table 6.7: Sources with validated measures, suggestions for Control Variables

Control Variables	Availability of Validated Measures
Industry	Classification by ANZSIC (2006) for Australian based research.
Organisation Size	N/A
Project Type	N/A
Project Complexity	N/A
Project Manager Age	N/A
Project Manager Gender	N/A

Having identified the above, it was necessary to determine if these measures were suitable for this research study, especially in light of the dilemma of the type of measure (Reflective Vs Formative). Section below explains the concerns raised in the literature with regard to the suitability of measures.

6.4.2 Question of the Measure

Formative measures are said to form a latent construct while reflective measures are expected to reflect the latent construct (MacKenzie et al., 2011). Researchers argue the relevance of the reflective measure versus the formative measure for measuring constructs. The recent years have witnessed concerns over this issue as studies (MacKenzie et al., 2011; Kim et al., 2010; Petter et al., 2007) discuss the fallacy of the formative measure in IS research. The scope of the research study discussed in this thesis does not include fuelling arguments against either of these types of measures. However, the current status of notions for measurement types has to be considered as it has the potential to impact the validity of this research study.

Kim et al., (2010) argue that most guidelines (Churchill, 1979) for developing measures apply only to reflective measures. Therefore, formative measures created using these guidelines are expected to be flawed. Hence, research studies carried out utilising formative measures are questioned. Kim et al., (2010, p. 345) set out to investigate if *“the alleged estimation instability of formative measurement is due to measurement model misspecification or simply the short-coming of formative*

measurement". Their findings proved that even without any misspecification on the measurement model the formative measures could lead to erroneous outcomes. Kim et al. (2010, p. 345) therefore warn that, *"the formative measure is at a critical juncture in the IS field"* raising obvious concerns.

"The usage of formative measurement, therefore, may have negative repercussions on the quality of IS research....Construct reusability could especially be jeopardized, leading to inconsistency in theory testing and barriers to building cumulative knowledge", (Kim et al., 2010, p. 363).

Although the formative measure is criticised, the reflective measure is not. Therefore, during this time of controversy, the formative, reflective war is left to be battled outside of this research study. However, in order to adhere to emerging trends, the literature was revisited to find suitable reflective measures, but none other than the measures for TMS (Akgün, et al., 2007), were found. Therefore, in the absence of suitable reflective measures, the decision was made to create reflective measures for the main constructs. The new reflective measures were created with careful and close consultation with the operational definitions. The next section will explain this process in further detail.

6.4.3 Creating New Reflective Measures

This process included tedious iterations (Churchill, 1979; Sethi & King, 1991) that involved revisiting the domain of the construct (literature, interview and focus group data and operational definitions). Reflective measures being created needed to ensure the theoretical meaningfulness of the constructs being measured. Poorly operationalised constructs are known to result in inferior quality of research (Burton-Jones & Straub, 2006).

Reflective measures reflect the construct. Each reflective measure employed to measure a construct should measure what is stated in the operational definition.

Hence, reflective measures are interchangeable¹³ (Coltman et al., 2008), and removing one measure will not affect the overall measurement of the construct. Theoretical guidelines advise visiting the domain of the construct when writing measures. Hence, the researcher re-visited and referred the literature, transcripts from the interviews and the work sheets from the focus group (Malhotra & Grover, 1998; Neuman, 2000).

In the first instance, when the author of this thesis created reflective measures, detailed discussions were carried out with the thesis supervisors to evaluate them. During these preliminary discussions, the measures that were created were closely matched against the operational definitions. The reflective nature of each measure was also evaluated. A few iterations were carried out until a consensus was reached. These measures that were agreed upon (Appendix C.1) were further validated with industry and academic experts (Malhotra & Grover, 1998) before the questionnaire was sent out for the data collection. The section that follows discusses the plans made for these tests. The conduct of the actual tests is explained in Chapter 7.

6.4.4 Content, Face Validity and Other Tests Planned

The first preliminary test planned was the content validity exercise. The purpose of this exercise is to get assistance from industry and subject experts for selecting questions to be included on the final questionnaire. Hence, a pool of reflective measures was created for each construct. The purpose of the exercise was stated with examples on the content validity sheet followed by instructions on how to sort the measures. The reflective measures created for each construct were presented together with the relevant operational definition. The respondents are asked to look closely at the operational definition and then rate measures on how closely they reflected the definition. Additionally, the respondents are asked to record the 4 measures that best reflected the operational definition, with the intention of identifying at least four measures for each construct. A multi-measure approach is suggested in the literature

¹³ This is different from the formative measure, which cannot be interchanged. Removing one formative measure may mean that a particular dimension of the construct is completely ignored.

for better validity and to improve statistical significance (Münstermann et al., 2010; Tiwana et al., 2007; Sethi & King 1991; Straub, 1989). Participants are also asked to suggest any improvements they see as appropriate to further improve the quality of the measures.

The second preliminary test planned was the face validity exercise. A draft questionnaire was then prepared incorporating the selections and suggestions from the content validity exercise. This exercise was planned to be carried out with a different set of industry and subject experts to get a different perspective on the questionnaire before it was sent out for the final data collection. Respondents are asked to comment on or correct as they see appropriate regarding the wordings of the questions, structure, format, spellings and anything else they deem appropriate.

Once these two preliminary tests were satisfactorily completed¹⁴ the plan was to launch the survey and collect data. A series of other validity tests will follow (Hinkin, 1998; Malhotra & Grover, 1998). All of the tests that were planned for the purpose of questionnaire validation are mentioned in Table 6.8 below. Details as regards the tests are available Chapter 7 in further detail.

¹⁴ The documents used in the content validity and face validity exercises are attached in Appendix C.2 and C.3 respectively.

Table 6.8: Tests planned for questionnaire validation

Test	Description	Evaluation
<i>Preliminary Validity Tests – Before the Data Collection</i>		
Content Validity	A process employed to select the items best suited to measure a particular construct.	Qualitative
Face Validity	A process engaged to determine that there are no structural, formatting or spelling mishaps.	Qualitative
<i>Further Validity Tests – After the Data Collection</i>		
Exploratory Factor Analysis (EFA)	An investigation that checks if the theoretically related data also ‘hangs’ together in statistical terms. This process is further utilised to minimise the number of factors.	Statistical
Reliability	A test that evaluates the internal consistency of the measures.	Statistical
Confirmatory Factor Analysis (CFA)	A graphical modelling technique to determine the fit of measures that are expected to be together. Taking the output from the EFA, this technique points out any measures that further confound statistical model fit.	Statistical
Discriminant Validity	A test that determines that the measures across different constructs do not have associations that is statistically confounding.	Statistical
Convergent Validity	A test to determine if the measures used in the same construct actually belong together.	Statistical

6.5 Design of the Questionnaire and Accompanying Documents

A questionnaire almost always has accompanying documents which needs to travel together. A cover letter is necessary to explain the study and request assistance. Research at the UOW has to abide by very strict ethical protocols. A requirement of the Ethics committee is to provide all necessary information to participants in an information sheet and to record participant signature on a consent form. The above mentioned three documents accompanied the questionnaire in this research study. This section will provide an overview of these documents and will also describe the wording, scale selection and the layout of the questionnaire.

6.5.1 The Cover Letter

In compiling the cover letter (Appendix C.3) guidelines from Dillman (2000) for writing a cover letter for questionnaires were closely followed. The structure of the letter is as follows.

Paragraph 1 -The purpose of the study

Paragraph 2 -The reason for contacting this particular organisation and the nature of required participants

Paragraph 3- Contributions expected of the study and benefit(s) to society

Paragraph 4- Precautions taken to ensure the privacy of the participants

Paragraph 5- Mention of attached documents

Paragraph 6- Letter is concluded and the web link and researcher's contact information is given.

6.5.2 The Information Sheet

The information sheet (Appendix C.3) contains the following,

1. Research Title
2. Explanation with regard to the purpose of the research
3. Information with regard to the researcher(s)
4. Information with regard to the participation in the survey
 - a. Expectations from the participants e.g. the type of participants
5. Possible risks and discomforts
 - a. Assurance of low risk
 - b. Approximate time needed to complete the survey etc.,
6. Benefits of the research
7. Contact details of the Ethics committee

6.5.3 The Consent Form

The Ethics committee at the UOW requires written consent from each participant in the survey method. It is advised that the signature be obtained following the presentation of all relevant information with regard to the research. The consent form (Appendix C.3) was designed to meet these requirements. It has the following contents:

Paragraph 1- Research Title

Paragraph 2- Names of the researchers

Paragraph 3-Participant's acknowledgement of receiving information on the research

Paragraph 4 - Participant's acknowledgement on the nature of participation

Paragraph 5 - Participant's acknowledgement on where to direct inquiries if needed

Paragraphs 6 & 7 - Participant's consent to participate and allow the data to be used for the purpose of this thesis and future publication.

At the bottom of the consent form the participants are expected to sign and record the date.

6.5.4 The Questionnaire

Wording and Tone

The questionnaire developed in this study is intended to be self-administered. Hence, the questions needed to be presented in a way that all participants easily understood what was asked of them. Participants and their informed inputs are of utmost importance. It is this voluntary contribution of information that would enrich the research study. Therefore, care was taken when addressing the participants. Participants were acknowledged as valuable informants in the cover letter and care was taken not to appear to “*talk down to respondents*” (Dillman, 200, p. 51).

The questionnaire was compiled using simple and specific words, keeping the questions short yet understandable, avoiding bias, vague and offensive questions to make it presentable to participants (Fowler, 2009; Dillman, 2000; Neuman, 2000).

Scale Selection

The scale and its anchor points determine the response recoding mechanism for questionnaires. This recording mechanism should be subtle enough to capture a range of values but not so over tedious that it would wear out the participants. The literature advises the following with regard to scaling.

“scaling ... creates an ordinal, interval or ratio measure of a variable expressed as a numerical score. Scales are common in situations where a researcher wants to measure how an individual feels or thinks about something” (Neuman, 2000, p. 180). The objective of scaling is to *“help in conceptualization and operationalization processes ... scaling produces quantitative measures and can be used with other variables to test hypotheses”* (Neuman, 2000, p. 182).

There are many types of scales¹⁵, the commonality being that they are all graphically illustrated and run from one extreme to the other (Neuman, 2000). *“Scales assume*

¹⁵ Thurstone scale, Borgardus Social Distance scale, Guttman scale (Neuman, 2000)

that people with the same subjective feeling mark the graphics scale at the same place” (Neuman, 2000, p. 182). Among the many types of scales, Likert scales are very popular. Likert scales offer a range of values to be selected on clearly stated anchor points over the length of the scale. Another benefit with Likert scales is that the anchor points could be stated with relation to the context of the measure.

The literature warns that the Likert scale length has to be thoroughly thought through and should help respondents relate to the context. Studies also state that a scale with an odd number will present a neutral anchor point in the middle (Neuman, 2000, 2007). This is known to be helpful to respondents in remaining neutral or selecting the mid-point when necessary. Appreciating this advice, a decision was made to have an 11 point ratio Likert scale with a zero origin and a middle point. The scale increments by 1 and could be substituted with percentages in respondents’ minds to relate when answering questions. In addition, if the question was not applicable to the context of the project being referred to, the participants were able to select ‘N/A’ at the end of the scale. Hence, the Likert scale records values from 0-10 and then ‘N/A’ at the very end.

The Questionnaire Layout

The layout of the questionnaire is as follows:

1. Key Terms: Explains the key terms used in the questionnaire
2. Part 1: Gathers data on the performance of a specific IT/IS project
3. Part 2: Gathers data on TMS received on the project in discussion
4. Part 3: Gathers data on the management roles performed by the top management on the project in discussion
5. Part 4: Demographic information

The questionnaire is attached in Appendix C.3.

6.6 Questionnaire Implementation Procedure

A well designed questionnaire is only one attribute towards success in the survey method. How the questionnaire is introduced and communicated to participants in order to obtain meaningful responses also contributes towards a successful data collection (Dillman, 2000). This section discusses the participant selection, sampling method(s) and questionnaire circulation and advertising used in the survey method.

6.6.1 Participant Selection

It is imperative that the questionnaire is answered by people who are well informed on the issues being discussed in the questionnaire (Seddon et al., 1999). Previous research studies indicate that a good source of information for TMS and ISPP is the mid-level IT/IS management in organisations (Chatterjee et al., 2002; Ragu-Nathan et al., 2004; Lin, 2010). During the qualitative methods carried out in this study (Chapter 4), it was noted that middle level IT/IS management had a wealth of information on issues related to this study, hence, were selected as suitable participants for the survey method. The middle level managers identified for this research were: IT managers, IT executives, program managers and project managers. In order to make sure that the participant's organisation was established in their core business to some level and had substantial interest in IT/IS projects, the following criteria were expected of the participants. The organisation where the project was carried out was expected to have had at least 15 full time employees, with at least 3 full time employees in the IT functional area concurrent to the project that is being discussed.

In order to gather as many participants as possible, with minimal risk to them, at their leisure, away from workplace intimidation, professional bodies related to the areas of study were contacted. The researcher identified the PMI, The ACS and the AIPM as the main professional bodies that could be approached for the data collection.

6.6.2 Sampling

Surveys are administered to a sample of the population for the obvious reason that the whole population cannot be subjected to a survey. A large sample size is better for statistical data analysis (Neuman, 2000). A prominent approach to decide on a sample size is the ratio between the respondents and the number of measures, and this system has been adhered to in this study. Mackenzie et al., (2011) points out that according to Cattell, (1978) and Everitt, (1975) this ratio range from 3:1 to 10:1.

In this study there are approximately 19 main constructs with roughly 4 measures for each. The following calculations were done to derive a probable sample size.

1. The number of latent variables = 19
2. There are approximately 4 measures for each latent variable. Therefore
 - a. 4 measures for each of the 19 latent variables = $(19 \times 4) = 76$
3. According to (3:1) ratio, respondents to measures sample size = $(76 \times 3) = 228$
4. According to (10:1) ratio, respondents to measures sample size = $(76 \times 10) = 760$

According to the calculations, a healthy range lies between 228 to 760 participants. Given that obtaining 760 participants is a very large target to achieve, it was decided to strive for 220 participants (or as many as possible) with the following sampling methods.

The participants selected for the study has specific characteristics (Section 6.6.1), hence, purposive sampling is suitable (Elbashir et al., 2008; Neuman, 2000). Yet, these participants may be difficult to approach with limited time to offer on their part. Therefore, in order to get as many respondents as possible the snowball sampling (Nueman, 2000) was also employed.

6.6.3 Questionnaire Circulation and Advertising

The questionnaire was planned to be hosted online on www.surveymonkey.com. In order to widely advertise the questionnaire all of the following ways for circulation were explored.

1. Web address (online link) of the questionnaire

The web address was provided to each professional body, together with a cover letter and a copy of the survey. Once the permission to administer the survey was obtained by the relevant authority, the web address was expected to be freely distributed amongst the members of the professional body.

2. Hard copy or printed media

Hard copies of the questionnaire were planned to be provided to people who preferred to answer on paper instead of visiting the web link. These hard copies were to be distributed to professional bodies to be handed out to members during their monthly events.

3. Phone and E-mail

Author of this thesis planned to phone her personal contacts matching the participant criteria and inform them regarding the survey. Interested parties were to be sent the questionnaire and the accompanying documents.

Periodic follow up with the recipients were planned to encourage them to return the completed questionnaire.

6.7 Ethics Procedure

The ethical consideration for research at the UOW was explained in some detail in Chapter 3. The following steps were followed in adherence to the guidelines set by the Ethics committee to obtain approval for the research study reported in this thesis.

Step 1– Applied with research details to the Ethics committee for approval.

The application to undertake research involving human participants consisted of the following information/documentation.

1. Copies of all documents
2. Project Title and a paragraph on the aim of the research.
3. Details on all researchers, i.e. names, positions, qualifications and experience
4. Area of research
5. Research design
6. Statistical design and anticipated number of participants
7. Ethical considerations such as risks
8. Benefits of the study
9. Rationale for selecting participants
10. Methods for participant recruitment
11. Methods for obtaining participant consent
12. Methods for preserving confidentiality and privacy of the participants

Step 2 – First round of evaluation: the Ethics committee requested further details and some minor modifications. Please see Appendix C.4.

Step 3 – Submission of the requested information and documentation (Appendix C.4).

Step 4 – Second round of evaluation: approval was granted under ethics reference no: HE13/291 (Appendix C.4).

The Figure 6.1 below succinctly illustrates the work discussed in this chapter.

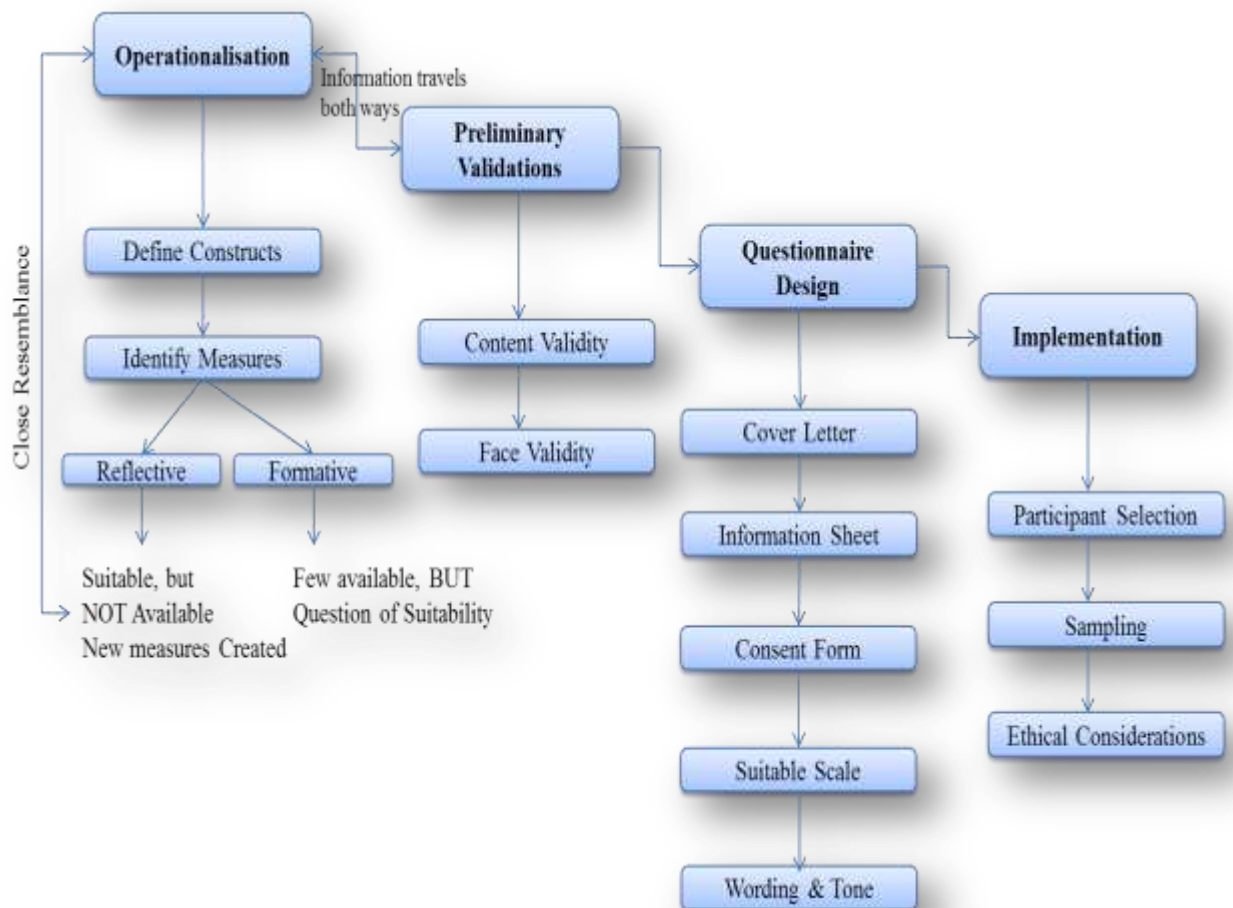


Figure 6.1: Steps carried out from operationalisation to questionnaire survey implementation

6.8 Chapter Conclusions

The survey method was selected for this study as it allows studying a sample of the population and can travel to a large group and has a quick turnaround time with a reasonable cost. Questionnaire survey is known as a quantitative method and is a good contributor to the mixed-method approach selected for this study.

Prior to the design of the survey, constructs identified by inductive and deductive methods were carefully operationalised to preserve the integrity of the research. In

determining measures for the questionnaire, warnings from recent studies with regard to the fallacy of the formative measure were taken into account. Since most of the previously validated measures in the literature are formative, reflective measures were created for managerial roles and ISPP. This chapter explains two preliminary tests planned for further testing of these new measures and mentions a series of other tests that will be explained in Chapter 7.

The questionnaire was designed with ratio type Likert scales to record numerical values. The scale is 11 points from 0 to 10, with the value 5 as the middle point. When distributing the questionnaire, participants working in IT/IS projects from across different industries were sought. Managers, Executives, project managers and program managers who managed an IT/IS project recently in organisations with substantial interest in IT and IS were invited to participate. Members from professional bodies that fit the participant criteria were contacted instead of approaching through work organisations to avoid any risks involved to participants when answering questions with regard to the top management.

The questionnaire was expected to reach a large sample and the expectation at this stage was to collect data from around 220 participants. Purposive and Snowball sampling methods were employed to collect as many responses as possible.

The questionnaire was accompanied by a cover letter, an information sheet and a consent form. These were first presented to the Ethics committee at the UOW for review. Following approval for distribution, the questionnaire survey was launched.

The web link (www.surveymonkey.com) where the questionnaire was hosted was advertised with professional bodies. Soft and hard copies of the questionnaire were also made available to willing participants. Periodical follow up with participants was made where necessary. The author collected all completed soft and hard copies of the questionnaire. Chapter 7 presented below will further detail the data collection and explain the data preparation and the analysis.

CHAPTER 7

7 DATA COLLECTION, PREPARATION AND THE ANALYSIS

7.1 Chapter Introduction

This chapter explains in detail the processes of data collection, preparation and analysis. In Section 7.2 on data the collection, methods used to gather data from well informed and responsible respondents are explained. Also mentioned are how risks to these respondents were assessed and minimised. Section 7.3, on data preparation explains the procedure followed to obtain a workable set of data. This includes identifying a workable sample by carrying out initial manual tests, deleting unwanted cases, applying remedies for missing values, coding the data as necessary etc.

The process of data analysis explained in Section 7.4 starts with necessary preliminary tests. These include checking for unengaged responses, skewness, kurtosis and normality. In Section 7.5, additional descriptive statistics tests that were carried out to further familiarise with the data and to understand the background of respondents are explained. The remainder of the data analysis is presented under two main headings. The first is on questionnaire validation (Section 7.6), and the second is on causal relationships between constructs (Section 7.7).

Section 7.6 on the questionnaire validation includes an assortment of validity and reliability tests. This section (7.6) first discusses two exercises that were carried out prior to the data collection to validate theoretical constructs. The section then proceeds to explain the conduct of Exploratory Factor Analysis (EFA) tests that were carried out to determine if the theoretical constructs could withstand the rigour of statistical tests. As a result of the EFA exercise certain changes were implemented in the constructs and they were then further subjected to Cronbach's Alfa tests to

examine their internal consistency and reliability. Further rigour was applied on these constructs by subjecting them to Confirmatory Factor Analysis (CFA) tests.

Confirmatory factor analysis is a graphical modelling technique and the constructs were further scrutinised. Variables/measures/items¹⁶ identified as problematic were removed from the constructs. This was a recursive process and was carried out until a statistically acceptable, theoretically viable model fit was achieved. These results were subjected to further examinations to identify common method biases that may have crept in during the data collection (Section 7.8). Furthermore, additional tests were carried out to assess Convergent and Discriminant validity tests discussed in Section 7.9. This is followed by Section 7.10 that presents causal investigations with Structural Equation Modelling (SEM).

As a prerequisite for SEM, multivariate assumptions were examined and having satisfactorily met the assumptions, the analysis proceeded to the next step. This study presents a large multivariate research model. Therefore, for maintaining clarity and to minimise error, structural models with composite variables are used to determine causal relationships. The model is then further examined for moderating and controlling effects, and is explained in Section 7.11. The chapter concludes with Section 7.12 that presents summarised interpretations of the findings.

7.2 The Process of Data Collection

Although a meticulously built survey instrument (detailed in Chapter 6) is a prerequisite for successful research outcome, the quality of analysis is also known to benefit from data that has been filled responsibly by informed respondents. A few different mechanisms were put in place to attract informed respondents and are briefly discussed below. Data for this study were collected from people who recently manage(d) IT/IS projects. The positions targeted were namely, IT/IS manager, program manager, project manager, executive and the like. The project being discussed was expected to be from the recent past, i.e. between the year 2009 and the

¹⁶ Variables, Items and Measures are used interchangeably in the literature (Podsakoff et al., 2003).

year 2013. Risks for respondents are a key cause of respondent deterrence. This being a main concern in the data collection, a reasonable remedy is necessary.

The questionnaire asks respondents to report the Top Management Support (TMS) received during the conduct of a particular project. Hence, if filled at their respective work places some risk of intimidation by the top management to the respondents was detected. As a countermeasure, it was decided that the best solution for this would be to consult respondents outside of their work places. Therefore, organisations such as the PMI, the AIPM and the ACS where such professionals gather were consulted. Presidents and officials from Sydney PMI and AIPM were very receptive and went out of their way to assist the author. They invited the author to say a few words with regard to the research and hand out leaflets (Appendix D.1) that advertised the unified resource locator (URL) where the online version of the survey was available. During some other events, the author was invited by Sydney's PMI and AIPM to hand out hard copies of the questionnaire prior to the start of the event and then collect them back at the end. Some participants were very happy to oblige and completed the questionnaire during the event and some chose to fill the survey online. Sydney's PMI, AIPM and ACS extended courtesy by advertising the research on their web sites, newsletters and so on, and also contacted their sister branches from other Australian states to advertise the research (Appendix D.1). Apart from these organisations the author consulted her own professional network to find additional respondents. Her supervisors also helped by contacting their network of professionals to introduce the survey.

The data were collected online via www.surveymonkey.com., and also using hardcopies of the questionnaire. The data from hard copies were manually entered using an option on the same website, followed by careful scrutiny to ensure that there were no data entry errors. The next essential prerequisite for the data analysis is to prepare the data in a format that can be analysed.

7.3 Preparation of the Data: The Workable Sample

According to the survey instrument design explained in Chapter 6, all questions except the *Additional Information* section are mandatory. In total, one hundred and fifty two people attempted the questionnaire. Out of this only 119 were completed, all the others had abandoned answering before they reached half way through the questionnaire. An initial eyeball analysis determined that 2 questionnaires were just played with and all answers were marked as either 0 or not applicable. Therefore, the usable number of responses is 117. The 117 responses were recorded by 117 different respondents. One questionnaire per person was maintained via a restriction available on the www.surveymonkey.com. The questionnaire tool enabled only one completion per computer.

The data preparation procedure was carried out in several steps. In the *first* step, data were de-identified as promised to the respondents and a variable name for each measure was assigned (Appendix D.2). In the *second* step, missing data were identified and remedial procedures were discussed with the research supervisors and the Director of the statistical consulting unit at the UOW and were applied. Parts 1 to 3, of the questionnaire which included questions from 1.1 through to 3.12 had a restriction imposed that made all questions mandatory. Therefore, for these questions, there were no missing values in the 117 responses selected for the analysis. However, each question allowed participants to report not applicable ‘(N/A)’ if necessary. These recordings were considered as missing values. Part 4 in the questionnaire consists of *Demographic and Additional information* sections. Out of these two, the *Demographics* section was made mandatory. Hence, there were no missing values for demographic information. There were a few missing values in the *Additional Information* section. The percentage of missing values were between 5%-7% and depended on the question. For instance, some respondents left ‘Age’ unanswered. The remedies discussed below were applied for each section as relevant and are succinctly explained in the Table 7.1 below.

One remedy applied is the application of the construct median for a related set of questions. Note that questions 1.1 through to 3.12 consist of blocks of questions which are reflective in nature. A median calculated horizontally case wise or

vertically pertaining to all answers by all respondents would in fact be inappropriate. Instead, a construct median was calculated for each construct that had a missing value, i.e. for each set of related questions, and one case at a time. Although tedious and time consuming this approach is deemed to be the best to fill in for missing values without violating the reflective nature of each construct. Missing values for continuous variables such as age and years of experience were substituted with the mean.

The *third* step in the data preparation was to code the data as necessary. Questions with a weight (0 to 10) on the Likert scale did not need any special coding. However, where ever there were textual answers, the relevant data were given a coding. When relevant, an incremental scale was assigned to match the logical representations. An example is the number of employees in an organisation: the least number was assigned a value of 1 and was incremented with each higher value presented in the questionnaire. General information with regard to the coding is available in the Table (7.1) below. However, it must be noted here that when the results are presented in this chapter, the coding is decoded prior to being presented. This allows the results to be more closely matched with the questions asked in the questionnaire.

Table 7.1: Remedies for missing data and types of coding applied

Question	Type of Question	Missing Data	Remedy	Coding
Part 1- Performance of the IT/IS Project (1.1-1.6)	A 11 point Likert Scale from 0-10, additionally, participants were allowed to state 'N/A' when needed.	'N/A' answers were treated as missing values.	Median was calculated for each set of questions pertaining to the same construct. This was carried out wherever a value was missing and for each construct in each questionnaire / case.	No special coding was required
Overall ISPP	11 point Likert Scale (0-10).	No missing values	No missing values	No special coding was required
Part 2 - Top Management Support (2.1)	A 11 point Likert Scale from 0-10, additionally, participants were allowed to state 'N/A'	'N/A' answers were treated as missing values.	No missing values	No special coding was required
Overall TMS	11 point Likert Scale (0-10).	No missing values	No missing values	No special coding was required
Part 3 - Managerial Roles Performed by the Top Management(3.1-3.12)	A 11 point Likert Scale from 0-10, additionally, participants were allowed to state 'N/A' when needed.	'N/A' answers were treated as missing values	Median was calculated for each set of questions pertaining to the same construct. This was carried out wherever a value was missing and for each construct in each questionnaire.	No special coding was required
Selecting a project management process or processes	Includes a 'N/A' answer that may be selected.	'N/A' answers were NOT treated as missing values, but needed to be consistent with questions in the same block, i.e. the answers to managerial roles.	A 'N/A' answer is only viable when all questions for managerial roles are also 0 or 'N/A'. If not, it was assumed that all processes were selected by the respondents.	Respondent's selection of a particular process recorded the name of the process. During the stage of coding a value of 1 was given when a particular process was selected a 0 was given when not.
Part 4 - Demographic Information	Multiple choice with one answer	No missing values	No missing values	Each selection was given a numerical value. The lowest was given the value of 1 and the rest incrementing as per the logical order given.
Additional Information	Questions leading to textual answers	Filling is not mandatory and few participants had chosen not to answer some questions. This ranged from 5%-7% depending on the question.	Continuous variables such as age, years of experience and years worked in the organisation were substituted with the mean	No special coding was required for continuous variables. The categorical variables such as gender were given a numerical value 1 for male, 2 for female.

7.4 Preliminary Data Analysis

The initial data set was established to a satisfactory level, following which certain preliminary tests were carried out. These tests included checking for unengaged responses, normality, skewness and kurtosis in the data. Microsoft Excel 2010 and IBM's SPSS Version 22 were used for preliminary analysis of the data. As indicated earlier, the questionnaire consists of four parts. The first three parts (1-3) contained questions with regard to: project performance, TMS and the managerial roles, and are largely responsible for gathering data for investigating the hypotheses. Part 4, consisting of questions for demographic and additional information is to be utilised to investigate moderating and controlling effects.

7.4.1 Detecting Unengaged Responses

The test for identifying unengaged responses was carried out first. Responses are said to be unengaged when the respondents answer without giving much attention to what is being asked of them. Such data would in fact lead to poor statistical inferences. The questions asked for the constructs ISPP, TMS and managerial roles are reflective and hence, the expectation is that answers to related questions obtain similar values. Therefore a set of standard deviations that is not overly large is expected. This test was carried out for the first three parts of each case, i.e. each variable in Part1- Information systems project performance, Part 2- Top Management Support and Part 3 - Managerial Roles. Although time consuming, this test is thorough in its approach for identifying unengaged responses.

The results of these tests produced acceptably small standard deviations, indicating that each question asked on the same variable has recorded values close to each other. The maximum and minimum standard deviations were also calculated for each and every variable in each case. The highest recorded was 5 and the lowest was 0. A close look at cases that presented such 'extreme' values indicated that they were one-off incidents and did not invalidate the whole case. Although the above mentioned tests may be going over the limit of preliminary data testing expectations, this approach determined that no additional cases should be deleted before further

analysis. Hence, it is safe to say that the data set was obtained with satisfactory respondent engagement.

7.4.2 Skewness and Kurtosis

Skewness and Kurtosis are two tests which are carried out to determine the shape of the data distribution (Coakes et al., 2010). Overly skewed or kurtotic distributions may confound statistical evidence. The acceptable range for both Skewness and Kurtosis is between + and - 2, i.e. the absolute value of 2. These tests were run twice, first, on the data for parts 1 to 3 and secondly for data on part 4. The first test will determine if there is a problem with the distribution of the data being utilised to predict relationships between the key constructs. The second test will determine the skewness and kurtosis of the data being used for predicting control and moderating effects. This separation of the data is not without reason; skewness or kurtosis, if evidenced in the first set, will need to be taken into more serious consideration than if found in the second set, as it is used for key statistical inferences in this thesis.

The results of the first test revealed that the data lies between the absolute value of 2 (i.e. +2 and -2) for the skewness test, but the results for kurtosis exposed 4 suspects. At this initial stage, these values are taken note of (Table 7.2) while proceeding with other preliminary data investigations. These variables will be watched during exploratory and confirmatory factor analysis and if found to produce low or cross loadings or if they negatively affect the goodness of fit of the model, it will be considered for deletion.

Table 7.2: Variables that produced values beyond the threshold for Kurtosis in the first data set –Parts 1-3 on the questionnaire

Variable¹⁷	ISPPL3	ISPPT1	ISPPT2	ISPPT4
Kurtosis	3.39	3.08	4.69	3.24

The second test revealed the following values above the threshold for both skewness and kurtosis (Table 7.3). Budget appears more kurtotic than any other and further investigations involving these variables will be carried out in the sections that follow.

¹⁷ See Appendix D.2 for relevant item/measure names

Table 7.3: Variables that produced values beyond the threshold for Skewness and Kurtosis in the Second data set - Part 4 on the questionnaire

Variable	Budget	Years worked in the organisation	Project Duration
Kurtosis	7.43	2.76	2.75
Skewness	-2.84	---	---

7.4.3 Checking for Normality

Some statistical tests and procedures assume normal distributions or asymptotically normal distributions for the parameters of interest. Therefore, normal distribution of the data is known to produce more accurate statistical results and is desired by researchers. Statistical tests were carried out on SPSS Version 22 to determine the normality of the data. These included examining histograms, Q-Q plots and box plots. Some outliers were indicated by box plots and they have been noted for further analysis if required later in the study, i.e. if results are irrational. In general however, Q-Q plots and histograms displayed normal or near normal distributions.

Therefore, a decision was made to assume that the data were sufficiently normally distributed for further analysis. The fact that skewness and kurtosis tests on the significant constructs obtained values acceptable within the known threshold also supported this decision. A transformation for the data at this stage does not seem necessary, but is an option to consider if the final statistical results provide nonsensical or confounding results.

7.5 Descriptive Statistics

Descriptive statistics are carried out to make general observations about the collected data (Coakes et al., 2010). In certain instances such as respondent age, experience and duration of the project, the mean, highest and lowest values are of interest. In certain others for example, the type of industry and project type and the like, the frequency of occurrence provides valuable background information. More details of these aspects are presented below.

7.5.1 Industry and Project Type

Industry

Respondents from many different industries (ANZSIC, 2006) were invited to answer the questionnaire in order to facilitate participation across a range of industries. However, a closer look at the data indicates that people from only the following industries have actively participated. These industries include the Information Technology, Education, Finance & Banking, Health Care, Utility (electricity, gas), Admin & Consultancy Services and Transport. A few other industries were mentioned, but did not have sufficient numbers to sample as separate groups. Therefore, they were all categorised together and named as ‘Other’ industries. During the analysis, each industry type was given a numerical code. However, when presenting the analysis in Table 7.4, they are decoded back for ease of understanding. Note that the values in Table 7.4 indicate that most respondents are from the IT industry and the least participation is from Administration and Consultancy services.

Project

The questionnaire contained questions with regard to the type of projects managed by the respondents. Hence, a few common project types were indicated as options for selection. For people from any other different project type, the opportunity to manually enter the project type was provided. During the analysis, project types were given codes and later decoded before presenting in this chapter.

The results indicate that most respondents worked on the following project types (Table 7.4): software implementation, software upgrade, software development,

software migration, software integration and infrastructure projects. The rest of the projects were categorised under ‘Other’ as there were no significant categories that could be identified from the textual answers recorded by the respondents. The data in Table 7.4 illustrates that most number of participants are from software development projects, closely followed by software implementation projects. Only a few respondents from software upgrade and migration projects have responded to the questionnaire.

Table 7.4: Type of Industries and Project Types reported by the respondents
(Highest is highlighted)

Industry	Frequency	Project Type	Frequency
Information Technology	47	Software Implementation	29
Education	9	Software Upgrade	6
Finance and Banking	11	Software Development	31
Healthcare	8	Software Migration	8
Utility (electricity, Gas)	8	Software Integration	10
Admin & Consultancy	5	Infrastructure	19
Transport	7	Other	14
Other	22	--	--
Total	117	Total	117

7.5.2 Respondent Age, Experience, Gender and Project Duration

Age

Respondents were also prompted for their age. This data were used to identify the mean age and the oldest and the youngest ages of the respondents that answered the questionnaire. The youngest age reported was 26 while the oldest reported an age of 65. The mean result for age is 43.76 years (see Table 7.5).

Experience

Two questions were asked from the respondents with regard to their experience. Descriptive statistical tests (Table 7.5) indicate that the respondents range from having 2 years of total experience in IT/IS projects to having up to 28 years of experience. With regard to respondent's time in the current organisation, one person reported being in the organisation less than a year while another reported having worked 23 years in the same organisation.

Project Duration

Data for project duration was calculated by asking respondents the approximate start and end dates for the project being discussed. Statistical results indicate the shortest project duration reported as 0.2 years while the longest project duration reported is 5 years (Table 7.5).

Table 7.5: Descriptive Statistics for Age, Experience and Project Duration

	Minimum	Maximum	Mean	Std. Deviation
Age	26	65	43.76	8.302
Total years of Experience	2	28	13.42	5.816
Years in organisation	0	23	5.55	4.777
Project Duration in years	0.20	5.00	1.3698	.92771

Gender

Respondents were asked to record their gender. Although a hypothesis using the gender is not investigated in this research, it is interesting to use it as a control variable to see if there is any significant effect on ISPP. Eighty eight (88) respondents recorded their gender as male while 29 recorded their gender as female. Therefore, approximately one fourth ($\frac{1}{4}$) of the respondents are female while there appear to be 3 times as many male respondents.

7.5.3 Employee Statistics, Project Budget, Manager Consulted and the Power Distance

Number of Employees

Three questions were placed in the questionnaire to gather data on the number of employees. These questions ask the number of employees in the organisation, number of employees engaged in the IT/IS function and the number of employees assigned to the project being discussed. Table 7.6 below illustrates the findings. The majority of the respondents i.e. 63, amounting to 53.84%, reported that their organisation had over a thousand employees. Forty nine (49), i.e. 41.88% of respondents reported that their organisations employed more than 50 employees in the IT/IS functional area. However, most projects had less than 10 people involved in the project. The number of respondents reporting less than 10 (including the 21 respondents that reported fewer than 5 employees) totalled to 68 cases i.e. 58.11% of all respondents.

Project Budget

Respondents were prompted with a few options to select their approximate project budget. The intention was to encourage a large sample of respondents with varying budgets. Hence, information from projects with budgets as low as \$1000 or less were captured along with projects with budgets of \$10,000 and above. The Table 7.6 below indicates that the number of projects reported with budgets over \$10,000 exceeds all others, and amounts to 100 cases, i.e. almost 86% of the cases had very large budgets. The reason behind the kurtotic value obtained for budget in Section 7.4.2 may be related to this.

Manager Consulted: The Top Manager of the Survey Respondents

Respondents were asked to state the manager they consulted for support on the project being discussed. The intention was to discover the top manager of the respondent. The questionnaire suggested six categories which were based on the literature. Most respondents reported their selection within these categories. The option to enter the name of any other type of manager was also allowed. A few had entered positions such as project management office manager, senior clinician (i.e. from healthcare industry) and general manager etc. During the preliminary data

investigation these were carefully considered and since similarities to the categories offered in the questionnaire were found, those entered positions were categorised accordingly. For example, the above mentioned positions all had characteristics of a senior manager, and hence, the Senior IT manager title suggested in the questionnaire was adjusted as ‘senior manager IT and other’, to cater for a wider variety.

According to the frequency analysis illustrated in Table 7.6, the Director is reported as the manager consulted most for support.

Distance to the Top Management

While finding out the level of manager consulted for support, i.e. the top manager for each respondent (see above), another question was designed to find out the power distance between the project manager and the top manager. During more advanced analysis using the research model (Section 7.11.2), the top management positions mentioned above were further categorised as Internal or External managers and were utilised to investigate moderating effects on the model. The question regarding the distance to the top manager was designed to assist with making this decision and to facilitate further analysis.

According to the frequency Table 7.6 below, 66 respondents reported they were only one level below the top manager while 2 people reported they were 4 and 5 levels away.

Table 7.6: Comparative view of descriptive statistics
Highest frequency highlighted

Employees: Organisation	Frequency	Employees: IT/IS Functions	Frequency	Employees: Project	Frequency	Project Budget	Frequency	Top Manager	Frequency	Distance to Top Manager	Frequency
<50	21	<5	9	<5	21	<1000	2	Program Manager	13	1 level	66
<100	8	<10	13	<10	47	<3000	4	IT Manager	8	2 levels	37
<500	15	<30	27	<30	26	<5000	6	Senior Manager (IT & other)	23	3 levels	12
<1000	10	<50	19	<50	11	<7000	5	Director	42	4 levels	1
More	63	More	49	More	12	>10,000	100	Chief Information Officer	18	5 levels	1
	-	-	-	-	-	-	-	Chief Executive Officer	13	-	-
Total	117		117		117		117		117		117

The questionnaire validation and causal relationship analysis between the constructs are discussed in the sections that follow.

7.6 Construct Reliability and Validity for Questionnaire Validation

7.6.1 Content Validity and Face Validity

The consideration given to construct operationalisation and development of measures was previously discussed in Chapter 6. There are certain follow up procedures that need to be administered to ensure the effectiveness of the survey instrument. The first of these procedures is to ensure that the questions meant the same to all participants. If not, the questionnaire is futile in its effort to capture the intended data. It is also important that there are no cosmetic issues such as formatting mishaps, spelling or grammatical errors. The presence of such shortcomings may not just be obstructive towards a successful data collection, but will also deter the interest of informed respondents.

The literature prescribes several approaches that will assist in getting the best possible survey instruments out to respondents. Content validity and face validity are the most commonly applied. The plan for these two tests was mentioned in Chapter 6, Section 6.4.4. Content validity refers to the process of selecting the best suited measures for a particular construct (Cronbach & Meehal 1995, Nueman, 2000). There are algorithmic procedures (Lawshe, 1975) mentioned in the literature. However, such procedures demand the participation of at least 10-15 participants. These participants are then disqualified from assisting the data collection any further. The number of respondents for the survey is limited and therefore a decision was taken to limit the number of participants for the content validity test but carry out a more in depth examination with a smaller group of people. Therefore, a thorough investigation was carried out with three senior academics (from management, information systems and marketing backgrounds) and an IT manager. These participants were given the content validity sheets (Appendix C.1) and were individually interviewed. Their selections and concerns were noted and were further discussed with the thesis supervisors, and a questionnaire was compiled for the next step, i.e. for the face validity.

During the face validity exercise, different participants were engaged. Two academics and one IT manager and three IT project managers were consulted. They

were asked to comment on the questionnaire structure, formatting and wording. They were also asked for advice on any other improvements including the spelling and the grammar. While a few questions were reworded as suggested, an immensely valuable contribution was made by one project manager.

Each of the questions in part 3 of the questionnaire inquires about a managerial role played by a top manager. While a scale of 0-10 is suggested, it is also possible for a respondent to specify that this question is not applicable for the project being discussed. Below each set of questions pertaining to the managerial roles played by the top manager, a single question attempts to capture when this particular managerial role was necessary for the project being discussed. The questionnaire previously pointed only to the project management processes (PMBOK® Guide, 2008). One observant project manager pointed out that all questions with regard to a particular managerial role may be inapplicable for a particular project, and therefore selecting a project management process would be inappropriate. This aspect was rectified in the following manner. An addition was introduced to the question capturing the project management process(es). It now reads, ‘all questions above are either 0 or not applicable’. The section that follows discusses further analysis carried out on the data.

7.6.2 Exploratory Factor Analysis

Exploratory factor analysis is a statistical procedure used to determine if the collected data does actually belong with the constructs or factors (as they are called henceforth in this section) included in the questionnaire. Exploratory factor analysis is also useful in reducing a large number of factors to a smaller number (Gaskin, 2010). It is however, advised that reducing the number of factors should be carefully executed without impeding theoretical notions brought about in the study (Coakes et al., 2010).

It is understood that inferences with regard to the data should not merely depend on statistical outputs, but should relate to the domain of study and the theory used to build it. Two approaches were attempted for EFA keeping in mind that further analysis with confirmatory factor analysis and structural modelling is planned to be

carried out. In the first attempt all of the data from parts 1 thru to 3 in the questionnaire were included. The variables from ISPP and managerial roles each loaded into separate factors, which indicated that the theoretical underpinning is proper. However, TMS, although with different weights, loaded on to a single factor with the Disturbance Handler role.¹⁸

The key argument in this thesis is that top management engagement in managerial roles leads to TMS. In order to carry out causal investigations, it is necessary to keep the managerial roles and TMS separate. Hence, a manual segregation is deemed necessary. The three sections used in the questionnaire are used as a guide for this purpose. Therefore, the managerial roles, ISPP and TMS are all separately subjected to the procedure of exploratory factor analysis. Having separate measurement models for ISPP and managerial roles is considered better suited for future statistical scrutiny involving confirmatory factor analysis. These models can later be amalgamated to build the structural model for causal analysis.

However, before embarking on this exercise, certain assumptions need to be verified. Since the sample size, normality and outliers have already been mentioned and missing values rectified, it is now necessary to consider the factorability of the data (Coakes et al., 2010). For this purpose exploratory factor analysis was carried out on all factors with Principal Axis Factoring as the extraction method where eigen values are greater than 1, and with Varimax rotation. The results are discussed below.

Coakes et al., (2010) recommends that the correlation matrix should be eyeballed before proceeding with further analysis to see if at least a few correlations can be found with values larger than 0.3. The correlation matrix with all factors from parts 1-3 in the questionnaire is seen to consist of more than a few large correlations and in fact has values greater than 0.5, which is above the recommended value. Other test results that need to be considered to determine factorability are the results from Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. Bartlett's Test of Sphericity returned a large value of 12261.124 and is

¹⁸ In advanced analysis in Section 7.10.3 the Disturbance Handler displays the highest significant predictive statistical influence (Schreiber et al., 2006) on TMS. This is possibly the reason for loading on the same factor during preliminary analysis.

found to be significant as per the specifications suggested in the literature. Kaiser-Meyer-Olkin measure of sampling adequacy meets its expectations by returning a value of 0.812, i.e. a value above 0.5. Hence, it can be declared that this data are factorable. In the next steps, ISPP, managerial roles and TMS will all be the subjects of separately carried out EFA exercises and are explained next.

Exploratory Factor Analysis on Managerial Roles

The initial test was carried out with 117 cases with 50 variables that belonged to 12 different factors. Examination of the results revealed the following. The correlation matrix contains a good number of values over 0.3, and KMO measure of sampling adequacy is 0.891 and Bartlett's Test of Sphericity returns a value of 7553.226 and is significant. The results are seen on Table 7.7 below. Past studies advise that on the communalities table, both initial and extracted columns should be examined to find values of 0.3 or above. In this particular instance communalities were all easily above 0.5.

Table 7.7: KMO and Bartlett's test of Sphericity for Managerial Roles

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.891
Bartlett's Test of Approx. Chi-Square		7553.226
Sphericity	Df	1128
	Sig.	.000

Variables from both the Leader role and Nurturer role loaded into one single factor. The Spokesman and the Negotiator roles also loaded into one single factor (Table 7.9). Two variables, (Sps3 and Fig3) were deleted due to cross and low loadings. Multiple iterations of the test were carried out until a satisfactory pattern matrix surfaced. The scree plot was also examined (Figure 7.1). The final set of factors settled for is 10 and together they explain over 82% of the total variance. Variance and pattern matrix Tables (7.8 and 7.9) follow.

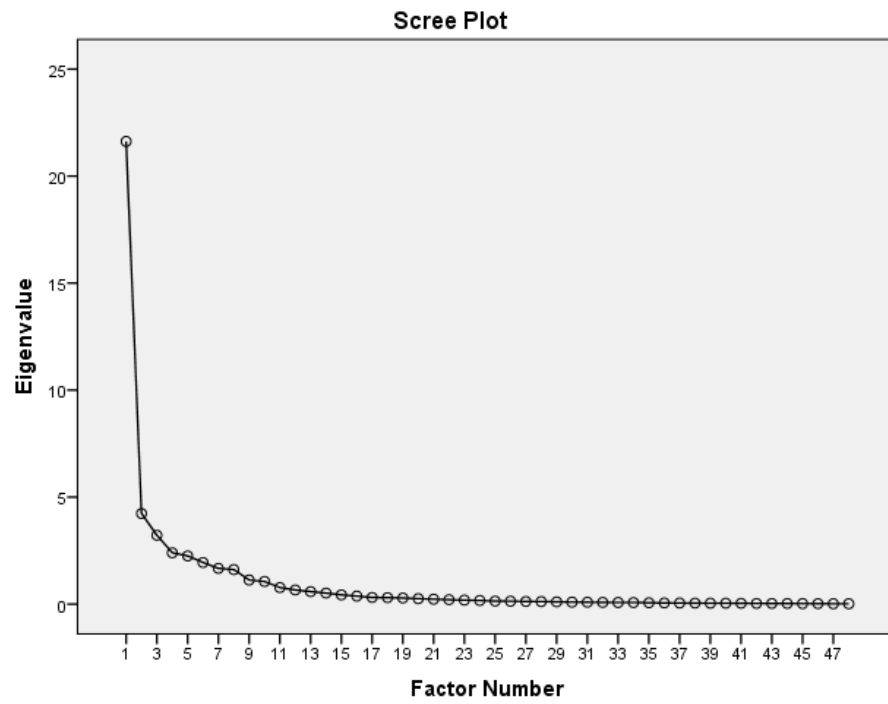


Figure 7.1: Scree plot for Managerial Roles

Table 7.8: Total variance explained for Managerial Roles

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	21.620	45.042	45.042	21.443	44.672	44.672	6.071	12.647	12.647
2	4.237	8.826	53.868	4.050	8.438	53.110	5.079	10.581	23.228
3	3.217	6.702	60.571	3.115	6.489	59.599	4.754	9.905	33.133
4	2.399	4.999	65.569	2.258	4.705	64.304	4.285	8.927	42.060
5	2.253	4.693	70.262	2.090	4.354	68.658	4.079	8.498	50.558
6	1.946	4.055	74.317	1.756	3.658	72.317	3.720	7.749	58.307
7	1.670	3.479	77.797	1.505	3.135	75.451	3.421	7.127	65.434
8	1.616	3.367	81.163	1.433	2.986	78.437	3.233	6.736	72.171
9	1.127	2.348	83.511	.926	1.930	80.367	2.670	5.563	77.734
10	1.059	2.207	85.718	.866	1.805	82.172	2.130	4.438	82.172

Table 7.9: Rotated pattern matrix for Managerial Roles

Factor→	1	2	3	4	5	6	7	8	9	10
Nur2	0.902									
Nur1	0.87									
Nur3	0.777									
Nur4	0.714									
Ldr1	0.704									
Ldr2	0.698									
Ld4	0.659									
Ldr3	0.658									
Neg3		0.805								
Neg4		0.804								
Neg2		0.732								
Neg1		0.719								
Sps4		0.646								
Sps1		0.632								
Sps2		0.575								
Mo4			0.821							
Mo5			0.803							
Mo6			0.771							
Mo1			0.718							
Mo3			0.608							
Mo2			0.567							
Tec3				0.904						
Tec4				0.899						
Tec1				0.896						
Tec2				0.886						
Li2					0.893					
Li1					0.849					
Li3					0.834					
Li4					0.819					
Dis3						0.85				
Dis2						0.8				
Dis1						0.788				
Dis4						0.723				
Ent3							0.8			
Ent2							0.786			
Ent4							0.718			
Ent1							0.693			
dTr4								0.795		
dTr2								0.763		
dTr3								0.698		
dTr1								0.697		
Res2									0.761	
Res1									0.655	
Res3									0.632	
Res4									0.567	
Fig1			0.427							0.704
Fig4										0.694
Fig2										0.589

Appendix D.2 contains the relevant item/measure names for the variable names on the far left.

Notes: Extraction Method: Principal Axis Factoring / Rotation Method: Varimax with Kaiser Normalization / Rotation converged in 8 iterations.

Exploratory Factor Analysis on Information Technology/Systems Project Performance

The analysis started with 26 variables from six factors across 117 cases. A few iterations revealed that 19 variables loaded on to 5 factors. The variables for the factor ‘Quality of communication interaction’ were deleted completely because it loaded across other factors and had low loadings. Hence, ISPPQ1, ISPPQ2, ISPPQ3 and ISPPQ4 were deleted. Three other variables across 2 factors were also left out as they had low and/or cross loadings. These variables are ISPPC1, ISPPC3 and ISPPF4. The selected factor loadings are illustrated in Table 7.10. Appendix D.2 contains the relevant item/measure names for the variables below. The scree plot was examined and 5 factors are identified on the plot (Figure 7.2)

The correlation table was examined and values greater than 0.3 are in majority. The communalities table was inspected to find that both initial and extraction columns contain values over 0.5. Results for KMO and Bartlett’s tests are satisfactory and are illustrated in Table 7.11 below. The percentage of variance explained by these five factors is 75% and is illustrated in Table 7.12.

Table 7.10 Rotated factor matrix for ISPP

Variable	Factor				
	1	2	3	4	5
ISPPFP3	.934				
ISPPFP1	.929				
ISPPFP2	.911				
ISPPFP4	.881				
ISPPT4		.860			
ISPPT2		.841			
ISPPT3		.803			
ISPPT1		.750			
ISPPC5			.840		
ISPPC6			.763		
ISPPC2			.712		
ISPPC4			.652		
ISPPL2				.825	
ISPPL1				.775	
ISPPL3				.721	
ISPPL4				.629	
ISPPF1					.760
ISPPF2					.755
ISPPF3					.743

Notes: Extraction Method: Principal Axis Factoring. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 5 iterations.

Table 7.11: KMO and Bartlett's tests for ISPP

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.845
Bartlett's Test of Approx. Chi-Square	2028.756
Sphericity Df	171
Sig.	.000

Table 7.12: Total variance explained for ISPP

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.995	42.080	42.080	7.773	40.910	40.910	3.700	19.476	19.476
2	2.488	13.094	55.174	2.363	12.435	53.345	3.229	16.992	36.469
3	2.005	10.551	65.725	1.685	8.869	62.214	2.710	14.264	50.732
4	1.863	9.808	75.533	1.542	8.114	70.328	2.540	13.369	64.101
5	1.127	5.933	81.466	.904	4.759	75.087	2.087	10.986	75.087

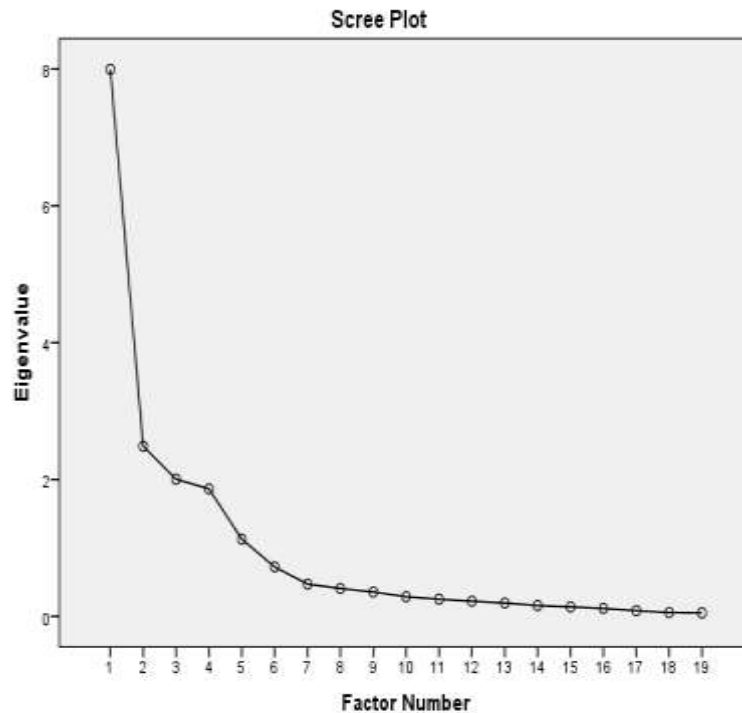


Figure 7.2: Scree plot for ISPP

Exploratory Factor Analysis for Top Management Support

In theory TMS is one factor. For the purpose of this study it is represented by four variables. The intention behind this particular exercise is to see whether these variables load into one single factor that represents TMS. The following results were obtained from this exercise.

Examination of the correlation matrix reveals that all values are above 0.8. The communalities table was inspected next; values in both initial and extraction columns are above 0.75. KMO and Bartlett's test expectations are well achieved (see Table 7.13). The factor matrix indicates (Table 7.14) one factor that explains over 84% of the variance (Table 7.15). The scree plot also illustrates one factor clearly (Figure 7.3). Hence, the four variables load into one single factor that represents TMS.

Table 7.13: KMO and Bartlett's test for TMS

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.854
Bartlett's Test of Sphericity	Approx. Chi-Square	498.494
	Df	6
	Sig.	.000

Table 7.14: Factor matrix for TMS

Variable	Factor
	1
TMS3	.935
TMS4	.931
TMS2	.916
TMS1	.887

Notes: Extraction Method: Principal Axis Factoring. 4 iterations required.
a Only one factor was extracted. The solution cannot be rotated.

Table 7.15: Total variance explained for TMS

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.524	88.112	88.112	3.367	84.169	84.169

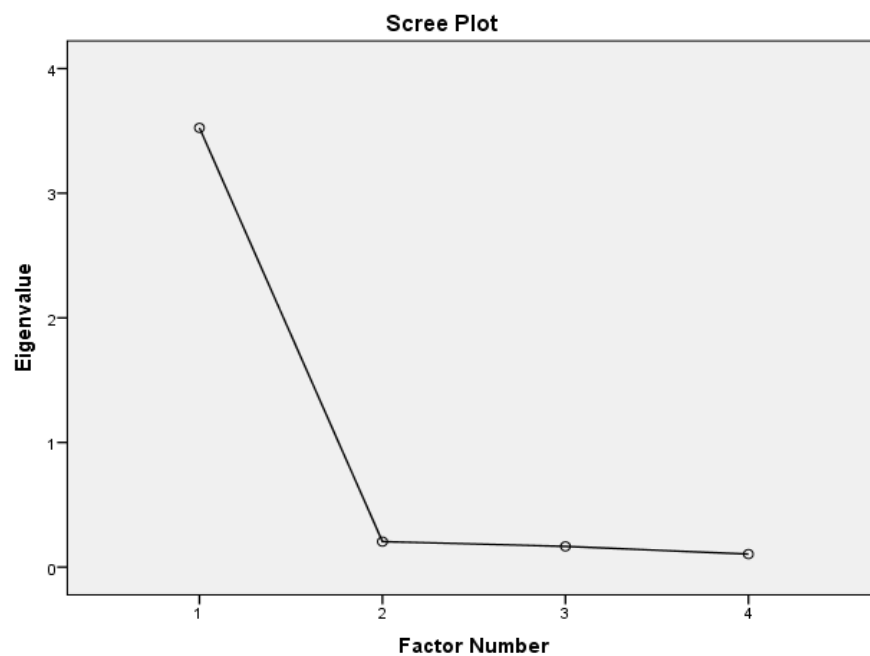


Figure 7.3: Scree plot for TMS

Having explained the EFA exercises in detail, the reliability analysis tests are explained next.

7.6.3 Reliability Analysis

Reliability analysis measures the internal consistency of the variables and is examined with Cronbach's alpha tests (Cronbach, 1951). First, all the variables selected from the exploratory factor analysis process were subjected to Cronbach's alpha reliability test together. This was followed by three other separate tests, one for each exploratory factor analysis that was carried out. The resultant Cronbach's alpha values in all instances are over the threshold of 0.7 (Table 7.16) and deleting further variables did not improve the alpha any further. Hence, it is safe to say that the data meet the requirements for reliability analysis.

Table 7.16: Reliability statistics for the variables selected from EFA exercises

Description	Cronbach's Alpha	Cronbach's Alpha Based on Standardised Variables	No of Variables
All variables together	.973	.973	71
Managerial Roles	.974	.974	48
IT/IS Project Performance	.918	.922	19
Top Management Support	.954	.955	4

7.7 Confirmatory Factor Analysis for Questionnaire Validation and as a prerequisite for Structural Modelling

Confirmatory factor analysis is utilised in the study reported in this thesis to achieve two main goals. In the first instance, it is used for carrying out further validity tests on the questionnaire. In the second instance, CFA is utilised as a pre-requisite for SEM. The software tool used for CFA is AMOS version 22.0. AMOS has the ability to graphically illustrate models. Hence, the use of AMOS adds flexibility towards testing and maintaining SEMs.

The results from the EFA exercises illustrated earlier are used as the base for the CFA (Gaskin, 2013b). Three separate CFA models are examined in this study, i.e. one each for, managerial roles, ISPP and TMS. Confirmatory factor analysis model

fitting is a recursive process which needs to be executed until a statistically acceptable, yet theoretically viable model fit is reached (Gaskin, 2013a). The process followed to obtain a satisfactory model fit is explained below.

The general procedure followed in this study for examining a CFA models is as follows. First, the standardised estimates were examined for factor loadings. Variables with low factor loadings were noted. The modification indices were examined to find large covariance between error terms; such covariance may confound results. There are arguments in the literature as to whether error terms from inter-constructs should be addressed as well as intra-construct. Some clearly demonstrate that if the model fit can be improved (AMOS Customer Loyalty Model Application, 2009) addressing covariance of error terms between (inter) constructs should be considered. In this research, both options were examined. That is, two separate examinations were carried out addressing large covariance between factors, and addressing the covariance on the same factor. Results from both options were examined. The option that addresses the covariance between error terms in different factors delivered a better model fit and is reported in this chapter. During model fit, the standardised residual covariances were also examined, and variables with large values (i.e. above 0.7) were noted for future consideration if necessary.

The variables noted from the above examinations were deleted from the model and the model fit was re-examined. If deletion of a particular item gave way to better model fit they were left deleted. Otherwise they were reintroduced and the model was re-examined for other such candidates.

7.7.1 Selection of Model Fit Indices

The model fit test provides an array of indices; therefore, an adequate set was carefully selected to be referred to, in this thesis. The reasons for the selection were not influenced by the desire to report only the successful indices, but on merits of how well each one would help assess the model statistically. Previous studies indicate that selecting scores from different indices are necessary and that they should cover absolute, incremental and parsimony fit indices (Hair et al., 2010; MacKenzie et al., 2011).

Both goodness of fit and badness of fit indicators are included in the absolute indices. The most popular goodness of fit indicators reported in studies are known as the Goodness-of-Fit indicator (GFI) and the Adjusted Goodness-of-Fit indicator (AGFI) tests. The literature warns that smaller sample size and higher degrees of model complexity and errors have the tendency to lower values achieved for these tests. GFI is desired to be >0.9 while AGFI is expected to be >0.8 (Gallagher et al., 2008). A ratio between Chi-square and Degrees of Freedom known as CMIN/DF is also reported in studies. The expectation for CMIN/DF is a value >3 . Badness of fit indicators commonly found are the Root-Mean-Square-Error-of-Approximation (RMSEA), and the Standardised-Root-Mean-Residual (SRMR), values <0.06 and sometimes <0.08 are described as acceptable (Schermelleh-Engel et al., 2003; Gallagher et al., 2008, Lowry et al., 2013, Arbuckle, 2013) for these tests.

Incremental model fit indices are known to assess how well a theoretical model fits (Gallagher et al., 2008). The indicators referred to commonly are, the Comparative Fit Index (CFI), the Normed Fit Index (NFI) and the Tucker-Lewis Index (TLI). CFI is expected to obtain a value > 0.95 while the expectation of the other two is a value of 0.9.

Generally, from the Parsimony fit indices the Parsimony Goodness-of-Fit-Index (PGFI) is reported. *“The acceptable cut-offs are lower than those generally accepted, with .50 seen as acceptable”* (Gallagher et al., 2008, p. 14).

Previous studies stress the fact that while obtaining statistical goodness of fit is important¹⁹, one should not be overwhelmed by statistical results and abandon theoretical implications. Noting all this advice from prior studies, the following CFA models were inspected. It should be noted that the estimation method used for modelling is the maximum likelihood estimates.

7.7.2 Confirmatory Factor Analysis for Managerial Roles

The process of examination started with the 48 variables obtained from the EFA. As mentioned above, in order to achieve a good model fit, the process was executed multiple times. Each time the model was saved in case it was necessary to return to the previous state.

Table 7.17 below illustrates the models examined, their model fit and the variables removed during each step. Although seven models are reported the procedure was carried out in excess of that number. However, these other models did not improve the model fit favourably. Therefore the most viable model fit is believed to be obtained via the 7th model mentioned below.

¹⁹ Two other indices commonly mentioned in literature are the P value, which is expected to be insignificant with a value greater than or equal to (\geq) 0.05 and the PCLOSE, which is expected to be >0.05

Table 7.17: Model fit indices for the confirmatory factor analysis model on managerial roles

Goodness of Fit Tests and their Thresholds												
Model	Chi-square	Df	CMIN/DF <3.0	GFI >.9	AGFI >.8	NFI >0.9	CFI >0.95	TLI >.9	RMSEA <0.08	SRMR <0.05	PGFI >.5	Remarks
1	2112.411	1024	2.063	.594	.534	.761	.859	.844	0.96	.0667	.517	48 variables included
2	1994.067	978	2.039	.602	.540	.768	.865	.851	0.95	.0649	.522	Delete Mo2
3	1960.201	979	2.002	.606	.546	.772	.869	.856	0.93	.0659	.526	Delete SPs2 add Mo2
4	1760.183	891	1.976	.620	.558	.784	.878	.865	0.92	.0572	.533	Delete SPs1,SPs4
5	1534.922	807	1.902	.634	.571	.801	.893	.880	0.88	.0513	.541	Delete Mo2,Mo3
6	1445.372	766	1.887	.641	.577	.808	.898	.885	0.87	.0511	.544	Delete dTr1
7	1383.495	727	1.903	.644	.578	.811	.899	.886	0.88	.0501	.544	Delete Res1

The selected model (Figure 7.4) now has 41 variables, Table (7.17) above illustrates the variables dropped. It is noted that the model fit indices are not all perfect. However, they were improved to a certain extent which would not harm the theoretical notions brought about in the study. Hence, is deemed adequate to move forward with further analysis. This model, (Figure 7.4) is used for imputing values for (first order) latent constructs that will contribute towards the structural model which will be discussed later in this chapter. It should be pre-noted here that the final structural model satisfied all of the above indices.

7.7.3 Confirmatory Factor Analysis for Information Technology/Systems Project Performance

The first model consisted of 19 variables spread across five factors. The model fit in the first attempt, as illustrated in Table 7.18 is acceptable. However, the model was further scrutinised to explore if the fit could be made even better. First, the item with the lowest loading was deleted. Therefore, ISPL4 from the ‘Learn’ factor was deleted. This however did not improve the model fit significantly. Therefore, ISPL4 was reintroduced and the next item with the least factor loading, i.e.ISPPC4 was removed. In this round the model fit improved remarkably and so it is decided that model 3 (Figure 7.5) will be utilised for the purpose of further analysis.

Table 7.18: Model fit indices for confirmatory factor analysis model for ISPP

Goodness of Fit Tests and their Thresholds												
Model	Chi-square	Df	CMIN/DF <3.0	GFI >.9	AGFI >.8	NFI >.9	CFI >.95	TLI >.9	RMSEA <.08	SRMR <.05	PGFI >.5	Variables deleted / Remarks
1	224.913	141	1.595	.844	.789	.896	.958	.949	.072	.0548	.629	19 variables included
2	193.644	124	1.562	.857	.803	.907	.964	.955	.07	.0548	.621	Delete ISPL4
3	184.055	124	1.484	.862	.810	.910	.968	.961	.065	.0563	.625	Delete ISPPC4 add ISPL4

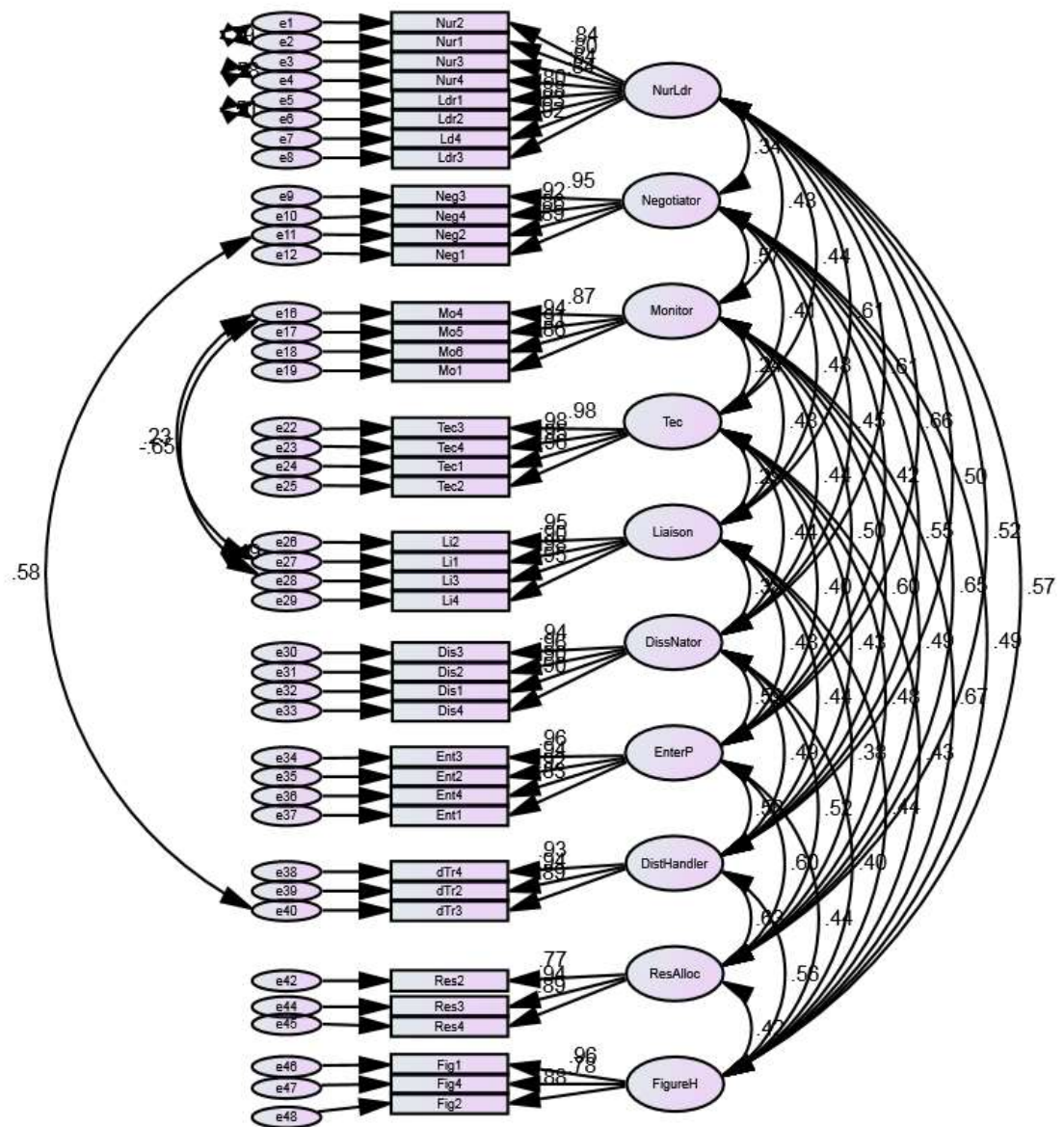


Figure 7.4: Confirmatory factor analysis model for Managerial Roles²⁰

(CFA model above is illustrated at the maximum size allowed by AMOS V 22)

²⁰ ResAlloc = Resource Allocator, FigureH= Figurehead, Tec= Technical Expert, NurLdr = Nurturing Leader, DistHandler=Disturbance Handler, EnterP = Entrepreneur, DissNator=Disseminator

Note the following on the Figure 7.4: the High factor loadings (these are also available in tabular format on Table 7.19, as the diagram is crowded), low covariances between the factors (i.e. below 0.7) and the covariances between error terms introduced to better the model fit.

Table 7.19: Standardised regression values for the confirmatory factor analysis model on managerial roles

Item	Factor	Estimate	Item	Factor	Estimate
Nur2 <---	Nurturing Leader	0.839	Li2 <---	Liaison	0.946
Nur1 <---	Nurturing Leader	0.797	Li1 <---	Liaison	0.899
Nur3 <---	Nurturing Leader	0.844	Li3 <---	Liaison	0.978
Nur4 <---	Nurturing Leader	0.837	Li4 <---	Liaison	0.948
Ldr1 <---	Nurturing Leader	0.804	Dis3 <---	Disseminator	0.944
Ldr2 <---	Nurturing Leader	0.881	Dis2 <---	Disseminator	0.957
Ld4 <---	Nurturing Leader	0.835	Dis1 <---	Disseminator	0.904
Ldr3 <---	Nurturing Leader	0.919	Dis4 <---	Disseminator	0.901
Neg3 <---	Negotiator	0.945	Ent3 <---	Entrepreneur	0.96
Neg4 <---	Negotiator	0.919	Ent2 <---	Entrepreneur	0.937
Neg2 <---	Negotiator	0.858	Ent4 <---	Entrepreneur	0.922
Neg1 <---	Negotiator	0.887	Ent1 <---	Entrepreneur	0.834
Mo4 <---	Monitor	0.875	dTr4 <---	Disturbance Handler	0.932
Mo5 <---	Monitor	0.945	dTr2 <---	Disturbance Handler	0.938
Mo6 <---	Monitor	0.908	dTr3 <---	Disturbance Handler	0.893
Mo1 <---	Monitor	0.863	Res2 <---	Resource Allocator	0.769
Tec3 <---	Technical Expert	0.982	Res3 <---	Resource Allocator	0.937
Tec4 <---	Technical Expert	0.978	Res4 <---	Resource Allocator	0.888
Tec1 <---	Technical Expert	0.954	Fig1 <---	Figure Head	0.959
Tec2 <---	Technical Expert	0.958	Fig4 <---	Figure Head	0.778
			Fig2 <---	Figure Head	0.883

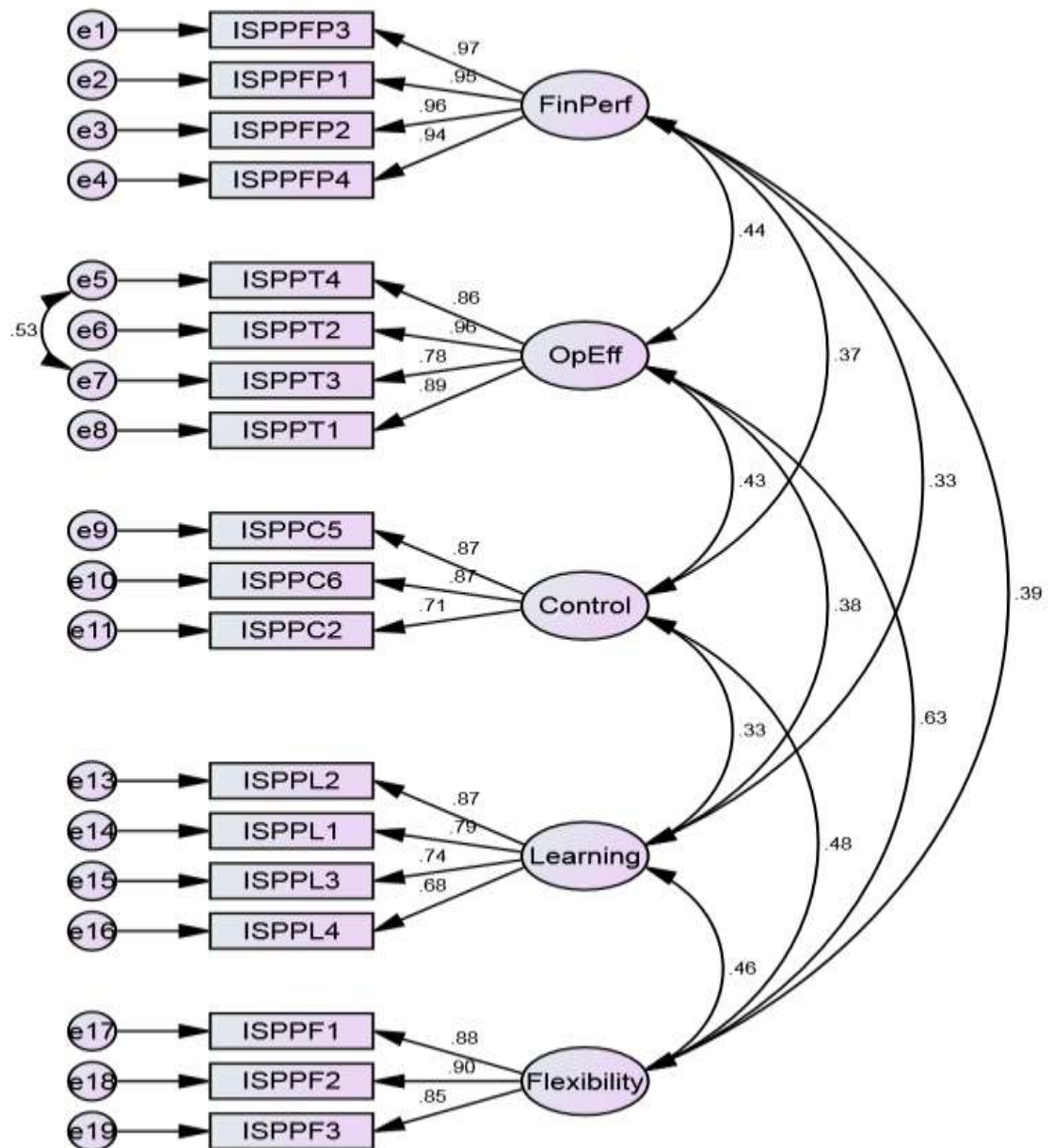


Figure 7.5: Confirmatory factor analysis model for ISPP dimensions²¹

Note the following on the Figure 7.5: High factor loadings, low covariances between the factors (below 0.7) and the covariances between error terms, introduced for better model fit.

²¹ FinPerf = Financial Performance
OpEff = Operational Efficiency

7.7.4 Confirmatory Factor Analysis for Top Management Support

This model (Figure 7.6) consists of one factor and four variables. One could argue that carrying out a confirmatory factor analysis for a single factor is unnecessary. However, a model fit test was carried out to conform to the same standards as the models mentioned above. This was deemed necessary as these models are utilised to impute composite values towards the final structural model. The model fit is acceptable for a model of this nature and is detailed below.

Table 7.20: Model fit indices for confirmatory factor analysis model on TMS

Goodness of Fit Tests and their Thresholds												
Model	Chi-square	Df	CMIN/DF <3.0	GFI >.9	AGFI >.8	NFI >0.9	CFI >0.95	TLI >.9	RMSEA <0.08	SRMR <0.05	PGFI >.5	Variables deleted / Remarks
1	6.891	2	3.44	.974	.870	0.986	0.990	.971	.145	.0119	.195	None

It is noted that the CMIN/DF is 3.44 which is slightly higher than the desired threshold of 3. However, there is evidence in the literature that statistical models with values up to 5 are accepted (Galaghar et al., 2008). RMSEA and PGFI are not entirely satisfactory but there are many others which meet the expectations. P value is 0.032 and is insignificant and is a sign of good model fit. PCLOSE is 0.67 and is greater than 0.05. Other model fit indicators such as GFI, AGFI, NFI, CFI and SRMR also meet their thresholds. Hence, this model is deemed adequate to proceed to the next stage of the analysis.

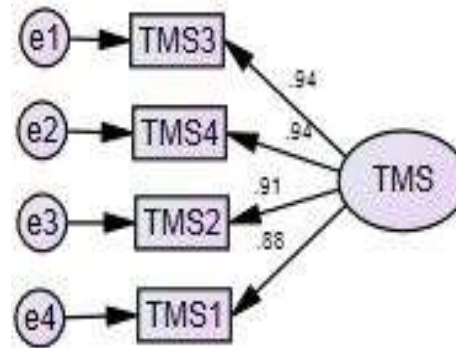


Figure 7.6: Confirmatory factor analysis model for TMS
(Note the high factor loadings)

7.8 Investigating Common Method Bias

Common method bias is described as “*variance that is attributable to the measurement method rather than to the constructs the measures represent*” (Podsakoff et al., 2003, p. 879). “*Common method biases arise from having a common rater, a common measurement context, a common item context, or from the characteristics of the items themselves*” (Podsakoff et al., 2003, p. 885). As a result of the common method bias the values obtained for the causal relationships may be confounded and may contribute towards measurement errors. As this study collected data for the dependent and independent variables on the same questionnaire from the same respondent, there is the risk of having common method bias. Hence, a method to determine common method bias for the collected data was identified.

Previous studies (Bagozzi, 2011; Podsakoff et al., 2003) explain the use of a common latent factor to determine if there is significant method bias. According to academic guidelines the “*structural parameters should be examined both with and without the latent common methods variance factor in the model*” (Podsakoff et al., 2003, p. 981). Adhering to such advice, this study chooses to utilise the common latent factor technique to investigate common method bias. The following advantages of the technique are acknowledged. “*This techniques does not require the researcher to identify and measure the specific factor responsible for the method effects, and it models the effect of the method factor on the measures rather than on the latent constructs they represent and does not require the effects of the method factor on each measure to be equal*” (Podsakoff et al., 2003, p. 894).

The three CFA models were subjected to an examination with a common latent factor. As prescribed by Podsakoff et al. (2003) the standardised regression weights with and without the common latent factor were examined. According to the literature if there are significant differences between these values, then that is evidence of common method bias (Bagozzi, 2011). If this was evidenced, the common latent factor will need to be embedded in the model to control for common method bias during further analysis.

The results obtained illustrated that there is no significant difference between the standardised regression weights obtained by the model with and without the common latent factor. All differences are ≤ 0.1 . Hence, it can be stated here that there is no significant interference by the common method bias on the results obtained in this study (Gaskin, 2012). Appendix (D.3) with outputs from the common method bias tests will illustrate each model with a common latent factor (CLF). The Appendix (D.3) will also present the estimates obtained with and without the CLF and the difference between these two estimates.

7.9 Validity Tests

7.9.1 Convergent Validity

Convergent validity is a test carried out to investigate that measures used in the same construct actually belong together (Neuman, 2007). According to MacKenzie et al., (2011), latent constructs with reflective indicators can be investigated using Average Variance Extracted (AVE). MacKenzie et al., (2011, p.313) says that an “*AVE greater than .50 is desirable because it suggests that the latent construct accounts for a majority of the variance in its indicators on average*”. It is also a good sign for convergent validity when the critical ratio (CR) for the same construct is greater than the AVE (Gaskin, 2011a)²². Critical ratio is also used for reliability analysis, and having large values (i.e. >0.7) as those in the Tables 7.21 and 7.22 strengthens the arguments made in the previous Section 7.6.3 on reliability analysis.

²² For both Convergent and Discriminant Validity tests Gaskin’s (2011b) statistical tool package was used.

Table 7.21: CR and AVE values for Managerial Roles

Factors	CR	AVE	MSV	ASV
Figurehead	0.908	0.768	0.453	0.249
Nurturing Leader	0.952	0.715	0.429	0.279
Negotiator	0.946	0.815	0.417	0.243
Monitor	0.944	0.807	0.453	0.255
Technical Expert	0.984	0.937	0.234	0.162
Liaison	0.970	0.890	0.372	0.201
Disseminator	0.961	0.859	0.371	0.236
Entrepreneur	0.953	0.836	0.429	0.273
Disturbance Handler	0.944	0.849	0.397	0.283
Resource Allocator	0.901	0.753	0.417	0.278

Table 7.22: CR and AVE Values for Performance Dimensions

Factors	CR	AVE	MSV	ASV
Flexibility	0.909	0.768	0.398	0.249
Financial Performance	0.976	0.912	0.191	0.149
Operational Efficiency	0.929	0.767	0.398	0.230
Control	0.858	0.670	0.235	0.167
Learning	0.855	0.598	0.211	0.144

7.9.2 Discriminant Validity

Discriminant validity is said to be the opposite test of the convergent validity. This is to say that if two constructs are different, then their measures should not illustrate any associations whatsoever (Neuman, 2007). The test that is popular in the literature for discriminant validity looks to determine if the square root of the AVE obtained for each construct is larger than the inter-construct correlation values (MacKenzie et al., 2011; Lowry et al., 2013). As per this prescription, the current study meets the required criterion for discriminant validity.

Table 7.23: AVE, Square Root of AVE and inter construct correlations for Managerial Roles

Factors	AVE	Figurehead	Nurturing Leader	Negotiator	Monitor	Technical Expert	Liaison	Disseminator	Entrepreneur	Disturbance Handler	Resource Allocator
Figurehead	0.768	0.876									
Nurturing Leader	0.715	0.572	0.845								
Negotiator	0.815	0.494	0.344	0.903							
Monitor	0.807	0.673	0.428	0.572	0.898						
Technical Expert	0.937	0.434	0.437	0.406	0.244	0.968					
Liaison	0.890	0.439	0.610	0.478	0.477	0.289	0.943				
Disseminator	0.859	0.404	0.609	0.448	0.441	0.441	0.378	0.927			
Entrepreneur	0.836	0.439	0.655	0.422	0.501	0.402	0.479	0.587	0.914		
Disturbance Handler	0.849	0.556	0.497	0.553	0.597	0.428	0.441	0.489	0.565	0.921	
Resource Allocator	0.753	0.418	0.518	0.646	0.495	0.484	0.377	0.520	0.595	0.630	0.868

Note that the highest for each construct is the square root of the AVE for each construct and is highlighted

Table 7.24: AVE, Square Root of AVE and inter construct correlations for Project Performance Dimensions

Factors	AVE	Flexibility	Financial Performance	Operational Efficiency	Control	Learning
Flexibility	0.768	0.877				
Financial Performance	0.912	0.391	0.955			
Operational Efficiency	0.767	0.631	0.437	0.876		
Control	0.670	0.485	0.373	0.430	0.818	
Learning	0.598	0.459	0.334	0.380	0.331	0.773

Note that the highest for each construct is the square root of the AVE for each construct and is highlighted

Pearson correlation from SPSS is also deemed suitable to determine convergent and discriminant validity. Therefore, as an alternative to the above tests and also for the benefit of the construct of TMS, which could not be validated in the above manner as the model consists only of one latent construct, Pearson correlation tests were carried out. These tests determined that correlations between constructs that were theoretically bound together were higher than the ones which were not. Hence, with the results obtained from both these exercises it is possible to state that the data collected for the constructs defined in this research study meet convergent and discriminant validity requirements.

7.10 Investigating Causal Relationships with Structural Equation Modelling

7.10.1 Calculation of Composite Values for the Structural Model

The research model presented in this study is a large multivariate model with many latent variables. Hence, a conventional, detailed path diagram is not entirely feasible. Arbuckle, (2013) explains the benefits of structural models using first-order composite latent variables. Such models using composite values can also be seen promoted in the literature (Newsome, 2000; Lawry et al., 2013). In fact it is said that using composite values reduce the bias and mean square error (Vasdekis et al., 2000; Newsome et al., 2000). In order to compile a model with composites, the necessary composite values need to be calculated for the latent variables. The AMOS Guide for Version 22 by Arbuckle (2013, p. 462), advises that, with the model based imputation function “...*you can impute values for any latent variables in the model*”. Hence, the confirmatory factor analysis models presented above were utilised to impute composite values. The table below explains the procedures followed to impute a composite value for each latent variable.

Table 7.25: Composite variables and how they were imputed

Latent Variable	Steps / Remarks	CFA model used
Figurehead	The regression imputation option was selected from the Analyse menu on AMOS. AMOS created a data file with a composite value for each latent variable in the model.	Managerial Roles Model (Figure 7.4)
Nurturing Leader		
Negotiator		
Monitor		
Technical Expert		
Liaison		
Disseminator		
Entrepreneur		
Disturbance Handler		
Resource Allocator		
TMS	- Same as above -	Top Management Support Model (Figure 7.5)
ISPP	<p>This was carried out in two steps. In the first step, using the performance dimensions model, values for each dimension was calculated using data imputation.</p> <p>Then a second model was created using these composite values for the dimensions. The model fit was inspected for uniformity and was determined to be good. Using this model a final value for ISPP was calculated</p>	<p>Performance Dimensions Model (Figure 7.6)</p> <p>Information Systems Project Performance Model (an interim model, used only for the imputation)</p>

Due to the complexity and the multivariate nature of the research model, it is necessary to first qualify the data before attempting SEM. As such, the data are expected to meet multivariate assumptions. The next section describes the exercises that were carried out to this effect.

7.10.2 Multivariate Assumptions

Linearity

Linearity of relationships between variables should be sufficient to successfully engage covariance based structural equation modelling for causal relationship analysis. The variables with composite values discussed earlier are utilised for structural model building in AMOS version 22. Therefore, the relationship between each independent variable and their dependent variable is investigated. This means that each managerial role is investigated for linear relationship with TMS and then TMS with ISPP. This test was run by choosing the Regression option from the Analyse menu in SPSS version 22 and then choosing the Curve Estimation sub-option.

All relationship types including the linear relationship²³ were selected for comparison. In each and every one of these comparisons the linear relationship recorded the highest F value, the highest R squared and was significant. The Table (7.26) below illustrates the R squared, the F values and the significance for linear relationships.

Table 7.26: Linearity for all relationships

Independent Variable	Dependent Variable	Equation with highest values	R squared	F value	Significance
Resource Allocator	TMS	Linear	.234	35.048	.000
Disturbance Handler	TMS	Linear	.432	87.570	.000
Entrepreneur	TMS	Linear	.193	27.483	.000
Disseminator	TMS	Linear	.090	11.391	.001
Liaison	TMS	Linear	.170	23.500	.000
Technical	TMS	Linear	.149	20.184	.000
Monitor	TMS	Linear	.441	90.751	.000
Negotiator	TMS	Linear	.273	43.172	.000
Nurturing-Leader	TMS	Linear	.216	31.752	.000
Figurehead	TMS	Linear	.473	103.076	.000
TMS	ISPP	Linear	.356	63.572	.000

²³ Examples for other types of relationships are: inverse, cubic, quadratic etc.

According to the values obtained, it can be stated that for all variables in the model, linear relationships take precedence above all others. Hence, the data qualifies for further analysis with covariance based structural equation modelling.

Multicollinearity

Checking for Multicollinearity is prescribed as necessary when more than one variable is predicting another. In the research model suggested in this thesis, ten factors (latent variables) were identified as predictors of TMS. Hence these ten latent variables need to be investigated for Multicollinearity amongst themselves. Variables are checked against each other, each given a chance at being the dependent variable and being predicted by the others. This test can be executed by selecting the Linear Regression from under the Regression option in the Analyse menu. The colinearity diagnostics in statistics tab is selected to obtain the VIF values to investigate if there are any concerns. If all values are under the value of 3 then there is reason to be extremely satisfied and reject any concerns of multicollinearity. However, VIF values up to 10 may be accepted.

Most VIF values were less than 3, however, there were some which were slightly above, and are between the values 3 and 4. According to the acceptable thresholds for VIF there is no reason to be alarmed. Yet, these are noted (Table 7.27) and will be investigated at length if needed during structural equation model fitting.

Table 7.27: VIF values reported above the lower threshold of 3

Multicollinearity between variables			
	Variable 1 (Dependent)	Variable 2 (Independent)	VIF Value
1	Resource Allocator	Nurturing-Leader	3.645
		Monitor	3.014
2	Disturbance Handler	Nurturing-Leader	3.924
		Figurehead	3.028
3	Entrepreneur	Nurturing-Leader	3.575
		Figurehead	3.060
		Resource Allocator	3.046
4	Disseminator	Nurturing-Leader	3.347
		Resource Allocator	3.173
		Figurehead	3.004
5	Liaison	Figurehead	3.002
6	Technical	Nurturing-Leader	3.935
		Resource Allocator	3.057
7	Monitor	Nurturing-Leader	3.699
		Resource Allocator	3.141
8	Negotiator	Nurturing-Leader	3.452
		Monitor	3.006
9	Nurturing-Leader	N/A	
10	Figurehead	Nurturing-Leader	3.100

Note: VIF values up to 10 are known to be accepted

7.10.3 The Structural Model

The composite variables calculated (Section 7.10.1) are used for the structural model (Figure 7.7). The model includes ten managerial roles that explain the variance of the TMS, which in turn explains the variance of the ISPP. The model fit is satisfactory with the goodness of fit indices CMIN/DF, GFI, AGFI, NFI, CFI, TLI and SRMR all meeting the required thresholds (Table 7.28). RMSEA is only slightly higher than expected and the P value at 0.045 is approaching insignificance which is a sign of good model fit. The PCLOSE at 0.150 is comfortably above the expected threshold. Hence, it can be stated that the structural model has satisfactory model fit.

In the structural model, the composite variables are represented as rectangles, the covariances are indicated with double headed arrows (between variables), and standardised regression weights²⁴ are placed on top of the single headed arrows. The values on the rectangles indicate the squared multiple correlations. The threshold adhered to determine statistical significance for this study is when the p value is ≤ 0.05 . The results obtained using the model can be further explained as follows.

Disturbance Handler, Monitor and Figurehead roles illustrate the highest regression values respectively, with significance at p value ≤ 0.05 . These are followed by Nurturing Leader, Negotiator and the Technical Expert roles. However, the p value is not significant for these roles. The Disseminator role illustrates a negative regression value and a significant p value while the Resource Allocator, Entrepreneur and Liaison illustrates almost negligible regression values. The value 0.63 (on top of the rectangle for the construct of TMS) is the squared multiple correlation of TMS with the ten managerial roles. This is interpreted as the managerial roles being able to explain 63% of the variance of TMS.

²⁴ Also known as standardised estimates

The arrow leading from TMS to ISPP has a regression value of 0.60 and the p value is highly significant at $<.001$. The variable ISPP illustrates a squared multiple correlation of 0.36 indicating that TMS explains 36% of ISPP. Figure 7.7 illustrates the structural model and the Table 7.29 illustrates the Standardised and Unstandardised regression values.

Table 7.28: The Goodness of Fit indices for the structural model

Chi-square	Df	CMIN/DF <3.0	GFI >.9	AGFI >.8	NFI >0.9	CFI >0.95	TLI >.9	RMSEA <0.08	SRMR <0.05	PGFI >.5	P >0.05	PCLOSE >0.05
18.621	10	1.862	.976	.812	.980	.990	.932	0.086	.0254	.150	0.045	.150

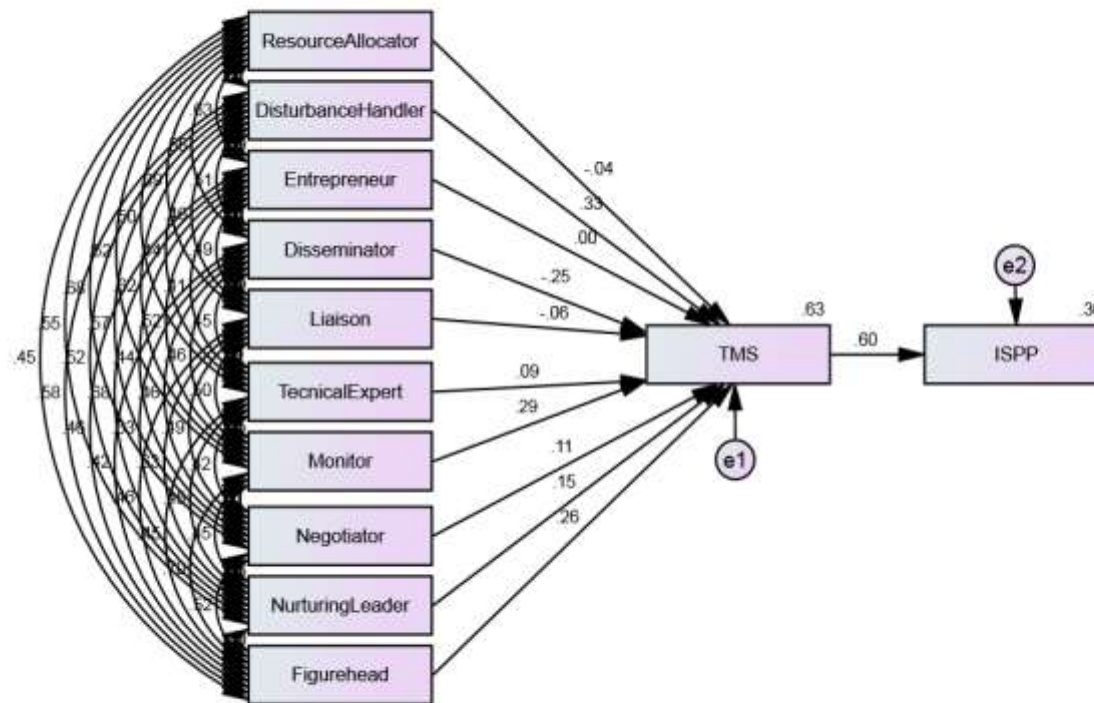


Figure 7.7: The structural model

Table 7.29: Standardised and unstandardised regression weights for the structural model

Regression Weights →			unstandardised			Standardised	
Variables			Estimate	S.E.	C.R.	P	Estimate
TMS	<--	Resource Allocator	-0.046	0.104	-0.443	0.658	-0.045
TMS	<--	Disturbance Handler	0.251	0.068	3.715	*<.001	0.33
TMS	<--	Entrepreneur	-0.003	0.063	-0.055	0.956	-0.005
TMS	<--	Figurehead	0.215	0.084	2.564	*0.01	0.257
TMS	<--	Nurturing Leader	0.124	0.094	1.312	0.189	0.148
TMS	<--	Negotiator	0.088	0.074	1.187	0.235	0.112
TMS	<--	Monitor	0.253	0.087	2.923	*0.003	0.29
TMS	<--	Disseminator	-0.177	0.06	-2.941	0.003	-0.246
TMS	<--	Liaison	-0.041	0.058	-0.717	0.473	-0.06
TMS	<--	Technical Expert	0.061	0.048	1.26	0.208	0.093
ISPP	<--	TMS	0.292	0.036	8.008	*<.001	0.597

*=Positive estimate with P value significant at ≤ 0.05 .

7.10.4 The Structural Model - An Alternate Analysis

An additional exercise to the norm was planned during the questionnaire design. With this scenario the author aimed to investigate if the arduously prepared, analysed and presented data up to this stage can in fact be verified to be correct. For this purpose, a single additional value was collected on the same questionnaire for the constructs, TMS and ISPP. Two questions prompted respondents to record an overall value for each construct. These values were then substituted on the model instead of the composite values previously imputed.²⁵

Similar results were obtained on the model, i.e. the managerial roles explained 65% of the variance on the construct of TMS and in turn TMS explained 33% of the variance of ISPP. However, in this model, as well as the Disturbance Handler, Monitor and Figurehead roles, the Nurturing Leader and Negotiator roles are also significant at p value ≤ 0.05 (Table 7.30).

²⁵ Single answers for managerial roles were not collected as this would have increased the length of the questionnaire by 12 questions since there were 12 roles initially.

Despite these trivial differences, it can be stated that the two models produced similar results. Hence, questions that inquired detailed and overall information have both successfully captured data to shape similar results. This indicates to a certain degree that the theoretical underpinning and the data capture have been successful.

The section that follows describes the analysis made regarding the moderating and controlling effects hypothesised in the conceptual framework.

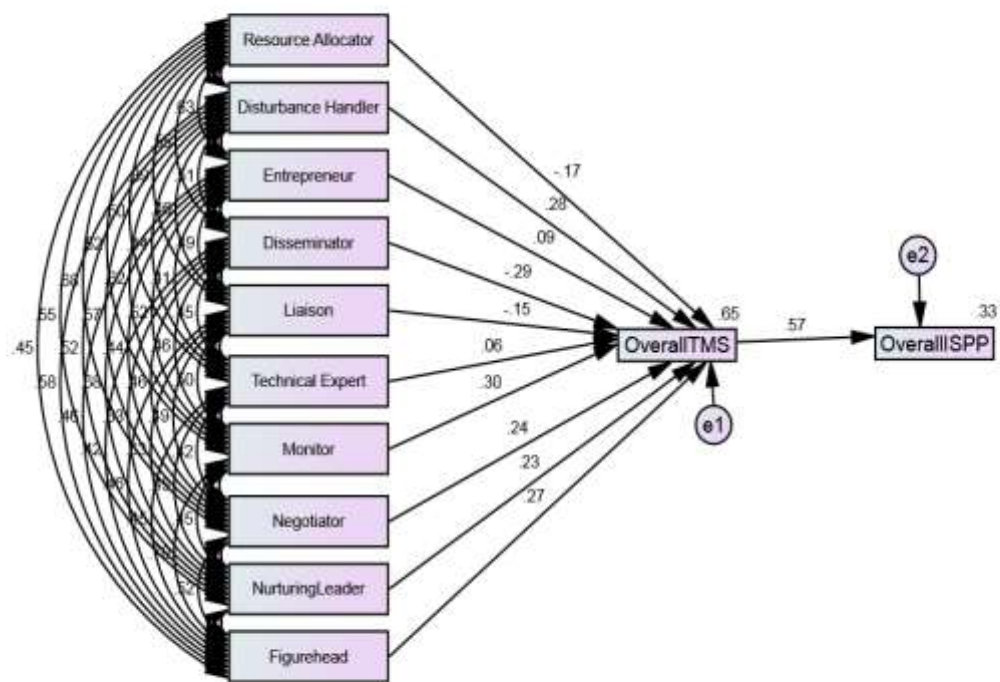


Figure 7.8: An alternate structural model

(with overall values for TMS and ISPP producing similar results)

Table 7.30: Standardised and unstandardised regression weights for the alternate structural model

Regression Weights		→	Unstandardised			Standardised	
Variable			Estimate	S.E.	C.R.	P	Estimate
OverallTMS	<---	Resource Allocator	-0.206	0.116	-1.776	0.076	-0.174
OverallTMS	<---	Disturbance Handler	0.245	0.076	3.227	*0.000	0.278
OverallTMS	<---	Entrepreneur	0.076	0.070	1.072	0.284	0.094
OverallTMS	<---	Disseminator	-0.239	0.068	-3.543	<.001	-0.286
OverallTMS	<---	Liaison	-0.116	0.065	-1.801	0.072	-0.147
OverallTMS	<---	Technical Expert	0.042	0.054	0.777	0.437	0.055
OverallTMS	<---	Monitor	0.300	0.097	3.093	*0.002	0.297
OverallTMS	<---	Figurehead	0.266	0.094	2.823	*0.005	0.273
OverallTMS	<---	Nurturing Leader	0.220	0.106	2.077	*0.038	0.226
OverallTMS	<---	Negotiator	0.218	0.083	2.636	*0.008	0.241
OverallISPP	<---	OverallTMS	0.417	0.056	7.480	*<.000	0.570

*=Positive estimate and P value significant at ≤ 0.05 .

7.11 Analysis of Moderating and Controlling Effects

This section presents the analysis carried out to investigate the moderating and controlling effects proposed in the conceptual framework. This research study hypothesised that the project management processes and the top management position are two variables having moderating effects on the relationship between managerial roles and TMS. The control variables suggested in this study are: Project complexity, Organisational size, (project manager) Age, Gender, Industry and Project type.

The analysis of the two moderating variables is presented first, followed by the analysis carried out on the control variables.

7.11.1 Moderating Effects of Project Management Processes

This study hypothesised that the type and concentration of TMS needed may differ during each of the five project management processes. Hence, the project management processes are hypothesised to moderate the relationship between managerial roles and TMS. The project management processes examined in this study are Initiation, Planning, Execution, Monitoring & Controlling and Closure (PMBOK® Guide, 2008).

The questionnaire was designed to gather data to identify managerial roles that were important for each project management process. Hence, the respondents were given the option to record the relevant project management process(es) against each managerial role. Alternatively, if a particular managerial role was completely unnecessary for the project concerned, the respondent was asked to record, ‘all answers with regard to the above managerial role are either zero or not applicable’. This preserves the data integrity since no processes should be recorded against a particular managerial role if that role is deemed unnecessary.

In preparation for the analysis, each time a project management process was recorded, a value of 1 was assigned and when not, a value of zero was assigned. After the data set was finalised, the values for each project management process were accumulated. The analysis was only carried out with relevance to the statistically verified managerial roles. The results obtained are displayed below in Table (7.31) for the ten roles that were previously verified. The values received for both Nurturer and Leader roles were averaged to find a common ground as they now represent one factor.

The analysis revealed that the Execution process demands managerial role engagement the most. Every single role scored highest engagement in the Execution process as well. Project Monitoring & Control process came second closely followed by the Planning process. The Initiation and Closure processes did not demand as much managerial role engagement. Apart from the Execution process, the role engagement requirements for other processes can be seen to vary.

Example1: Figurehead role - the order of demand for engagement following the Execution process is Initiation, Monitoring & Control, Planning and then Closure.

Example 2: Nurturing Leader role - the order of demand for engagement following the Execution process is Planning, Monitoring & Controlling, Initiation and then Closure

It is clear that certain managerial roles are more important for some project management processes than others. It is also clear that some project management processes demand a high engagement from the top managers, while the others require moderate engagement. Therefore, it is stated here that the need for TMS and hence, managerial roles engagement is moderated by project management processes.

Table 7.31: Engagement of managerial roles across the Project Management Processes

							Percentages (%)					
Managerial Roles	Initiation	Planning	Execution	M&C	Closure	N/A	Initiation	Planning	Execution	M&C	Closure	N/A
Figurehead	72	68	73	71	46	4	21.56	20.36	21.86	21.26	13.77	1.20
Liaison	50	49	63	50	30	19	19.16	18.77	24.14	19.16	11.49	7.28
Monitor	48	57	82	81	28	5	15.95	18.94	27.24	26.91	9.30	1.66
Disseminator	47	55	79	57	31	19	16.32	19.10	27.43	19.79	10.76	6.60
Entrepreneur	36	57	71	60	22	20	13.53	21.43	26.69	22.56	8.27	7.52
Disturbance Handler	29	43	88	79	25	6	10.74	15.93	32.59	29.26	9.26	2.22
Resource Allocator	33	70	82	66	21	5	11.91	25.27	29.60	23.83	7.58	1.81
Negotiator	52	67	84	77	32	6	16.35	21.07	26.42	24.21	10.06	1.89
Technical	27	38	78	57	21	26	10.93	15.38	31.58	23.08	8.50	10.53
Nurturing Leader	44	48	69.5	45.5	24.5	16.5	17.74	19.35	28.02	18.35	9.88	6.65
Total by Project Process	482	600	839	689	305							
Ranking by Project Process	4	3	1	2	5							

7.11.2 Moderating Effects by the Top Management Position

The second moderating effect proposed in this study states that the top manager's position affects managerial roles. This suggests that managers from certain positions are more likely to play some roles better than the others. The multiple levels within the top management were established in the literature review (Chapter 2, Section 2.5). Although there are other classifications for the levels within the top management, this study utilises the Internal and External classifications suggested by Mintzberg (1973).

External roles are expected to be carried out by managers in very high positions, while the internal roles are expected to be carried out by other managers in top management. Furthermore, internal roles are projected as more organisational based while the external roles are projected towards the outside environment. Previously in this chapter it was identified that the top management positions most commonly accessed for support by the respondents are the Director, the Senior Manager (IT & Other), the Chief Information Officer, the Chief Financial Officer, the Program Manager and the IT Manager, respectively.

For the purpose of analysis it is necessary to identify the above managerial positions with the internal and external roles. The position of the top manager by itself does not provide adequate information for this classification. So, a second question was included in the questionnaire. This second question asked respondents to record the power distance between the respondent and the top manager. Armed with this information a manual qualitative evaluation was carried out. The positions: Director, Senior Manager (IT & Other), Program Manager and the IT Manager were generally classified under the internal role category while the Chief Information Officer and Chief Financial Officer were classified under the external role category. However, when a participant recorded reporting to a senior director or a *very* senior manager and if that position was reported to be over three management levels away from the respondent²⁶, those cases were classified under the external role. In the final data set there were 79 cases marked Internal and 38 marked External. Two SEMs were

²⁶ With reference to the second question regarding the power distance

investigated separately, first for External managers and secondly for Internal managers. The differences of estimates are seen in Figures 7.9 and 7.10 also on Table 7.32.

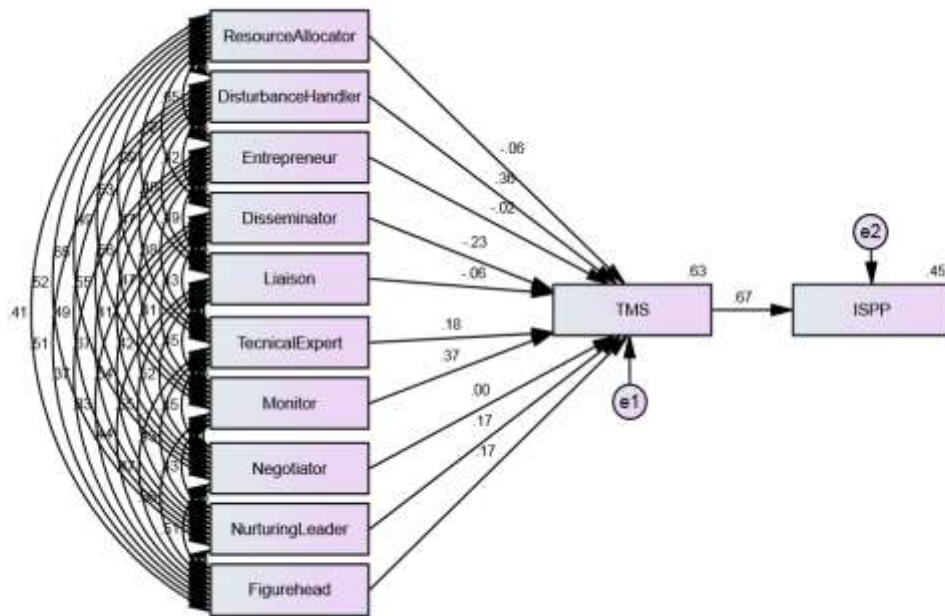


Figure 7.9: Moderating effects from top managers – Internal Role

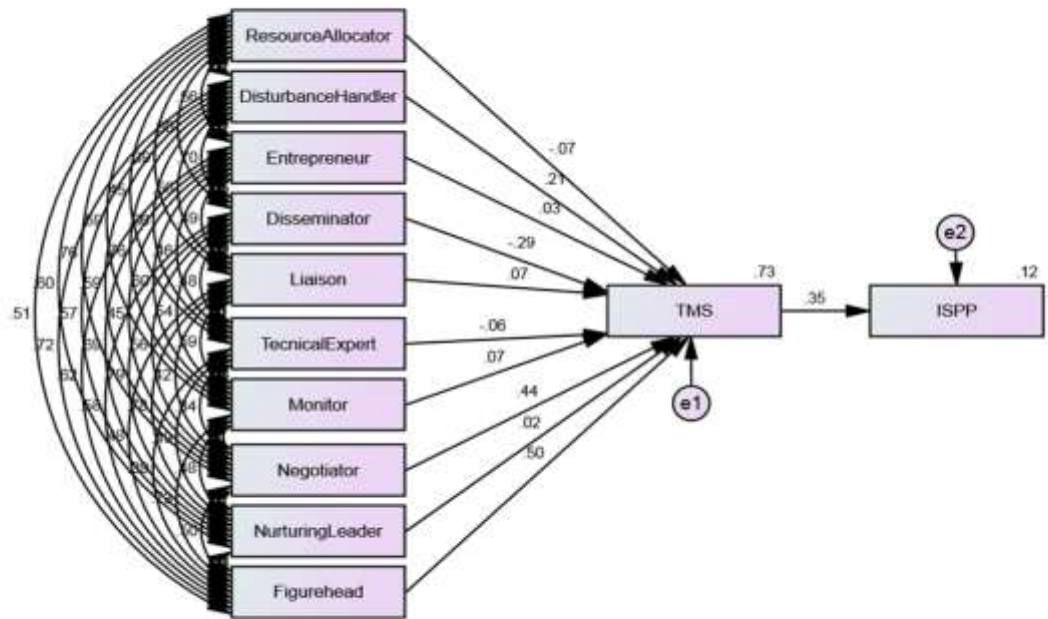


Figure 7.10: Moderating effects for top manager – External Role

Table 7.32: Results from the Internal and External group moderation

Variables			Internal		External	
			Estimate	P	Estimate	P
TMS	<---	Resource Allocator	-0.068	0.610	-0.059	0.673
TMS	<---	Disturbance Handler	0.283	<.001	0.134	0.197
TMS	<---	Entrepreneur	-0.017	0.840	0.019	0.816
TMS	<---	Figurehead	0.155	0.199	0.336	<.001
TMS	<---	Nurturing Leader	0.155	0.239	0.011	0.938
TMS	<---	Negotiator	0.000	0.997	0.334	0.002
TMS	<---	Monitor	0.344	0.002	0.047	0.707
TMS	<---	Disseminator	-0.177	0.025	-0.168	0.082
TMS	<---	Liaison	-0.045	0.551	0.038	0.729
TMS	<---	Technical Expert	0.126	0.055	-0.031	0.642
ISPP	<---	TMS	0.319	<.001	0.193	0.024

Notes for Z-Score: ** p-value < 0.05; * p-value < 0.10

Both the z-score for distance and p value for significance were observed. According to the z-score, it is determined that the managerial roles, Negotiator, Monitor and Technical Expert significantly differ across the internal and external groups. Estimate columns on Table (7.32) for both internal and external columns indicate the large differences between the two groups (Gaskin, 2013c). The Negotiator and Monitor roles are traditionally known as external roles. According to the table above the Negotiator role shows higher significance in the external role category. The Monitor role however is seen breaking tradition and is showing significance in the internal role category. The Technical Expert role, as expected, illustrates greater prominence as an internal role.

The z-score does not illustrate further significant differences, yet, it is noted that certain other roles, such as the Disturbance Handler and the Figurehead have high estimates and are significant at $p \text{ value} \leq 0.05$ in their respective traditional role categories.

The results obtained point out that the top manager's position has an impact on how well they can engage in a particular managerial role

7.11.3 Analysis of Controlling Effects

This study controlled for the following variables: Industry, Project Type, Organisational Size, Project Complexity, Age and Gender. Except for the variable 'Age' all other variables needed some preparation before analysis. For the variable Gender, a numeric value of 1 was given for male and 2 for female. Industry and project type recorded textual answers; hence, a numerical value was assigned for each. The industries that recorded adequate numbers for analysis are: Education, Finance & Banking, Health Care, Utility (electricity, gas), Information Technology, Admin & Consultancy services and Transport. The rest were classified as 'Other'. The project types that recorded adequate numbers for further analysis are: Software Implementation, Software Upgrade, Software Development, Software Migration, Software Integration and Infrastructure projects. Other remaining project types with a fewer number of respondents were classified as 'Other'.

Project complexity is a composite variable which consists of project budget, number of project employees and project duration. Organisational size is calculated using the number of organisational employees, and number of IT functional employees. AMOS data imputation method was used to calculate composite variables. The variable Age was utilised in its usual numerical form. Two models were fitted separately, one with Gender, Age, Project Complexity and Organisational Size and the other with Project type and Industry type. The latter, utilised a method where one variable is removed, i.e. n-1 variable method. The variables removed for both project and industry types are the ones classified as ‘Other’. This segregation of models is only due to limited space on the model, not all variables could be fitted together.

The first model (Figure 7.11) indicates that the dependent variable, ISPP increased slightly (i.e. up to 40%) when the Gender, Age, Project Complexity and Organisational Size were introduced. However, there are no significant effects from any one of them, although there is some evidence to suggest that project complexity negatively affects ISPP. Variable Gender is approaching significance at p value 0.05 and suggests that female project managers may drive a project towards better performance compared to their male counter parts. The standardised and unstandardised regression values with CR and p values are illustrated on Table 7.33.

The second model (Figure 7.12) with project type and industry as control variables, explains 47% of the variation of ISPP. However, except for the project type software migration, all others appear to negatively affect ISPP. Infrastructure and software upgrade projects appear to be significantly, yet negatively affecting the ISPP. This means that infrastructure and software upgrade projects have a higher chance of failing than another type of a project.

The results obtained for industry types illustrate that there are two significant estimates at $p \text{ value} \leq .05$, a positive estimate with the Finance industry and a negative estimate for the Healthcare industry. The remaining industry types have positive values, yet none of them are significant. The standardised and

unstandardised regression values for both project and industry types with CR and p values are illustrated on Table 7.34.

This indicates that the IT/IS projects from the Finance industry has a better possibility of obtaining a higher level of ISPP. Projects from the healthcare industry are likely to obtain a lower level of ISPP.

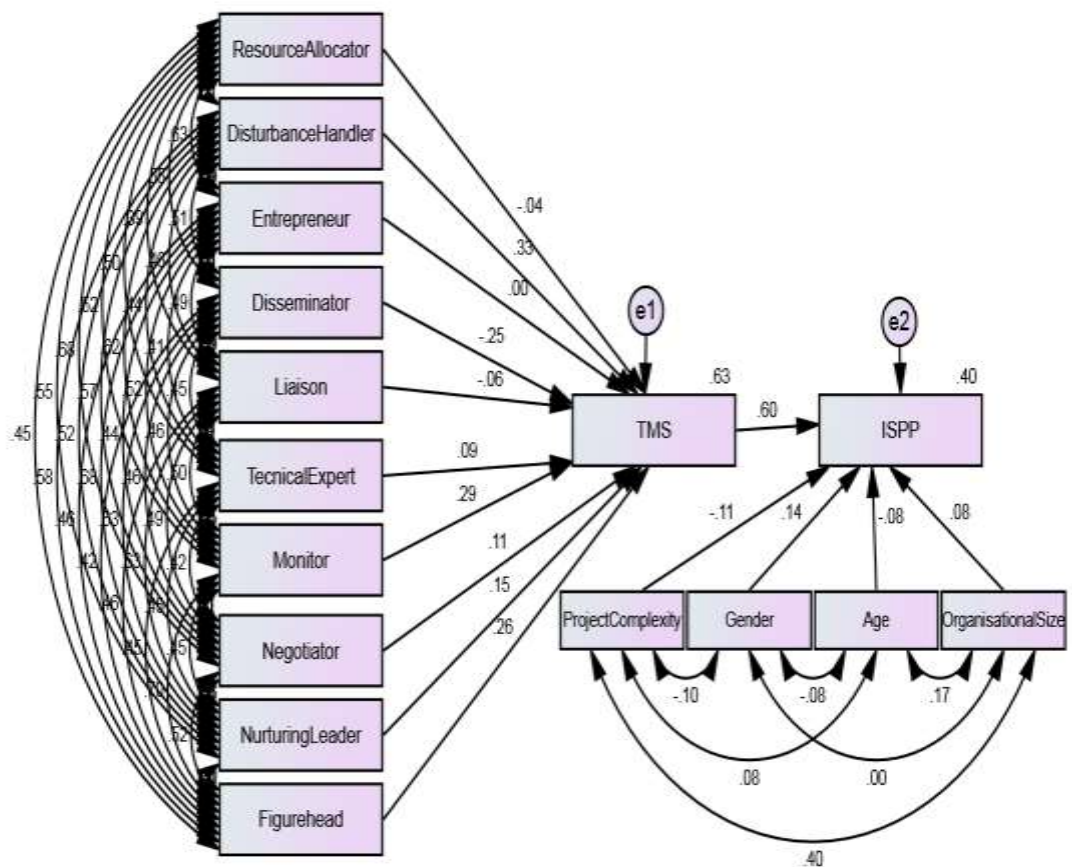


Figure 7.11: Controlling effects from Project Complexity, Gender, Age, Org. Size

Table 7.33: Standardised and unstandardised Regression weights for the Structural Model with Age, Gender Project Complexity and Organisation Size as Control Variables

Regression Values →			Unstandardised		Standardised		
Variables			Estimate	S.E.	C.R.	P	Estimate
TMS	<---	Resource Allocator	-0.046	0.104	-0.443	0.658	-0.045
TMS	<---	Disturbance Handler	0.251	0.068	3.715	<.001	0.33
TMS	<---	Entrepreneur	-0.003	0.063	-0.055	0.956	-0.005
TMS	<---	Figurehead	0.215	0.084	2.564	0.01	0.257
TMS	<---	Nurturing Leader	0.124	0.094	1.312	0.189	0.148
TMS	<---	Negotiator	0.088	0.074	1.187	0.235	0.112
TMS	<---	Monitor	0.253	0.087	2.923	0.003	0.29
TMS	<---	Disseminator	-0.177	0.06	-2.941	0.003	-0.246
TMS	<---	Liaison	-0.041	0.058	-0.717	0.473	-0.06
TMS	<---	Technical Expert	0.061	0.048	1.26	0.208	0.093
ISPP	<---	Gender	0.327	0.171	1.915	(*)0.056	0.14
ISPP	<---	TMS	0.292	0.035	8.256	<.001	0.596
ISPP	<---	Age	-0.009	0.009	-1.035	0.301	-0.076
ISPP	<---	Organisational Size	0.034	0.034	1.022	0.307	0.082
ISPP	<---	Project Complexity	-0.205	0.15	-1.366	0.172	-0.108

*=Positive estimate and P value significant at ≤ 0.05 - Control Variables Only

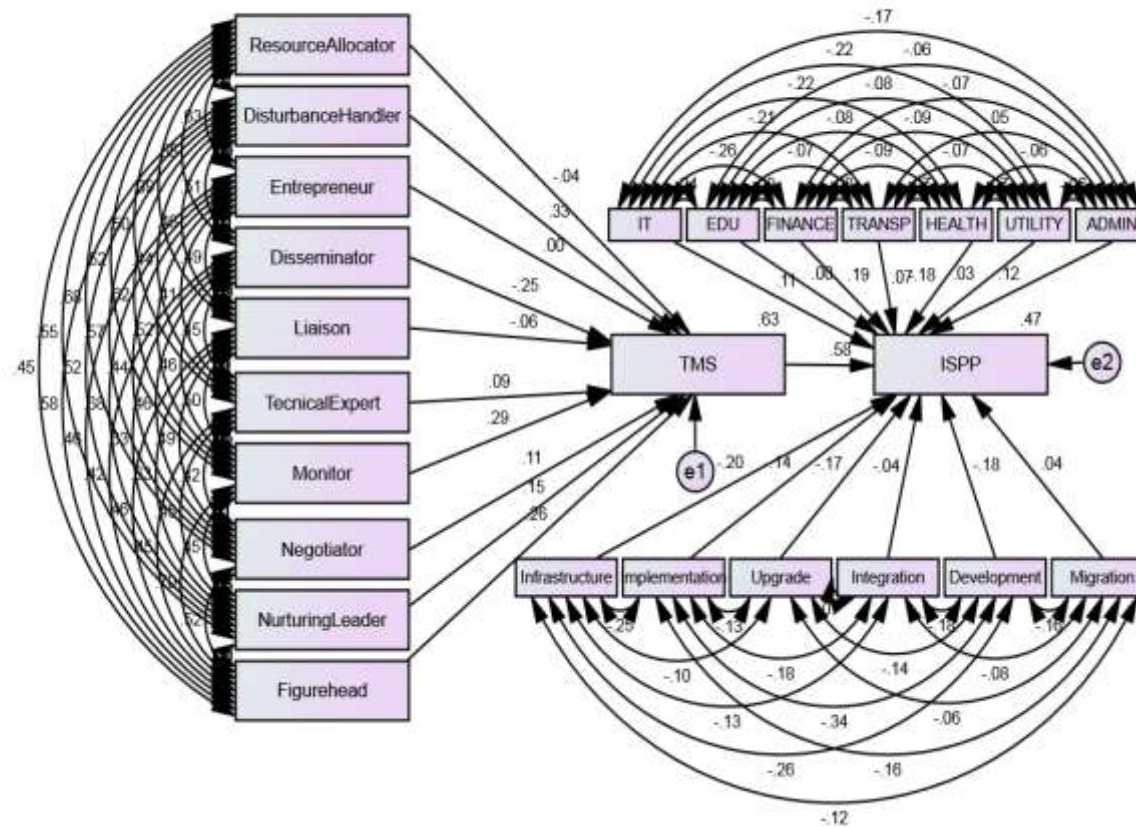


Figure 7.12: Controlling effects from Project Type and Industry

Table 7.34: Standardised and unstandardised Regression Weights for the Structural Model with Project and Industry Types as Control Variables

Regression Values →			Unstandardised				Standardised
Variables			Estimate	S.E.	C.R.	P	Estimate
TMS	<---	Resource Allocator	-0.046	0.104	-0.443	0.658	-0.045
TMS	<---	Disturbance Handler	0.251	0.068	3.715	<.001	0.33
TMS	<---	Entrepreneur	-0.003	0.063	-0.055	0.956	-0.005
TMS	<---	Negotiator	0.088	0.074	1.187	0.235	0.112
TMS	<---	Monitor	0.253	0.087	2.923	0.003	0.29
TMS	<---	Disseminator	-0.177	0.06	-2.941	0.003	-0.246
TMS	<---	Liaison	-0.041	0.058	-0.717	0.473	-0.06
TMS	<---	Technical Expert	0.061	0.048	1.26	0.208	0.093
TMS	<---	Figurehead	0.215	0.084	2.564	0.01	0.257
TMS	<---	Nurturing Leader	0.124	0.094	1.312	0.189	0.148
ISPP	<---	TMS	0.279	0.033	8.539	<.001	0.576
ISPP	<---	Transport	0.308	0.318	0.97	0.332	0.073
ISPP	<---	Utility	0.108	0.302	0.357	0.721	0.027
ISPP	<---	Admin & Consultancy	0.577	0.363	1.591	0.112	0.116
ISPP	<---	IT	0.235	0.189	1.244	0.214	0.115
ISPP	<---	Education	0.011	0.29	0.037	0.971	0.003
ISPP	<---	Finance	0.644	0.27	2.384	*0.017	0.187
ISPP	<---	HealthCare	-0.712	0.302	-2.356	*0.018	-0.179
ISPP	<---	Software Upgrade	-0.792	0.357	-2.217	*0.027	-0.174
ISPP	<---	Software Integration	-0.157	0.303	-0.517	0.605	-0.044
ISPP	<---	Software Development	-0.407	0.236	-1.725	0.084	-0.179
ISPP	<---	Software Migration	0.156	0.324	0.48	0.631	0.039
ISPP	<---	Infrastructure	-0.539	0.258	-2.09	*0.037	-0.198
ISPP	<---	Software Implementation	-0.326	0.238	-1.367	0.172	-0.14

*=Positive estimate and P value significant at ≤ 0.05 - Control Variables Only

7.12 Summary of the Interpretations and Chapter Conclusions

This chapter presented the procedures followed for the data collection, preparation and the analysis. An overall depiction of the work discussed in this chapter is given below in Figure 7.13.

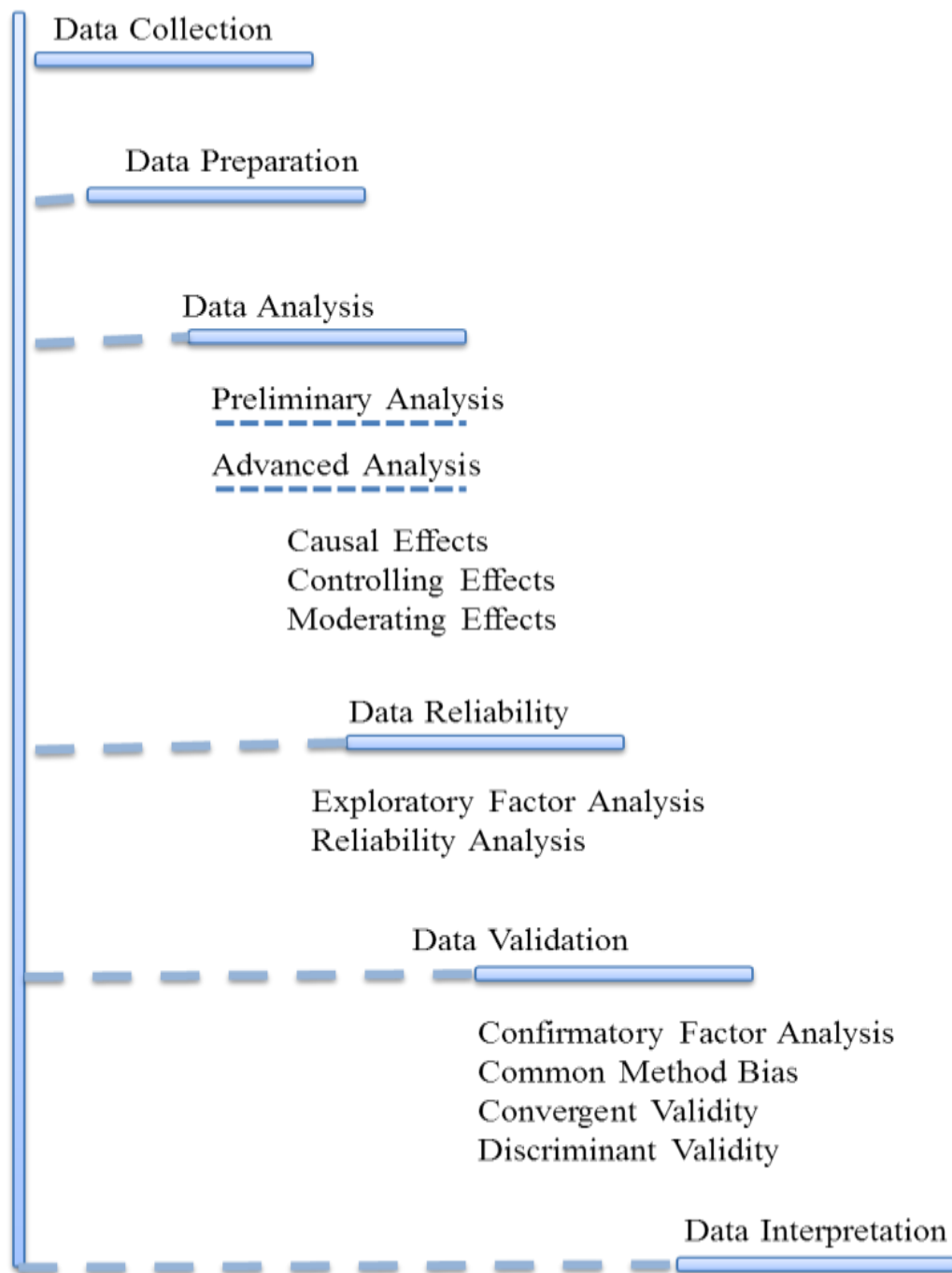


Figure 7.13: A summarised illustration of work carried out from data collection thru to interpretation of the findings

The usable sample of data for this study was determined as 117 cases. The data were found to be adequately normally distributed with no major concerns with skewness and kurtosis and hence with this modest data set, a series of tests were carried out.

During the descriptive statistics tests it was revealed that most of the respondents were from the IT industry and were engaged in software development projects. The respondents ranged from 26 years to 65 years with a mean age of 44 years. Some of them had vast experience in managing projects, i.e. as many as 28 years, while some had only a few years of experience behind them. Over 75% of project managers that responded were male. The majority of projects, i.e. 85% of the projects were reported to have large budgets (i.e. over 10,000 Australian dollars) but over 58% reported to have small project teams. The majority however belonged to organisations with more than 1000 employees with more than 50 employees engaged in the IT functional area. Most respondents reported that they were only 1 or 2 levels below their top manager in the managerial hierarchy. The managerial position most commonly accessed for support on IT/IS projects was reported to be that of the Director.

The section on questionnaire validation discusses pre and post data collection tests that were carried out. Prior to the data collection, the content validity procedure gathered expert opinions that were incorporated into the questionnaire. The Face validity also helped gather some valuable inputs on the questionnaire formatting and presentation. The post data collection tests were initiated with the Exploratory Factor Analysis, during which certain measures were found to confound results and were removed. The reliability tests carried out following the deletions mentioned obtained values that comfortably surpassed the statistical threshold and hence, the changes made are statistically accepted. Confirmatory Factor Analysis was carried out next, and certain measures were further compromised to obtain a suitable model fit. The measures removed during both Exploratory and Confirmatory factor analyses were permanently deleted from the data set as preparation for further investigations with causal analysis. A separate data set was not committed for causal investigations due to the modest number of responses. Thus, the confirmatory factor analysis models

were further utilised to impute composite variables in preparation of causal investigations using structural equation modelling.

Structural equation models with composite variables were used for causal investigations to help reduce the complexity of the large multivariate model suggested in this study. The results obtained indicate that engaging in the Disturbance Handler, Monitor and Figurehead roles are of significant importance when managers are expected to render support for an IT/IS project. Three other roles, although not statistically significant in this data set, indicates positive contributions towards TMS. These roles are: the Nurturing Leader, the Negotiator and the Technical Expert roles. The structural model was further analysed for moderating and controlling effects.

Evidence to support the proposition that the relationship between managerial roles and TMS is moderated by the project management processes was found. The analysis also revealed that some managerial roles are more effective when executed by certain managerial positions than others and thus indicates that managerial position is also a moderator in the relationship between managerial roles and TMS. Analysis of the control variables suggests evidence of lower levels of ISPP when projects are deemed complex. Low ISPP was evidenced again when projects were from the Healthcare industry and when project types were either infrastructure projects or software upgrade projects. Projects from the Finance industry show better possibility of achieving higher ISPP than projects from other industries. Another interesting indication brought about in this analysis using control variables is that female project managers tend to achieve better levels of performance than male projects managers. However, it should be noted that only a quarter ($\frac{1}{4}$) of the sample are female, hence, the generalisation of the above statement is debatable. Final conclusions for the study reported in this thesis takes into consideration not only the findings from the survey method, but findings from the literature review, the interviews and the focus group. These conclusions, contributions and the limitations are discussed in Chapter 8.

CHAPTER 8

8 STUDY CONCLUSIONS, CONTRIBUTIONS AND LIMITATIONS

8.1 Chapter Introduction

This final chapter in the thesis discusses and presents the final research conclusions, contributions and limitations. Prior to presenting the final conclusions, all findings from the mixed-method approach were carefully observed. Priority was given to the findings from the survey method due to the relatively large number of participants and rigour employed with statistical techniques. Section 8.2 discusses the conclusions with regard to the seven research hypotheses that were introduced in Chapter 5. Each hypothesis is addressed in consultation with the findings from the literature review and the mixed-methods. Section 8.3 compares the findings, identifies managerial roles that lead to Top Management Support (TMS) and further classifies them as key and supportive roles. The finalised new definition for the concept of TMS is presented incorporating the above classifications. The answers to the research questions are presented in Section 8.4. The contributions from this study are presented in Section 8.5. The contributions include a novel concept definition for TMS, a new questionnaire for investigating managerial roles, information regarding the most important managerial roles and information regarding the changing nature of TMS within a project. Also presented as research study contributions are operational definitions and the research framework.

Limitations of this study are listed in Section 8.6. In Section 8.7, the author suggests future research directions that may potentially advance the knowledge base for TMS in the IT/IS project discipline and beyond. Concluding remarks on the work presented in this chapter are available in Section 8.8.

8.2 Conclusions on the Hypotheses


































This section presents the final conclusions regarding the seven hypotheses introduced with the refined conceptual framework in Chapter 5, Section 5.4. The hypotheses were addressed in consultation with the findings from the methods utilised in the mixed-method approach. The survey method employed rigorous statistical techniques on a relatively large number of responses in comparison to the other methods. Hence, the findings from the survey method were considered the most prominent when drawing the final conclusions with regard to the hypotheses. The statistical results interpreted the Leader and the Nurturer as one role, which the author consequently named as the Nurturing Leader role. The operational definition recommended for the Nurturing Leader is, “*promoting staff development by assisting with sharpening staff skills*”. This particular statistical interpretation made on the data collected using *reflective* measures strongly indicated that the two roles, the Leader and the Nurturer were very strongly related to each other. Thus, the measures from the two roles may be used interchangeably, and the presence of one role indicates the presence of the other.

As a result of identifying the Nurturing Leader role, the findings from the literature review and the focus group needed adjusting in order to facilitate comparisons from across all of the investigations²⁷ reported in this thesis. The literature review and the focus group method acknowledged that the Leader role leads to TMS. As regards the Nurturer role however, there were no records to support a positive relationship between the Nurturer role and TMS. As noted in the previous paragraph with regard to this special case, the presence of one role is assumed to indicate the presence of the other. Therefore, the findings from the literature review and the focus group were adjusted to contain the Nurturing Leader role. The interview method findings indicated both Leader and Nurturer as roles that lead to TMS, and as such, no adjustments were needed. The Table 8.1 below illustrates this scenario explained above.

²⁷ The term all investigations refer to the combined efforts of the literature review and the mixed methods (interviews, focus group and survey)

On a different note, the inverted figures in the survey method (Table 8.1) indicate the roles which were not statistically significant, yet they provided a positive statistical value (indicated in red in the softcopy). Further detailed discussions on the managerial roles follow.

Table 8.1: The adjustments needed for comparison across the mixed-methods

Roles	Lit. Review	Interview	Focus Group	Survey
Figurehead				
Leader				
Nurturer				
Liaison				
Monitor				
Disseminator				
Spokesman				
Entrepreneur				
Disturbance Handler				
Resource Allocator				
Negotiator				
Technical Expert				

Nurturer+
Leader

The information given above is necessary when referring to the hypotheses. Each hypothesis is addressed and presented in a separate subsection.

8.2.1 Interpersonal Roles and Top Management Support

The first hypothesis stated in this research is as follows:

H1: Top management carrying out Interpersonal roles leads to top management support

This hypothesis is partially supported with both the Figurehead and the Nurturing Leader roles from the Interpersonal role category being recognised as leading to TMS. The bases for selecting these two roles are described below.

Four roles were initially categorised under the Interpersonal role category i.e. the Leader, Liaison and Figurehead roles from Mintzberg (1973) and the Nurturer role found in the interview method (Chapter 5, Figure 5.2). Subsequently, as a result of the exploratory factor analysis process reported in Chapter 7, Section 7.6.2, the Leader role and the Nurturer role were amalgamated together to form the Nurturing Leader role. In order to facilitate necessary comparisons, the findings from the literature review, interviews and focus group were adjusted as required.

When compared, the findings from the literature review and the interview and the focus group methods indicated that engaging in the Nurturing Leader role led to TMS. However, there was no evidence to support that engaging in the Figurehead role leads to TMS (Table 8.1). The Liaison role was mentioned only in the interview method as a role that led to TMS. Prior to making a decision however, findings from the survey method were also considered.

The results obtained from the survey data are as follows (see Chapter 7, Figure 7.7). The Figurehead role was found to be statistically significant at $p \text{ value} \leq 0.05$ with a standardised estimate of .26. The Nurturing Leader role accounted for a standardised estimate of 0.15, but was not statistically significant. The standardised estimate for the Liaison role illustrated a negative value and was statistically insignificant.

There are apparent differences in the findings from across the methods in the mixed-method approach. Although the survey method was considered the more prominent of the methods, findings from the other methods and the literature review were also

considered when making the final decision. The Figurehead role displaying significant predictive statistical influence (Schreiber et al., 2006) on TMS was the first role to be recognised for supporting the hypothesis. The Nurturing Leader role, with a statistical estimate of 0.15, and identified as a role leading to TMS in the literature review, and the interview and the focus group methods was also selected as a role that leads to TMS.

As such, H1 is partially supported; the Figurehead and the Nurturing Leader roles have been identified as roles that lead to TMS.

8.2.2 Informational Roles and Top Management Support

The second hypothesis states the following:

H2: Top management carrying out Informational roles leads to top management support

This hypothesis is partially supported with the Monitor role recognised as an Informational role leading to TMS

The roles investigated from the Informational category included the Monitor, the Disseminator and the Spokesman. Findings from the literature review and the interview and focus group methods indicated that the Monitor and the Disseminator roles lead to TMS. A relationship between the Spokesman role and TMS was not convincingly established. These findings were then compared with the findings from the survey method.

The exploratory factor analysis carried out on the survey data (Chapter 7, Section 7.6.2) produced low factor loadings for the Spokesman role. Thus, there is lack of support for the Spokesman role from all of the investigations. The Spokesman role therefore was removed from being considered any further. The Monitor role displayed a standardised estimate of .29 and is significant at $p \text{ value} \leq 0.05$. The Disseminator role was also significant at $p \text{ value} \leq 0.05$, but demonstrated a negative standardised estimate of -.25 (Chapter 7 - Figure 7.7). Findings from the literature

review and all of the mixed methods supported to establish the Monitor as a role that leads to TMS. However, there is no consensus among the findings for the Disseminator role. Also, a significant negative statistical result was produced for the Disseminator role and thus, it cannot be identified as a role leading to TMS.

The hypothesis H2 therefore, is only partially supported with the Monitor role demonstrating positive significant predictive influence towards TMS.

8.2.3 Decisional Roles and Top Management Support

The third hypothesis introduced is as follows:

H3: Top management carrying out Decisional roles leads to top management support

This hypothesis is partially supported. The findings from the mixed-method approach indicate that carrying out the Disturbance Handler role from the Decisional role category leads to TMS.

The Four roles investigated in the Decisional role category were, the Disturbance Handler, the Negotiator, the Entrepreneur and the Resource Allocator. The findings from the literature review, the interviews and the focus group indicated that the Disturbance Handler, the Entrepreneur and the Resource Allocator all lead to TMS. The Negotiator, although identified as a role leading to TMS in the literature and the interviews, was not identified in the focus group method.

According to the results obtained from the statistical analysis, the Disturbance Handler is highly significant at p value $<.001$, with a standardised estimate of 0.33. The Negotiator role has a non-significant yet, a positive estimate with TMS. The Resource Allocator and the Entrepreneur roles illustrated insignificant and small standardised estimates. Considering the findings obtained from the literature review and all of the mixed methods, only the Disturbance Handler can convincingly be identified as leading to TMS.

Therefore, hypothesis H3 is only partially supported with the Disturbance Handler role demonstrating highly significant predictive influence towards TMS.

8.2.4 Technical Role and Top Management Support

The fourth hypothesis states the following:

H4: Top management carrying out the Technical Role leads to top management support

This hypothesis is not convincingly supported.

Technical Expert is the sole member of the Technical role category. The literature review and the interviews identified that engaging in the Technical role leads to TMS. In contrast, the result obtained from the structural model (Chapter 7, Figure 7.7) did not indicate a significant influence by the Technical Expert role on TMS. However, a positive estimate of 0.09 was reported. Hence, although statistically not sufficiently significant to support the hypothesis, the Technical Expert role is given further thought in Section 8.3.

Findings with regard to the hypothesis H4 across the mixed methods were not unanimous and convincing support could not be established. As such, hypothesis H4 was not supported.

8.2.5 Moderating Effects by the Position of the Top Management

Top management is claimed to have multiple levels (Lim et al., 2013; Olie et al., 2012). The work carried out by the top managers depends on their level of authority (Al-Taie et al., 2013; Li & Harrison, 2008; Sambamurthy & Zmud, 1999). This research study selected the top management classification by Mintzberg (1973) for further investigations. Mintzberg's classification has two levels, the first level (the 'Chief' level of managers e.g. CEO), is known to play *External* roles and the second level (e.g. Director, Senior Manager etc.) is known to play *Internal* roles (details in Chapter 5, Section 5.4.5). This research study investigates if different managerial

levels from within the top management engage more effectively in certain managerial roles than in the others. Hence, the following hypothesis was stated:

H5: The positive association between top managers carrying out managerial roles and TMS is moderated by the position of the top manager.

This hypothesis is partially supported. The survey data were analysed with statistical techniques to find evidence to address the hypothesis (Chapter 7, Section 7.11.2). Two structural models were prepared, one for managers who were expected to engage in internal roles and the other for managers who were expected to engage in external roles. The z-scores from both models were compared to find substantial distance between the two estimates. The following findings were made.

The Negotiator, the Monitor and the Technical Expert roles clearly indicated a significant difference with different managerial levels. The Monitor role demonstrated significance at p value $< .05$ with a standardised estimate of 0.34, but this estimate was evidenced in the Internal role category and not in the external role category as previously suggested by Mintzberg (1973). The Negotiator role produced an estimate of 0.33 and is significant at p value $< .05$, as an external role. The Technical role, with a standardised estimate of 0.13 is approaching significance at p value ≤ 0.05 as an internal role.

In addition, i.e. outside of the z-score comparison, the Disturbance Handler and the Figurehead roles indicated significance in their preferred classifications. That is, the Disturbance Handler role produced a standardised estimate of 0.28 with a p value of $< .001$ when carried out as an internal role and the Figurehead role demonstrated a standardised estimate of 0.34 and was significant at p value $< .001$ when carried out as an external role. Hence, it is clear that some roles illustrate statistical significance when carried out by one managerial level/position than the other. Therefore, it is stated that hypothesis H5, is partially supported.

As per the findings in relation to this hypothesis, an adjustment is in order for the operational definition of the Monitor role. The Monitor role was evidenced as a

significant contributor when carried out as an internal role instead as an external role as previously suggested in the literature (Mintzberg, 1973). The Monitor role operationalised in this research (Chapter 6, Section 6.3) as “*The degree to which the top management seeks to receive information to understand the IT/IS project*” (adapted from Grover et al., 1993), is henceforth considered as a managerial role more suited to be carried out as an internal role. It is recommended that the Monitor role be operationalised in future research studies as, “*The degree to which the top management seeks to receive information from staff to understand the IT/IS project*”.

8.2.6 Moderating Effects of the Project Management Process Groups

A typical project is classified as having five project management process groups (PMBOK® Guide, 2008). These project management process groups are: Initiation, Planning, Execution, Monitoring & Control and Closure. Each process group consists of tasks that are carried out by the project manager in order to successfully complete a project. Although some work is repeated, most work is local to each project management process group.

The study reported in this thesis investigates if the type and level of managerial role engagement is variable depending on the project management processes. In other words, the study investigates if each project management process demands different role engagement as well as different level of role engagement. Hence, the following hypothesis was stated:

H6: The positive association between top managers carrying out managerial roles and TMS is moderated by the project management processes.

This hypothesis was fully supported, i.e. the type and level of role engagement in IT/IS projects are moderated by project management processes. The findings from the analysis reported in Chapter 7, Section 7.11.1 indicate the following.

The project Execution process demands the highest engagement from all managerial roles, while the project Closure process demands the least. The project Monitoring and Control process demands the second highest role engagement, followed by the

project Planning and the project Initiation processes respectively. Additionally, it was noted that each project management process demands different levels of engagement from each individual role. Since it is too complex to explain such variations from across eight managerial roles and five project management processes, a pictorial illustration is made available in Table 8.4 in Section 8.4.2.

The hypothesis H6 therefore, is fully supported.

8.2.7 Top Management Support and Information Technology/Systems Project Performance

The seventh and final hypothesis in this study is as follows:

H7: Top Management Support (obtained via managerial role engagement) is important for Information Technology/Systems Project Performance

The statistical analysis carried out on the data from the survey method provided statistical evidence to fully support this hypothesis.

According to the structural model illustrated in Chapter 7 (Figure 7.7), TMS displayed a large predictive effect on Information Technology and Systems Project Performance (ISPP) where the p value was found to be significant at $<.001$. In this analysis, ISPP illustrates a squared multiple correlation of 0.36. This indicates that TMS explains 36% of the variance of ISPP. This is consistent with previous literature which indicates that while TMS is a largely important factor for ISPP, it is possibly among the top three Critical Success Factors (CSFs) (Boonstra, 2013; Elbanna, 2013; Dong et al., 2009, Standish, 2009; Akgün et al., 2007) Hence, 36% of the variance for ISPP is explained by TMS in this research provides further evidence to support the notion in the literature.

Hypothesis H7 is fully supported as there is sufficient statistical evidence to state that TMS is highly important for ISPP. Judging from the statistical evidence, TMS explains about one third of the variance for ISPP, and is amongst the top three factors that affect the performance of IT/IS projects.

8.3 Concluding Discussion on the Definition for the Concept of TMS

Top management support is unarguably a most important CSF for ISPP (Young & Poon, 2013; Somers & Nelson, 2004; Sharma & Yetton, 2003; Poon & Wagner, 2001). However, the concept of TMS still lacks a theoretically defined and empirically tested definition. Prior literature illustrates three notions (behaviour, perception, and both behaviour and perception) for top management support. The *behaviour* based notion is largely popular (Boonstra, 2013; Garrett & Neubaum, 2013; Elbanna, 2013; Dong, 2008; Young & Jordan, 2008) compared to the others. Hence, the decision to study behaviour based top management support in the research study reported in this thesis.

8.3.1 Identifying Key Managerial Roles for Top Management Support

A theoretical concept definition that travels the ladder of abstraction (Osigweh, 1989) was first stated in Chapter 2 following a thorough literature review. This definition was subsequently investigated using the findings from 12 interviews and a focus group study (detailed in Chapter 4). However, the attributes to be included in the concept definition at the middle and lowest abstraction levels were not made clear by these investigations. Therefore, as a final definitive study, the survey method was carried out. Table 8.2 below presents an overview of the findings and indicates the roles that were found to lead to TMS in each investigation.

Table 8.2: A Comparative view of the findings from the mixed-method approach

Method	Figurehead	Nurturing Leader	Liaison	Monitor	Disseminator	Spokesman	Entrepreneur	Disturbance Handler	Resource Allocator	Negotiator	Technical Expert
Lit. Review	X	√	X	√	√	X	√	√	√	√	√
Interviews	X	√	√	√	√	X	√	√	√	√	√
Focus Group	X	√	X	√	√	X	√	√	√	X	X
Survey	√	P	X	√	X	X	X	√	X	P	P
Found to compliment TMS in all methods?	No	Yes	No	Yes	No	No	No	Yes	No	No	No

P is for “although statistically insignificant, the role denotes a Positive predictive influence on TMS”.

The Table 8.2 above illustrates that the literature review and all of the mixed methods have determined Monitor, Disturbance Handler, and Nurturing Leader as roles that lead to TMS. Hence, these are considered to be key managerial roles that lead to TMS. The Figurehead role, although not identified as important in the literature review, interview or focus group methods, displayed a significant statistical effect²⁸ on TMS (see Chapter 7, Figure 7.7). Hence, noting that the findings from the survey method are deemed most important, the Figurehead role was considered as a key role that leads to TMS. The decisions made with regard to the *key roles* that lead to TMS are consistent with the conclusions made on hypotheses H1 to H4 in Section 8.2.

²⁸ with a standardised estimate of 0.26, significant at p value ≤ 0.05

8.3.2 Identifying Supportive Managerial Roles for TMS

In addition to the managerial roles that were identified as key roles that lead to TMS, certain other roles were identified as *supportive roles*. These supportive roles were not considered as important as the key roles since only some methods found that these supportive roles lead to TMS.

A dilemma was identified with regards the findings concerning the Disseminator role from among the mixed methods. The Disseminator role, while identified in all qualitative investigations as a role leading to TMS, illustrated a significant negative statistical effect on TMS (see Chapter 7, Figure 7.7). Previously in this study (Chapter 4, Section 4.2.7), it was pointed out that both Monitor and Disseminator roles were related to communication activities and hence, noted the possibility of one role being redundant. The results from the statistical analysis supported this already noted presumption. Thus, the Disseminator role was removed from the list of managerial roles that could potentially lead to TMS. The Liaison role, although mentioned in the interviews, illustrated an insignificant statistical influence on TMS (see Chapter 7, Figure 7.7). During the preliminary discussions in Chapter 4, Section 4.2.7 it was stated that the Liaison role displayed a close connection to the Negotiator role, hinting that one of them may be redundant. In view of the facts stated above, the Liaison role was removed from further consideration. The findings from the literature review and all of the mixed methods rejected the possibility of the Spokesman role leading to TMS. Thus, the Spokesman role was also removed from the list of managerial roles altogether. As such, the process of elimination of the highly irrelevant and insignificant roles made way for a secondary set of roles that can lead to TMS.

Therefore, the managerial roles, Resource Allocator, Negotiator, Entrepreneur and Technical Expert were identified as leading to TMS, but, to a lesser degree than the previously identified key managerial roles stated in Section 8.3.1. These roles are henceforth addressed as *supportive roles* that lead to TMS.

8.3.3 Finalised Definition for the Concept of Top Management Support

Four separate investigations (a literature review, 12 interviews, a focus group discussion and a questionnaire survey) were carried out to study TMS from a managerial role perspective. The following facts were determined from the findings obtained from these investigations. Eight managerial roles were found to lead to TMS in IT/IS projects. These roles were further classified as *key roles* (Disturbance Handler, Monitor, Figurehead, Nurturing Leader) and *supportive roles* (Resource Allocator, Negotiator, Entrepreneur, Technical Expert). The Table 8.3 below is succinctly illustrating the decision made on each managerial role investigated in this research study.

Table 8.3: The decisions on the managerial roles following the investigations

Role	Key Role	Supportive Role	Removed
Disturbance Handler	√		
Monitor	√		
Figurehead	√		
Nurturing Leader	√		
Technical Expert		√	
Negotiator		√	
Resource Allocator		√	
Entrepreneur		√	
Spokesman			√
Disseminator			√
Liaison			√

The following is concluded with regard to the concept of TMS. The definition for the concept of TMS from a managerial role perspective has three levels of abstraction: i.e. the lowest, middle and the highest levels of abstraction (Osigweh, 1989). Hence, the concept definition is able to “retain extensional (breadth or denotation) gains by ladder climbing, while minimising losses in connotative (intention or depth) precision.” Osigweh (1989, p. 584).

The findings from the recent investigations do not impact the definitions on the middle and the highest levels of abstraction previously stated in this thesis (see

Chapter 5, Section 5.2). However, changes were introduced to the lowest level of abstraction as a result of the recent findings. The key roles and the supportive roles for TMS were identified and incorporated into the lowest level of abstraction. The updated definition for the concept of TMS at the lowest level of abstraction is as follows:

“Top management support is a set of favourable actions carried out by the top management by engaging in Key managerial roles: Disturbance Handler, Monitor, Figurehead & Nurturing Leader and Supportive managerial roles: Negotiator, Entrepreneur, Resource Allocator & Technical Expert”.

This definition for the concept of TMS, taking a managerial role perspective is a major contribution from this study. This contribution is theoretically grounded and is empirically verified and is expected to fill a gap that long needed attention (Butler & Fitzgerald, 1999; Williams & Ramaprasad, 1996). The finalised definitions for each level of abstraction are illustrated in Figure 8.1.

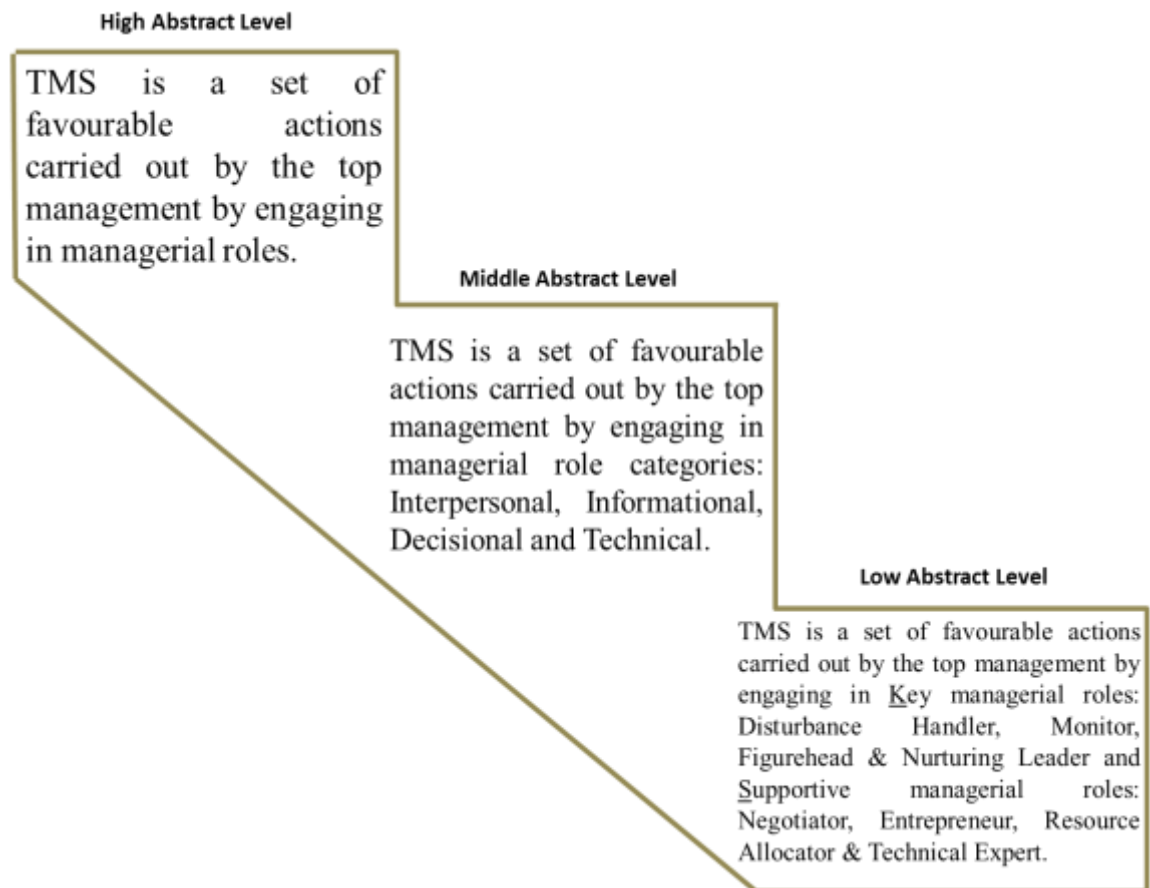


Figure 8.1: The concept of Top Management Support in IT/IS Projects

Conclusions on the Research Questions and the Validated Research Framework

This section addresses the main and sub research questions. The sub-questions are answered first in the order they were initially presented. The answer to the main research question is stated once all sub-questions are answered.

The overarching research question presented in this study is:

“Does top management engagement in managerial roles help to achieve top management support, which in turn helps to improve the performance of IT/IS projects?”

The follow up research sub-questions presented in the study are:

1. How does top management engagement in managerial roles relate to TMS in IT/IS projects?
2. Which top management roles contribute largely towards TMS?
3. How is managerial role engagement spread across project management processes?
4. Are certain roles more efficiently carried out by certain top managers than the others?

8.3.4 Answers to Research Sub-questions 1 and 2

Research questions 1 and 2 are answered together as they are closely related. They present a much clearer solution answered together than if answered separately. The first question is:

How does top management engagement in managerial roles relate to top management support in IT/IS projects?

The second question asks:

Which top management roles contribute largely towards TMS?

The answer to the first sub-question: The findings from this study established that top management engagement in managerial roles leads to TMS in IT/IS projects (Sections 8.2 and 8.3). Eight managerial roles were found to contribute positively towards TMS in an IT/IS project context. These roles were further segregated as key and supportive roles considering the level of significance they demonstrated on TMS (Section 8.3).

The roles, Disturbance Handler, Monitor, Figurehead and Nurturing Leader are presented as the key managerial roles due to their more significant influence on TMS. The Technical Expert, the Negotiator, the Resource allocator and the Entrepreneur are classified as playing supportive roles.

Answer to the second sub-question: The *key roles* are the major contributors towards TMS. The Disturbance Handler²⁹ was found to be the most dominant of the roles, hence the largest contributor towards TMS. The significance the Disturbance Handler role has on TMS implies that the project managers expect their top manager's support in subduing disturbances that occur in an IT/IS project. The Monitor, a role more involved with information communication in an IT/IS project is presented as the second most important role. While the Figurehead, that carries out duties of a more social nature is presented as the third most important role. The Nurturing Leader is considered as the fourth most important role. Figure 8.2 below is an illustration of the key and supportive roles that lead to TMS.

²⁹ The order of importance relates to the statistical estimates obtained using structural equation modelling (see Chapter 7-Figure 7.7)

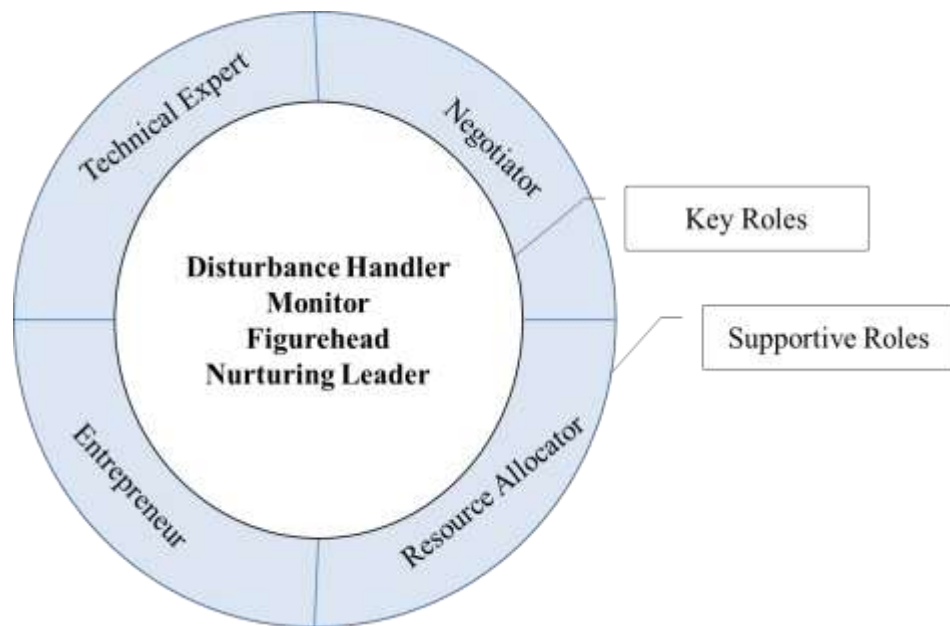


Figure 8.2: An illustration of the Key and Supportive roles for TMS

8.3.5 Answers to Research Sub-question 3

The third research sub-question is:

How is managerial role engagement spread across project management processes?

The finding from this thesis study determined that the managerial role engagement varied across the project management processes (Initiation, Planning, Execution, Monitoring & Control and Closure). The order of demand for role engagement from highest to lowest across the project management processes is: Execution, Monitoring and Control, Planning, Initiation and Closure. The Figure 8.3 below depicts the demand on total role engagement for each project management process, the values indicated are percentages.

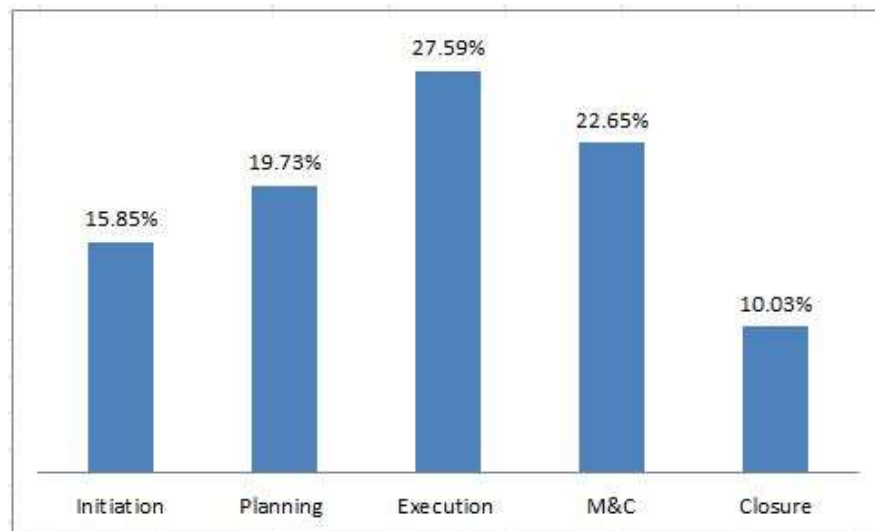


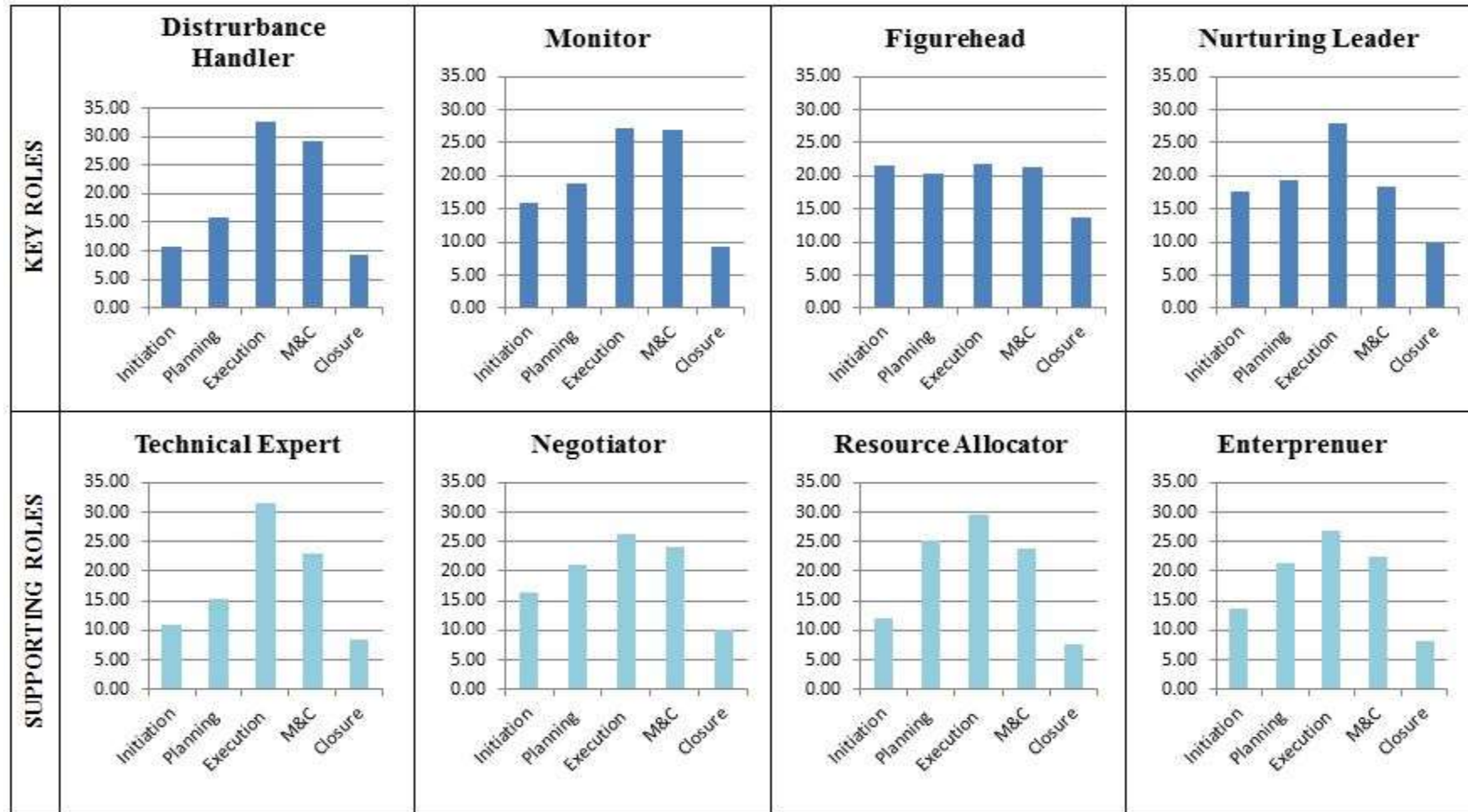
Figure 8.3: Demand for overall role engagement–Project Management Processes

Findings further indicate that within each project management process, the need for each individual role engagement is different. It is infeasible to describe such variances in words due to its complexity; hence, a pictorial illustration is given below. Table 8.4 illustrates the demand for each managerial role across the project management processes.

These findings are consistent with past studies that predict a fluctuation in TMS throughout the project (Elbanna, 2013; Somers & Nelson, 2004; Nandhakumar, 1996). Top management support is a valuable organisational resource, and hence adequate planning is required to make TMS available for all projects (Alsudiri et al., 2013). This is true especially since many organisations have multi-project environments where projects concurrently compete for TMS (Elbanna, 2013).

The information presented above, with regard to the varying need for different *type* of role engagement and different *levels* of role engagement within a project, will no doubt be useful for organisational resource planning (Bharadwaj et al., 1999; Ross et al., 1996).

Table 8.4: Comparative view of role engagement across the Project Management Processes



8.3.6 Answers to Research Sub-question 4

The fourth sub-question is:

Are certain roles more effectively carried out by certain top managers than by the others?

In this research the top management was identified as having two managerial levels (Lim et al., 2013; Olie et al., 2012; Johnson et al., 2011; Mintzberg, 1973). The “C” level of managers (example: Chief Executive Office, Chief Information Officer etc.) are expected to carry out managerial roles that involve looking beyond their organisation. These roles are classified as *external* roles (Mintzberg, 1973). The Director, Senior Manager, Program Manager and the like are expected to engage more efficiently in managerial roles that are based on managing activities within their organisation. These roles are classified as *internal* roles (Mintzberg, 1973).

In Section 8.2.5, when discussing hypothesis H5, it was stated that some managerial roles demonstrated statistical significance when they were carried out by one level of management rather than the other. For instance, the Negotiator and the Figurehead roles demonstrated larger coefficients when carried out as external roles, whereas the Monitor, the Technical Expert and the Disturbance Handler roles displayed larger coefficients when carried out as internal roles.

Hence, different managerial levels from within the top management engage more effectively in certain managerial roles than in the others (Mintzberg, 1973; Yukl & Mahsud, 2010). Knowledge in this regard is of definite importance to project managers, as they will know which level of management should be contacted for the type of support currently needed. This information will also be of importance to the top management for work assignments and training (Hunt & Baruch, 2003).

8.3.7 Answer to the Main Research Question

Like pieces to a puzzle, the hypotheses and the research sub-questions helped put together the answer for the main research question, i.e.

“Does top management engagement in managerial roles help to achieve top management support, which in turn helps to improve the performance of IT/IS projects?”

The findings from this study indicate that the top management carrying out their managerial roles help achieve TMS in an IT/IS project context (refer Sections 8.2.1 to 8.2.4 and Section 8.4.1). Top management support obtained in this manner is found to help achieve significant levels of ISPP (Section 8.2.7). This could be further elaborated as follows.

Firstly, top management engagement in the managerial roles, Disturbance Handler, Monitor, Figurehead, Nurturing Leader, Technical Expert, Negotiator, Resource Allocator and Entrepreneur have been found to lead to TMS in an IT/IS project context.

Secondly, TMS obtained via management role engagement is found to help achieve better performance in IT/IS projects. Statistical results illustrate (see Chapter 7, Figure 7.7) that more than one third of ISPP (i.e. 36%) can be explained with TMS obtained by the top management engaging in managerial roles. This finding is consistent with past studies that claim TMS as one of the top three most important CSFs that effect the performance of IT/IS projects (Boonstra,2013 Elbanna, 2013; Lin, 2010; Dong et al., 2009; Standish, 2009; Akgün et al., 2007; Dong, 2001;,. Bajwa et al., 1998; Bardi et al., 1994).

8.3.8 The Validated Research Framework

The research framework was adjusted with the findings obtained from this study (Figure 8.4). While the main structure of the preliminary conceptual framework (Chapter 5) and the direction of relationships are still intact, some adjustments were made. The framework now suggests two main classifications for managerial roles (Internal/External and Key/Supportive). Research findings also directed a change to the dependent variable (ISPP) and demanded changes for the operational definitions of the Nurturing Leader and the Monitor roles. The updated operational definitions are stated in Section 8.2 and Section 8.2.5 respectively. The changes made to the conceptual framework are explained below.

Internal and External Role Classification

Internal and external classifications for the managerial roles were first suggested by Mintzberg when he published his work on the role-theory in 1973. Mintzberg has divided the roles in his theory into these two management classifications. He further notes that the roles under each managerial classification should function best when carried out by a manager from that category. Evidence was found to support this notion with one main exception. The findings suggested that the Monitor role, previously classified as best carried out as an external role (Mintzberg, 1973) is more effective if carried out as an internal role (detailed in Sections 8.2.5 and 8.4.3).

Key and Supportive Role Classification

The two new classifications suggested for the managerial roles are named as Key and Supportive. They were introduced during the extended discussions in Section 8.3 with regards to the definition of the concept of TMS. The Disturbance Handler, Monitor Figurehead and Nurturing Leader were identified as key managerial roles. Top management engagement in the key roles is necessary in order to provide TMS for IT/IS projects. Top managers engaging in the Resource Allocator, Negotiator, Entrepreneur and the Technical Expert roles also lead to TMS. However, the influence of these roles on TMS is secondary to the influence of the *key* roles, and hence, the name *supportive* roles.

Changes to the dependent variable

The dependent variable (ISPP) initially consisted of six dimensions (Financial Performance, Quality of Communication Interaction, Control, Flexibility, Learning and Operational Efficiency). However, during the exploratory factor analysis the dimension, ‘Quality of Communication Interaction’ was removed since it failed statistical expectations. The process of exploratory factor analysis was explained in Chapter 7, Section 7.6.2. Hence, the final framework consists of only the remaining five dimensions for ISPP.

The research framework adjusted with the findings indicates that top management engagement in managerial roles leads to TMS. Also indicated is TMS obtained with the top management engaging in managerial roles is significantly important for ISPP. The moderating effects of the management position and project management processes on the relationship between the managerial roles and TMS are also illustrated.

Prima Facie, the framework (Figure 8.4) may denote that the top management engagement in the Interpersonal, Informational, Decisional and Technical role categories are all of equal importance for ISPP. However, a keen observer will note that the key roles and the supportive roles have been segregated on the framework. Thus, the subtle illustration on the framework is that the Interpersonal, Informational and Decisional role categories consisting of the four key managerial roles are of more importance for TMS, and therefore, for IT/IS project performance. The Technical role category is of lesser importance.

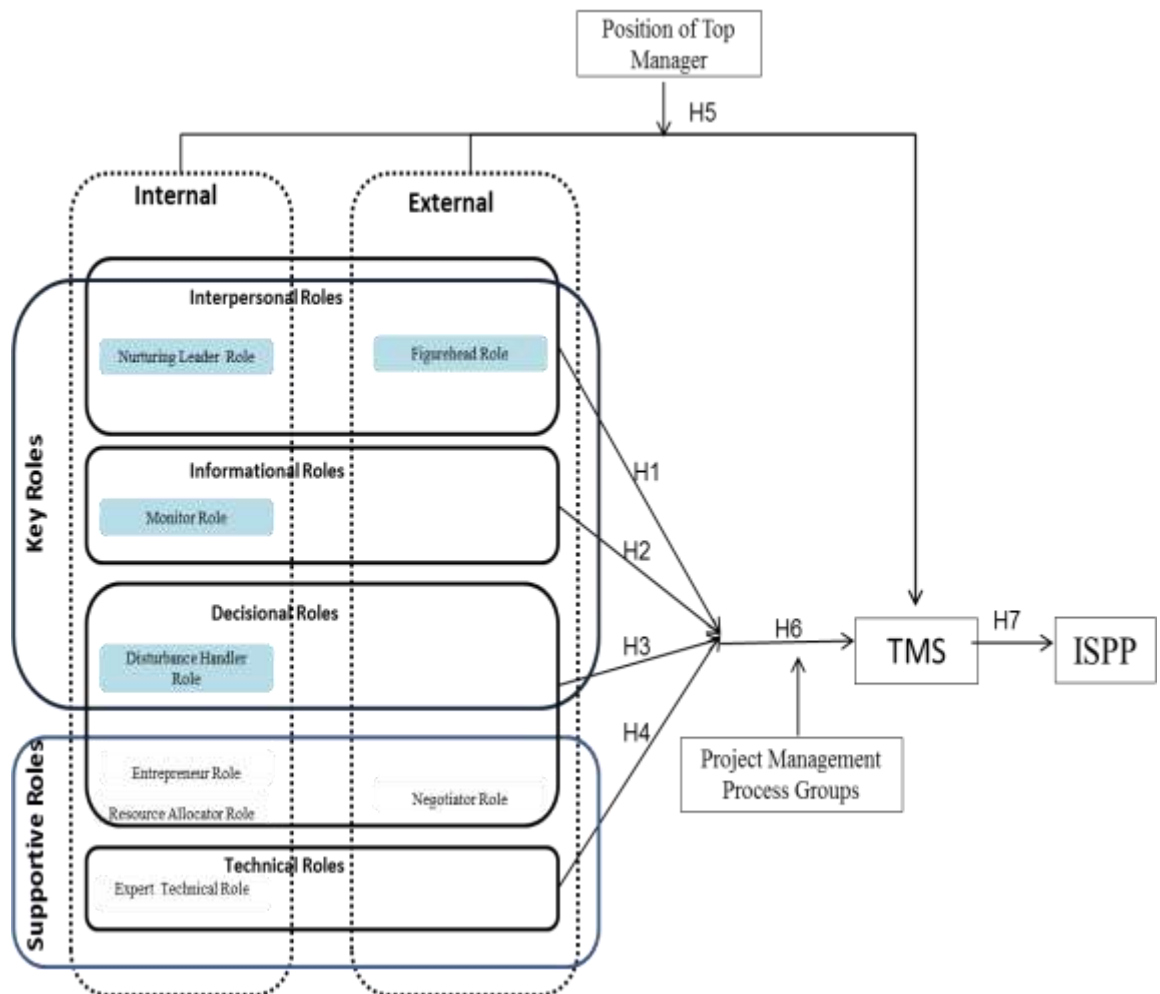
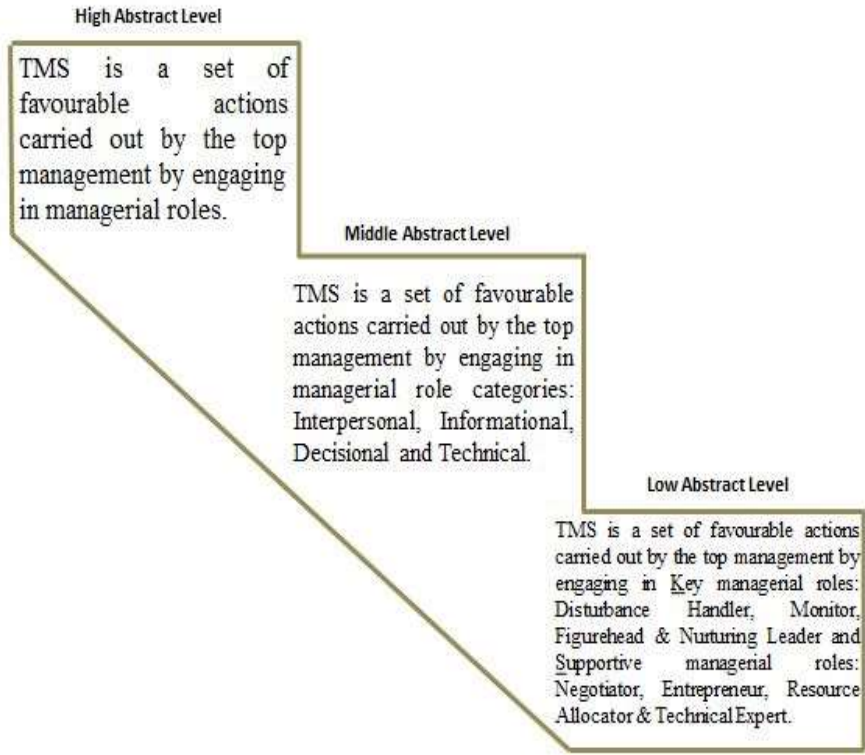


Figure 8.4: Finalised validated research framework

8.4 Contributions from the Research Study

Description	Reference
<p>8.4.1 New Definition for the Concept of Top Management Support</p> <p>This research contributes a definition for the concept of TMS that is theoretically defined (Osigweh,1989) and empirically tested with twelve interviews, a focus group and a questionnaire survey. The concept definition has three levels of abstraction, i.e. high, middle & low. The levels of abstraction may be used in conjunction or alone to refer to a specific context. The concept definition at the lowest level of abstraction illustrates the constituents of TMS. This allows a level of access and manageability for TMS that has never before been allowed.</p> <p>Industry practitioners may use this information for training purposes. They may also concentrate on the roles that help achieve TMS. Future researchers are encouraged to adapt this concept definition for TMS and carryout further research in either similar or different contexts. It must be noted that the middle and lowest abstraction levels could be adjusted to different research contexts.</p>	 <p>High Abstract Level</p> <p>TMS is a set of favourable actions carried out by the top management by engaging in managerial roles.</p> <p>Middle Abstract Level</p> <p>TMS is a set of favourable actions carried out by the top management by engaging in managerial role categories: Interpersonal, Informational, Decisional and Technical.</p> <p>Low Abstract Level</p> <p>TMS is a set of favourable actions carried out by the top management by engaging in Key managerial roles: Disturbance Handler, Monitor, Figurehead & Nurturing Leader and Supportive managerial roles: Negotiator, Entrepreneur, Resource Allocator & Technical Expert.</p> <p>Ref: Section 8.3 and Figure 8.1</p>

8.4.2 A New, Validated Questionnaire to Measure Managerial Roles, TMS and ISPP

This study contributes a new, yet statistically validated questionnaire to measure managerial roles, TMS and ISPP (see Appendix E for notes). The questionnaire was developed using constructs that were established in theory. The constructs were further investigated with two qualitative studies before the final questionnaire was compiled for the data collection. The questionnaire was subjected to validity and reliability tests and stringent statistical analysis procedures before being finalised. This new questionnaire consists of reflective measures abiding by current measurement concerns (MacKenzie et al., 2011; Kim et al., 2010) and is easily adaptable to other contexts beyond IT/IS projects.

Previous Mintzbergian role based research in IT/IS (Gottschalk & Karlsen, 2005; Grover et al., 1993) and other disciplines (Varajão et al., 2008; Tsui & Ohlott, 1988; Pavett, 1984; Tsui, 1984) appear to have been limited by the capabilities of the questionnaire they selected (McCall & Segrist, 1980). Thus, previous studies have only investigated six managerial roles so far. The questionnaire contributed in this thesis is considered an advancement on the existing questionnaire instruments commonly used in prior studies due to:

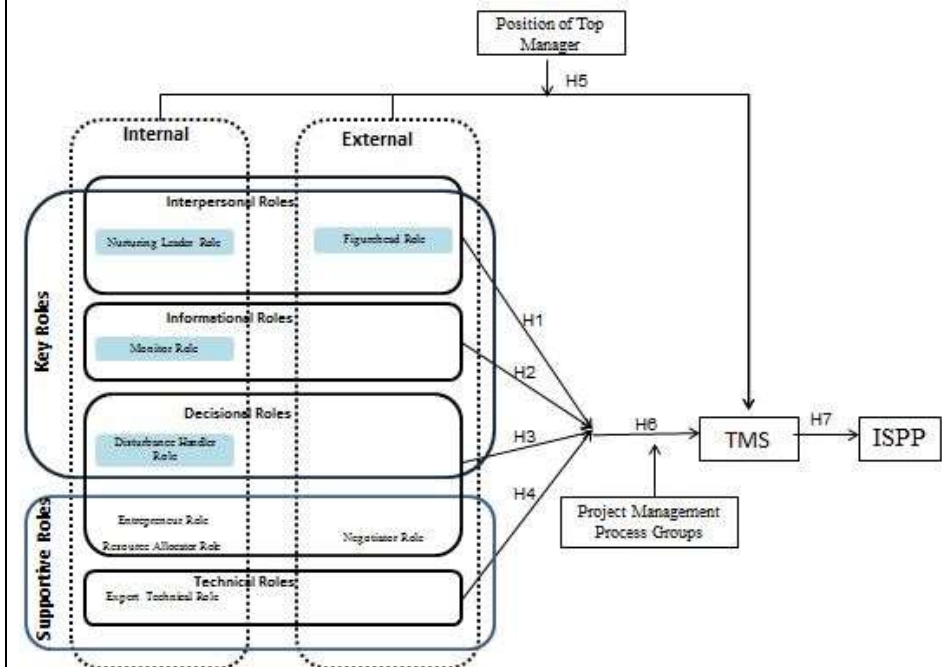
- the lengthy, arduous preparation and validation,
- the use of reflective measures,
- the ease of adaptability to diverse contexts,
- the ability to investigate up to ten managerial roles and
- the ability to investigate beyond the commonly used questionnaire to find that the Figurehead and the Disturbance Handler roles are key to TMS. This would not have been possible without the new questionnaire and would have had a large impact on the research findings.

The author contributes this questionnaire to the body of knowledge with the hope that both academic and industry researchers will find further flexibility for carrying out research in the area of managerial roles.

8.4.3 The Validated Research Framework and Verified Operational Definitions

This thesis contributes a validated research framework with managerial roles, TMS and ISPP. Also contributed are verified operational definitions for the constructs included in the framework. The operational definitions may be utilised in its present state for future research. The framework can be used as a reference point in future research studies. For example, the framework can be utilised to investigate managerial role based TMS and ISPP from the top managers' point of view instead of the project managers', as per the work reported in this thesis.

Different viewpoints on the same problem may in fact bring forth interesting information that may help to iron out any differences.



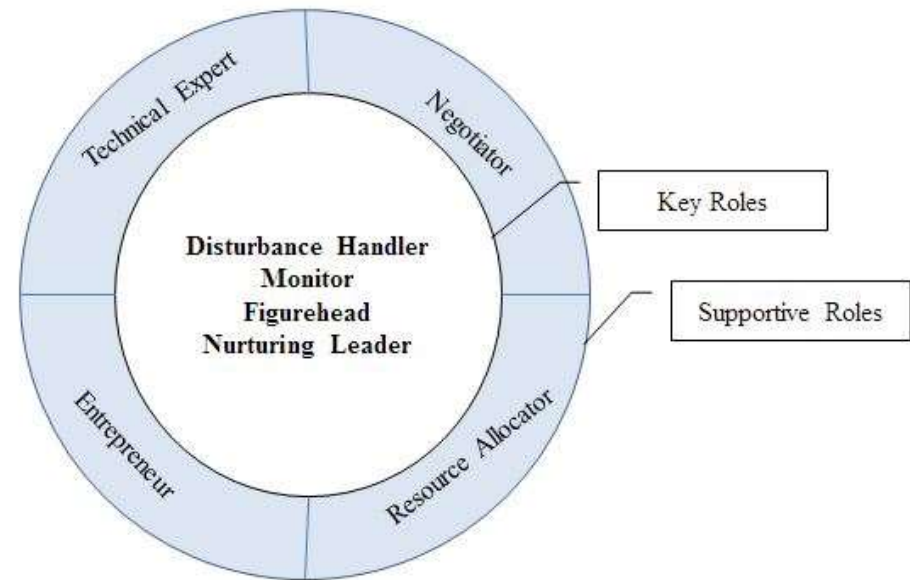
Ref: Section 8.4.5 and Figure 8.4

8.4.4 A Guide to the Most Important Managerial Roles for TMS

In an academic perspective, this research study tapped into an entirely new area. That is, this thesis is the first to investigate and find that top management engagement in managerial roles leads to TMS and that certain managerial roles are of significant importance for TMS than the others. Notice the segregation of key and supportive roles on the adjacent figure. The key roles identified are Disturbance Handler, Monitor, Figurehead and Nurturing Leader.

Practising top and project managers should be made aware of these key roles to plan ahead to provide TMS for projects. As such, this information can be utilised to obtain better performance in IT/IS projects.

Academic scholars may carry out similar studies in different contexts and compare results and further advance the body of knowledge on TMS in IT/IS and other projects.

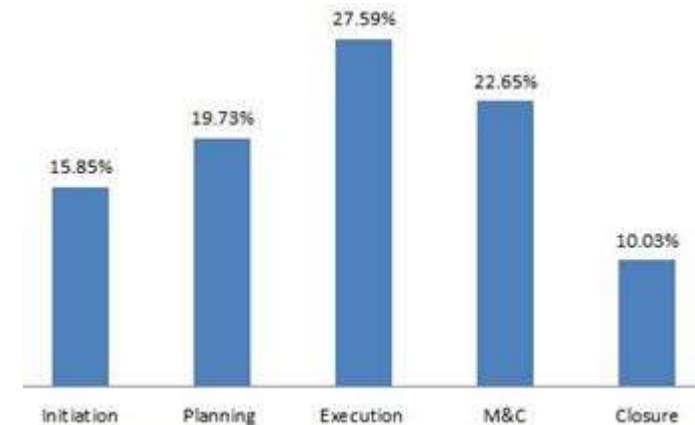


Ref: Section 8.4.1 and Figure 8.2

8.4.5 An Index Depicting the Demand for Managerial Role Engagement across Project Management Processes

This study identified that the demand for engagement in managerial roles differs across the project management processes. In a typical project, the Execution process demands the highest engagement in managerial roles, while the Closure process demands the least. Most organisations carry out multiple concurrent projects that compete for resources (Elbanna, 2013). TMS is one such resource (Alsudiri et al., 2013) and hence, practising project and top managers will find this information useful for organisational resource planning (Bharadwaj et al., 1999; Ross et al., 1996).

Academics may also find this information interesting as TMS research carried out in conjunction with project management processes is rare. Hence, this research is shedding much wanted light into an area which was previously unattended.



Ref: Section 8.4.2 and Figure: 8.3

8.5 Limitations of the Study

No research study is without limitations. It is however important to be upfront and state the limitations for the benefit of the recipients who consider utilising the contributions to pursue research in a similar area. The following are limitations of this study.

1. The findings may be limited to the sample size

This research was designed to employ a mixed-method approach with both qualitative and quantitative methods. As such, a series of interviews, a focus group study and a questionnaire survey were carried out. While the participation expectations were met for the interview and focus group methods, with 12 and 5 respondents respectively, expected number of responses was not received for the questionnaire survey. Despite the author planning and working toward obtaining over 200 responses, only 117 valid responses were secured. The statistical yardsticks however were sufficiently met (Chapter 7). A larger sample may have been useful in further validating the results.

2. The research was carried out only on projects from the IT/IS context.

The interviews, focus group and the questionnaire survey all gathered responses from IT/IS personnel. Therefore, one could argue with regards to the applicability of the findings of this study into contexts beyond IT and IS projects. In order to overcome any prejudices, the author recommends future researchers to carry out investigations in the context of their interest using the framework and the questionnaire contributed in this thesis.

3. Definition for the concept of TMS is based on a managerial role perspective

Previous definitions on the concept of TMS are based on either the *behaviour*, the *perception*, or *both behaviour and perception* of the top manager. While the behaviour based notion appears to be more popular, definitions offered so far in the literature lack adequate theoretical and empirical rigour. This thesis redresses this gap, first by defining a theoretical concept from established theory and then by

subjecting it to empirical investigations. This thesis utilises a managerial role perspective for defining the concept of TMS. The author acknowledges that there may be any number of other means to define the concept of TMS.

4. No separate pilot study was carried out

The study reported in this thesis carried out three methods adhering to a mixed-method approach. This study avoided using the same participants in different methods to avoid bias. Thus, in order to preserve as many participants as possible for the survey, and also because of time and cost constraints, a separate pilot study was not carried out.

This is not in any way to say that the questionnaire validation process was compromised. The questionnaire validation process was carried out utilising the modest set of data that was collected. The follow up analysis adhered to the notions brought about in the questionnaire validation (See Chapter 7). Thus, in the final analysis, the variables that were removed were not utilised. Other changes such as amalgamating two variables together were reflected in the final analysis. Yet, one may argue that the additional step of an independent pilot study may have added further analytical rigour.

8.6 Possible Future Directions

1. Extension of this study into other contexts

It will be of interest to see the likeness of this study being extended to other industries. An example of such a possibility is to investigate top management role engagement beyond IT/IS projects. Future studies could look to determine if role engagement is of any difference when the industry and/or the project types differ.

2. Adapting and researching with the new managerial role engagement questionnaire

The new questionnaire can be adapted to other contexts without being restricted to IT/IS projects. For example it can be easily used to investigate managerial role engagement at a different level in the organisation or even in entirely different environments such as healthcare or hospitality.

The literature review in this work reported a number of studies that investigated managerial roles in various contexts such as the academia, hospitality and healthcare (Mech, 1997; Pavett, 1984; Tsui, 1984). These studies appeared to be restricted by the unavailability of a recent survey tool. The study reported in this thesis has presented a new research tool (Appendix E) that can be utilised for such studies in the future.

3. Comparative studies

This study investigated TMS from the project managers' point of view. It would be interesting to see yet another study that investigates TMS from the top managers' point of view. Comparison of such findings may help to further understand TMS from different viewpoints and help to iron out any misunderstandings. Future researchers who choose to investigate this area will vastly benefit from adapting the framework and questionnaire contributed in this thesis.

8.7 Chapter Conclusions

This chapter presented the research study conclusions, contributions and limitations. The findings from this research study indicate that top management engagement in managerial roles leads to TMS and assists in achieving better project performance in IT/IS projects. The findings also determined that the top manager's position and the project management processes influence the relationship between managerial role engagement and TMS.

This research, like any other is not without limitations. One limitation is the question of generalisation of the results due to the investigation being from only the IT/IS project context. Another limitation identified is the modest data sample. The fact that the new definition for the concept of TMS is based on a managerial role perspective may also be seen as limiting by some. However, it is acknowledged that one research cannot provide answers to all problems. Hence, the following future directions are suggested.

It is recommended that the likeness of this study be extended to other industries to improve on the generalisation of the findings. Also suggested is that another study be undertaken to explore the point of view of the top management with regards to managerial role engagement, TMS and ISPP, in contrast to the project managers' point of view reported in this thesis. A comparison of the findings from the present study and the suggested study may provide a broader view and may even lead to the elimination of any misunderstanding between the top and the project managers with regard to TMS.

The contributions from this study include a novel definition for the concept of TMS, a validated research framework, a guide to the most important managerial roles and an index illustrating the demand on the managerial roles across the project management processes. Yet another contribution is the new and validated questionnaire tool. Future researchers are encouraged to adapt and utilise this tool in diverse research contexts in the future.

REFERENCES

- Agarwal, N., & Rathod, U. (2006). Defining success' for software projects: An exploratory revelation. *International Journal of Project Management*, 24(4), 358-370.
- Akgün, A. E., Byrne, J. C., Lynn, G. S., & Keskin, H. (2007). Team stressors, management support, and project and process outcomes in new product development projects. *Technovation*, 27(10), 628-639.
- Ali, U., & Kidd, C. (2013). Critical success factors for configuration management implementation. *Industrial Management & Data Systems*, 113(2), 250-264.
- Allan, P. (1981). Managers at work: A large-scale study of the managerial job in New York City government. *The Academy of Management Journal*, 24(3), 613-619.
- Alsudiri, T., Al-Karaghoul, W., & Eldabi, T. (2013). Alignment of large project management process to business strategy: A review and conceptual framework. *Journal of Enterprise Information Management*, 26(5), 596-615.
- Al-Taie, M., Lane, M. S., & Cater-Steel, A. (2013). The relationship between organisational strategic IT vision and CIO roles: one size does not fit all. *Australasian Journal of Information Systems*, 18(2), 5-35.
- AMOS Customer Loyalty Model Application., (2009), SPSS Hong Kong, accessed 26 November 2013,
<http://www.spss.com.hk/amos/loyalty_model_application.htm>
- Andersson, S., & Florén, H. (2011). Differences in managerial behavior between small international and non-international firms. *Journal of International Entrepreneurship*, 9(3), 233-258.
- Arbuckle, J.L., (2013), *IBM® SPSS® Amos™ 22 User's Guide*
- Atkinson, R. (1999). Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International Journal of Project Management*, 17(6), 337-342.
- Atkinson, S. (2004). Senior management relationships and trust: an exploratory study. *Journal of Managerial Psychology*, 19(6), 571-587.
- Atkinson, S., & Butcher, D. (2003a). Trust in the context of management relationships: an empirical study. *Advanced Management Journal*, 68(4), 24.
- Atkinson, S., & Butcher, D. (2003b). Trust in managerial relationships. *Journal of Managerial Psychology*, 18(4), 282-304.
- Augustine, S., Payne, B., Sencindiver, F., & Woodcock, S. (2005). Agile project management: steering from the edges. *Communications of the ACM*, 48(12), 85-89.
- Baccarini, D. (1999). The logical framework method for defining project success. *Project Management Journal*, 30(4), 25-32.
- Bacharach, S. B. (1989). Organizational theories: Some criteria for evaluation. *Academy of Management Review*, 14(4), 496-515.
- Bagozzi, R. P. (2011). Measurement and meaning in information systems and organizational research: methodological and philosophical foundations. *MIS Quarterly*, 35(2), 261-292.
- Bajwa, D. S., Lewis, L. F., Pervan, G., Lai, V. S., Munkvold, B. E., & Schwabe, G. (2008). Factors in the global assimilation of collaborative information

- technologies: an exploratory investigation in five regions. *Journal of Management Information Systems*, 25(1), 131-166.
- Bajwa, D. S., Rai, A., & Brennan, I. (1998). Key antecedents of executive information system success: a path analytic approach. *Decision Support Systems*, 22(1), 31-43.
- Barclay, C. (2008). Towards an integrated measurement of IS project performance: The project performance scorecard. *Information Systems Frontiers*, 10(3), 331-345.
- Bardi, E. J., Raghunathan, T. S. & Bagchi, P. K. (1994) Logistics information systems: the strategic role of top management. *Journal of Business Logistics*, 15, 71-85.
- Barki, H., & Hartwick, J. (1994). Measuring User Participation, User Involvement, and User Attitude. *MIS Quarterly*, 18(1), 59-82.
- Barki, H., Rivard, S., & Talbot, J. (2001). An integrative contingency model of software project risk management. *Journal of Management Information Systems*, 17(4), 37-70.
- Baroudi, J. J. (1985). The impact of role variables on IS personnel work attitudes and intentions. *MIS Quarterly*, 9(4), 341-356.
- Bassellier, G., & Pinsonneault, A. (1998). *Assessing top management support for information technologies: an new conceptualisation and measure*. Paper presented at the European Conference on Information Systems.
- Bassellier, G., Reich, B. H., & Benbasat, I. (2001). Information technology competence of business managers: A definition and research model. *Journal of Management Information Systems*, 17(4), 159-182.
- Bayona-Oré, S., Calvo-Manzano, J. A., Cuevas, G., & San-Feliu, T. (2014). Critical success factors taxonomy for software process deployment. *Software Quality Journal*, 22.
- Bazeley, P. (2007). *Qualitative Data Analysis with NVivo*: SAGE.
- Beck, P., Jiang, J. J., & Klein, G. (2006). Prototyping mediators to project performance: Learning and interaction. *Journal of Systems and Software*, 79(7), 1025-1035.
- Belassi, W., & Tukel, O. I. (1996). A new framework for determining critical success/failure factors in projects. *International Journal of Project Management*, 14(3), 141-151.
- Belout, A., & Gauvreau, C. (2004). Factors influencing project success: the impact of human resource management. *International Journal of Project Management*, 22(1), 1-11.
- Benbasat, I., & Zmud, R. W. (2003). The identity crisis within the IS discipline: Defining and communicating the discipline's core properties. *MIS Quarterly*, 183-194.
- Bharadwaj, A. S., Sambamurthy, V., & Zmud, R. W. (1999). *IT capabilities: theoretical perspectives and empirical operationalization*. Paper presented at the Proceedings of the 20th international conference on Information Systems, 378-385
- Bhatt, G. D., & Stump, R. L. (2001). An empirically derived model of the role of IS networks in business process improvement initiatives. *Omega*, 29(1), 29-48.
- Boddy, C. (2012). The Nominal Group Technique: an aid to Brainstorming ideas in research. *Qualitative Market Research: An International Journal*, 15(1), 6-18.

- Boh, W. F., & Yellin, D. (2007). Using enterprise architecture standards in managing information technology. *Journal of Management Information Systems*, 23(3), 163-207.
- Bonner, J. M., Ruekert, R. W., & Walker Jr, O. C. (2002). Upper management control of new product development projects and project performance. *Journal of Product Innovation Management*, 19(3), 233-245.
- Boonstra, A. (2013). How do top managers support strategic information system projects and why do they sometimes withhold this support? *International Journal of Project Management*, 31(4), 498-512.
- Bruque-Cámara, S., Vargas-Sánchez, A., & Hernández-Ortiz, M. J. (2004). Organizational determinants of IT adoption in the pharmaceutical distribution sector. *European Journal of Information Systems*, 13(2), 133-146.
- Burton-Jones, A., & Straub Jr, D. W. (2006). Reconceptualizing system usage: An approach and empirical test. *Information Systems Research*, 17(3), 228-246.
- Butler, T., & Fitzgerald, B. (1999). Unpacking the systems development process: an empirical application of the CSF concept in a research context. *The Journal of Strategic Information Systems*, 8(4), 351-371.
- Byrd, T. A., & Turner, D. E. (2000). Measuring the flexibility of information technology infrastructure: Exploratory analysis of a construct. *Journal of Management Information Systems*, 17(1), 167-208.
- Carbonell, P., & Rodríguez-Escudero, A. I. (2009). Relationships among team's organizational context, innovation speed, and technological uncertainty: An empirical analysis. *Journal of Engineering and Technology Management*, 26(1), 28-45.
- Carmeli, A., & Halevi, M. Y. (2009). How top management team behavioral integration and behavioral complexity enable organizational ambidexterity: The moderating role of contextual ambidexterity. *The Leadership Quarterly*, 20(2), 207-218.
- Carmeli, A., Schaubroeck, J., & Tishler, A. (2011). How CEO empowering leadership shapes top management team processes: Implications for firm performance. *The Leadership Quarterly*, 22(2), 399-411.
- Carroll, S. J., & Gillen, D. I. (1987). Are the classical management functions useful in describing managerial work? *Academy of Management Review*, 12(1), 38-51.
- Carter, M., Grover, V., & Thatcher, J. B. (2011). The Emerging CIO Role of Business Technology Strategist. *MIS Quarterly Executive*, 10(1), 19-29.
- Cattell, R. B. (1978). *The Scientific Use of Factor Analysis*: New York: Plenum Press.
- Chandler, D., & Munday, R. (2011). *A Dictionary of Media and Communication*. Oxford University Press. Retrieved 8 Mar. 2014, from <http://www.oxfordreference.com.ezproxy.uow.edu.au/view/10.1093/acref/9780199568758.001.0001/acref-9780199568758>.
- Chang, K.-C., Wong, J.-H., Li, Y., Lin, Y.-C., & Chen, H.-G. (2011). External social capital and information systems development team flexibility. *Information and Software Technology*, 53(6), 592-600.
- Chareanpunsirikul, S., & Wood, R. C. (2002). Mintzberg, managers and methodology: some observations from a study of hotel general managers. *Tourism Management*, 23(5), 551-556.

- Chatterjee, D., Grewal, R., & Sambamurthy, V. (2002). Shaping up for e-commerce: institutional enablers of the organizational assimilation of web technologies. *MIS Quarterly*, 65-89.
- Chow, T., & Cao, D. B. (2008). A survey study of critical success factors in agile software projects. *Journal of Systems and Software*, 81(6), 961-971.
- Churchill Jr, G. A. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research*, 64-73.
- Coakes, S.J., Steed, L., Ong, C. (2010). *SPSS Version 17 for Windows: Analysis without Anguish*, John and Wiley Sons Australia Ltd.
- Collier, N., Fishwick, F., & Floyd, S. W. (2004). Managerial involvement and perceptions of strategy process. *Long Range Planning*, 37(1), 67-83.
- Coltman, T., Devinney, T. M., Midgley, D. F., & Venaik, S. (2008). Formative versus reflective measurement models: Two applications of formative measurement. *Journal of Business Research*, 61(12), 1250-1262.
- Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, 189-211.
- Cooke-Davies, T. (2002). The "real" success factors on projects. *International Journal of Project Management*, 20(3), 185-190.
- Cooper, R. G., & Kleinschmidt, E. J. (1987). New products: what separates winners from losers? *Journal of Product Innovation Management*, 4(3), 169-184.
- Correll, J. G. (1994). How to get top management support for MRP II. *Hospital Material Management Quarterly*, 15(4), 23-28.
- Crawford, I. M. (1997). *Marketing research and information systems: Food & Agriculture Org.*
- Crawford, L. (2005). Senior management perceptions of project management competence. *International Journal of Project Management*, 23(1), 7-16.
- Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches*: (2nd ed.) Thousand Oaks: Sage.
- Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin*, 52, 281-302
- Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*. 16. 297-334.
- Cycyota, C. S., & Harrison, D. A. (2006). What (Not) to Expect When Surveying Executives A Meta-Analysis of Top Manager Response Rates and Techniques Over Time. *Organizational Research Methods*, 9(2), 133-160.
- Dai, C. X., & Wells, W. G. (2004). An exploration of project management office features and their relationship to project performance. *International Journal of Project Management*, 22(7), 523-532.
- Dakin, S., & Hamilton, R. (1990). How "General" are your General Managers? *Management Decision*, 28(1).
- D'Aveni, R. A., & MacMillan, I. C. (1990). Crisis and the content of managerial communications: A study of the focus of attention of top managers in surviving and failing firms. *Administrative Science Quarterly*, 634-657.
- Davis, K. (2014). Different stakeholder groups and their perceptions of project success. *International Journal of Project Management*, 32(2), 189-201.
- De Holan, P. M., & Mintzberg, H. (2004). Management as life's essence: 30 years of the Nature of Managerial Work. *Strategic Organization*, 2(2), 205-212.
- De Ruyter, K. (1996). Focus versus nominal group interviews: a comparative analysis. *Marketing Intelligence & Planning*, 14(6), 44-50.

- Delbecq, A. L., Van de Ven, A. H., & Gustafson, D. H. (1975). *Group techniques for program planning: A guide to nominal group and Delphi processes*: Scott, Foresman Glenview, IL.
- Desouza, K. C. (2003). Facilitating tacit knowledge exchange. *Communications of the ACM*, 46(6), 85-88.
- Di Vincenzo, F., & Mascia, D. (2011). Social capital in project-based organizations: Its role, structure, and impact on project performance. *International Journal of Project Management*.
- Dierdorff, E. C., Rubin, R. S., & Morgeson, F. P. (2009). The milieu of managerial work: An integrative framework linking work context to role requirements. *Journal of Applied Psychology*, 94(4), 972.
- Dillman, D. A. (2000). *Mail and internet surveys: The tailored design method* (Vol. 2): Wiley New York.
- Donaldson, T., & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of Management Review*, 20(1), 65-91.
- Dong, L. (2001). Modeling top management influence on ES implementation. *Business Process Management Journal*, 7(3), 243-250.
- Dong, L. (2008). Exploring the impact of top management support of enterprise systems implementations outcomes: Two cases. *Business Process Management Journal*, 14(2), 204-218.
- Dong, L., Neufeld, D., & Higgins, C. (2009). Top Management Support of Enterprise Systems Implementations. *Journal of Information Technology*, 24(1), 55-80.
- Dubin, R. (1969). *Theory building*: New York: Free Press.
- Dutton, J. E., & Ashford, S. J. (1993). Selling issues to top management. *Academy of Management Review*, 18(3), 397-428.
- Elbanna, A. (2013). Top management support in multiple-project environments: an in-practice view. *European Journal of Information Systems*, 22(3), 278-294.
- Elbashir, M. Z., Collier, P. A., & Davern, M. J. (2008). Measuring the effects of business intelligence systems: The relationship between business process and organizational performance. *International Journal of Accounting Information Systems*, 9(3), 135-153.
- Espinosa, J., Cummings, J. N., & Pickering, C. (2012). Time separation, coordination, and performance in technical teams. *Engineering Management, IEEE Transactions on*, 59(1), 91-103.
- Everitt, B. (1975). Multivariate analysis: The need for data and other problems. *The British Journal of Psychiatry*, 126(3), 237-240.
- Eweje, J., Turner, R., & Müller, R. (2012). Maximizing strategic value from megaprojects: The influence of information-feed on decision-making by the project manager. *International Journal of Project Management*, 30(6), 639-651.
- Fawcett, J., & Downs, F. S. (1992). *The relationship of theory and research*: FA Davis Philadelphia.
- Felekoglu, B., & Moultrie, J. (2014). Top Management Involvement in New Product Development: A Review and Synthesis. *Journal of Product Innovation Management*, 31(1), 159-175.
- Fisher, J., Shanks, G., & Lamp, J. (2007). A ranking list for information systems journals. *Australasian Journal of Information Systems*, 14(2), 5-18.

- Fornaciari, C. J., Sherlock, J. J., Ritchie, W. J., & Dean, K. L. (2005). Scale development practices in the measurement of spirituality. *International Journal of Organizational Analysis*, 13(1), 28-49
- Fortune, J., & White, D. (2006). Framing of project critical success factors by a systems model. *International Journal of Project Management*, 24(1), 53-65.
- Fowler, F.J.(2009). *Survey research methods*: Thousand Oaks, USA: Sage Publications.
- Francoeur, C., Labelle, R., & Sinclair-Desgagne, B. (2008). Gender diversity in corporate governance and top management. *Journal of Business Ethics*, 81(1), 83-95
- Gable, G. G. (1994). Integrating case study and survey research methods: an example in information systems. *European Journal of Information Systems*, 3(2), 112-126.
- Gable, G. G., Sedera, D., & Chan, T. (2008). Re-conceptualizing Information System Success: The IS-Impact Measurement Model. *Journal of the association for Information Systems*, 9(7), 377-408.
- Gallagher, D., Ting, L., & Palmer, A. (2008). A journey into the unknown; taking the fear out of structural equation modeling with AMOS for the first-time user. *The Marketing Review*, 8(3), 255-275.
- Garrett, R. P., & Neubaum, D. O. (2013). Top management support and initial strategic assets: A dependency model for internal corporate venture performance. *Journal of Product Innovation Management*, 30(5), 896-915.
- Gaskin, J. (2010). *EFA demonstration* [video file].Gaskination's Statistics. <http://youtube.com/Gaskination>
- Gaskin, J. (2011a). *Validity during CFA made easy* [video file].Gaskination's Statistics. <http://youtube.com/Gaskination>
- Gaskin, J. (2011b). *Validity Master* [computer software].Stats Tools Package. <http://statwiki.kolobkcreations.com>
- Gaskin, J. (2012). *Common method bias using common latent factor* [video file].Gaskination's Statistics. <http://youtube.com/Gaskination>
- Gaskin, J. (2013a). *SEM Series Part 5a: Confirmatory Factor Analysis* [video file].Gaskination's Statistics. <http://youtube.com/Gaskination>
- Gaskin, J. (2013b). *EFA to CFA plugin* [video file].Gaskination's Statistics. <http://youtube.com/Gaskination>
- Gaskin, J. (2013c). *SEM Series Part 9: Multigroup Moderation* [video file].Gaskination's Statistics. <http://youtube.com/Gaskination>
- Gemino, A., Reich, B. H., & Sauer, C. (2007). A temporal model of information technology project performance. *Journal of Management Information Systems*, 24(3), 9-44.
- Gemünden, H. G., Salomo, S., & Krieger, A. (2005). The influence of project autonomy on project success. *International Journal of Project Management*, 23(5), 366-373.
- George, B. A., & Marino, L. (2011). The epistemology of entrepreneurial orientation: Conceptual formation, modeling, and operationalization. *Entrepreneurship Theory and Practice*, 35(5), 989-1024.
- Ghapanchi, A. H., Aurum, A., & Low, G. (2011). A taxonomy for measuring the success of open source software projects. *First Monday*, 16(8-1).
- Gibson, J. W., & Tesone, D. V. (2001). Management fads: Emergence, evolution, and implications for managers. *The Academy of Management Executive*, 15(4), 122-133.

- Gingnell, L., Franke, U., Lagerström, R., Ericsson, E., & Lilliesköld, J. (2014). Quantifying success factors for IT projects—An expert-based Bayesian model. *Information Systems Management*, 31(1), 21-36.
- Glass, R. L. (1999). Evolving a new theory of project success. *Communications of the ACM*, 42(11), 17-19.
- Glick, M. B. (2013). The development of an instrument for measuring role perceptions of US chief executive officers. *Modern Management Science & Engineering*, 1(1), p58
- Gopal, A., Espinosa, J., Gosain, S., & Darcy, D. P. (2011). Coordination and Performance in Global Software Service Delivery: The Vendor's Perspective. *Engineering Management, IEEE Transactions on*, 58(4), 772-785.
- Gosling, J., & Mintzberg, H. (2003). The Five Mind-Sets of a Manager. *Harvard Business Review (November)*, 54-63.
- Gottschalk, P. (2002). *The chief information officer: a study of managerial roles in Norway*. Paper presented at the Hawai International Conference on System Sciences.
- Gottschalk, P., & Karlsen, J. T. (2005). A comparison of leadership roles in internal IT projects versus outsourcing projects. *Industrial Management & Data Systems*, 105(9), 1137-1149.
- Grant, R. M. (2010). *Contemporary Strategy Analysis and Cases: Text and Cases*: John Wiley & Sons.
- Green, S. G. (1995). Top management support of R&D projects: a strategic leadership perspective. *Engineering Management, IEEE Transactions on*, 42(3), 223-232.
- Grover, V., Jeong, S. R., Kettinger, W. J., & Lee, C. C. (1993). The chief information officer: A study of managerial roles. *Journal of Management Information Systems*, 10(2), 107-130.
- Guimaraes, T., & Igbaria, M. (1997). Client/server system success: exploring the human side. *Decision Sciences*, 28(4), 851-876.
- Guo, L. (2009). Upholding the missions of academic medical centers: new work roles for CEOs. *Medical Education Online*, 5.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis (7th, & ed.)*. Upper Saddle River, N., USA: Prentice-Hall, Inc.
- Han, W. M., & Huang, S. J. (2007). An empirical analysis of risk components and performance on software projects. *Journal of Systems and Software*, 80(1), 42-50.
- Hartman, F., & Ashrafi, R. (2002). Project management in the information systems and information technologies. *Project Management Journal*, 33(3), 5-15.
- Hartog, C., & Herbert, M. (1986). 1985 Opinion Survey of MIS Managers: Key Issues. *MIS Quarterly*, 10(4), 351-361.
- Harvey, N., & Holmes, C. A. (2012). Nominal group technique: an effective method for obtaining group consensus. *International Journal of Nursing Practice*, 18(2), 188-194
- Henderson, L. S., & Stackman, R. W. (2010). An exploratory study of gender in project management: interrelationships with role, location, technology, and project cost. *Project Management Journal*, 41(5), 37-55.
- Hill, C. W., & McShane, S. L. (2008). *Principles of management*: McGraw-Hill/Irwin.
- Hinkin, T. R. (1995). A review of scale development practices in the study of organizations. *Journal of Management*, 21(5), 967-988.

- Hinkin, T. R. (1998). A brief tutorial on the development of measures for use in survey questionnaires. *Organizational Research Methods*, 1(1), 104.
- Hong, L. C. (2011). Predictors of project performance and the likelihood of project success. *Journal of International Management Studies*, 6(2), 1-11.
- Howell, J. M., & Sheab, C. M. (2001). Individual differences, environmental scanning, innovation framing, and champion behavior: key predictors of project performance. *Journal of Product Innovation Management*, 18(1), 15-27.
- Hoy, W. K. (2009). *Quantitative Research in Education: A Primer*: SAGE Publications.
- Huang, J. W., & Li, Y. H. (2011). Slack resources in team learning and project performance. *Journal of Business Research*, 65(3), 381-388.
- Hunt, J. W., & Baruch, Y. (2003). Developing top managers: the impact of interpersonal skills training. *Journal of Management Development*, 22(8), 729-752.
- Hwang, M. I., & Schmidt, F. L. (2011). Assessing moderating effect in meta-analysis: A re-analysis of top management support studies and suggestions for researchers. *European Journal of Information Systems*, 20(6), 693-702.
- Ifinedo, P. (2008). Impacts of business vision, top management support, and external expertise on ERP success. *Business Process Management Journal*, 14(4), 551-568.
- Igbaria, M., Zinatelli, N., Cragg, P., & Cavaye, A. L. M. (1997). Personal computing acceptance factors in small firms: a structural equation model. *MIS Quarterly*, 279-305.
- Ika, L. A. (2009). Project success as a topic in project management journals. *Project management journal*, 40(4), 6-19.
- Ika, L. A., Diallo, A., & Thuillier, D. (2012). Critical success factors for World Bank projects: an empirical investigation. *International Journal of Project Management*, 30(1), 105-116.
- Islam, M. Z., Doshi, J. A., Mahtab, H. & Ahmad, Z. A. (2009) Team learning, top management support and new product development success. *International Journal of Managing Projects in Business*, 2, 238-260.
- Jarvenpaa, S. L. & Ives, B. (1991) Executive involvement and participation in the management of information technology. *MIS Quarterly*, 205-227.
- Jayaram, J., & Narasimhan, R. (2007). The influence of new product development competitive capabilities on project performance. *Engineering Management, IEEE Transactions on*, 54(2), 241-256.
- Johnson, G., Whittington, R., Scholes, K., & Pyle, S. (2011). *Exploring strategy: text & cases*: Financial Times Prentice Hall.
- Jordan, G., & Segelod, E. (2006). Software innovativeness: outcomes on project performance, knowledge enhancement, and external linkages. *R&D Management*, 36(2), 127-142.
- Karake, Z. A. (1995). The management of information technology, governance, and managerial characteristics. *Information Systems Journal*, 5(4), 271-284.
- Karlsen, J., Gottschalk, P., & Andersen, E. (2002). *Information technology management roles: A comparison of IT executives and IT project managers*. Paper presented at the Proceedings of the 35th Hawaii International Conference on System Sciences.

- Kearns, G. S. (2007). How the internal environment impacts information systems project success: an investigation of exploitative and explorative firms. *Journal of Computer Information Systems*, 48(1), 63-75.
- Kerr, S., Hill, K. D., & Broedling, L. (1986). The first-line supervisor: phasing out or here to stay? *Academy of Management Review*, 11(1), 103-117.
- Kerzner, H. (2006). *Project management: a systems approach to planning, scheduling, and controlling*: Wiley.
- Kim, G., Shin, B., & Grover, V. (2010). Investigating Two Contradictory Views of Formative Measurement in Information Systems Research. *MIS Quarterly*, 34(2).
- Kitzinger, J. (1995). Qualitative research. Introducing focus groups. *BMJ: British Medical Journal*, 311(7000), 299.
- Klein, H. J., Molloy, J. C., & Brinsfield, C. T. (2012). Reconceptualizing workplace commitment to redress a stretched construct: Revisiting assumptions and removing confounds. *Academy of Management Review*, 37(1), 130-151.
- Kor, Y. Y. (2003). Experience-based top management team competence and sustained growth. *Organization Science*, 14(6), 707-719.
- Kotter, J. P. (2010). *General Managers: Simon and Schuster*: New York.
- Koumaditis, K., Themistocleous, M., & Da Cunha, P. R. (2013). SOA implementation critical success factors in healthcare. *Journal of Enterprise Information Management*, 26(4), 343-362.
- Kraut, A. I., Pedigo, P. R., McKenna, D. D., & Dunnette, M. D. (1989). The role of the manager: What's really important in different management jobs. *The Academy of Management Executive*, 3(4), 286-293.
- Krumwiede, D. W., Sheu, C., & Lavelle, J. (1998). Understanding the relationship of top management personality to TQM implementation. *Production and Inventory Management Journal*, 39, 6-10.
- Kurke, L. B., & Aldrich, H. E. (1983). Mintzberg was right!: A replication and extension of the nature of managerial work. *Management Science*, 29(8), 975-984.
- Kvale, S., & Brinkmann, S. (2008). *Interviews: Learning the craft of qualitative research interviewing*: Publisher: Sage.
- Lam, W. (2005). Investigating success factors in enterprise application integration: a case-driven analysis. *European Journal of Information Systems*, 14(2), 175-187.
- Larson, E. W., & Gray, C. F. (2011). *Project Management: The Project Management Process* (5th ed.): McGraw Hill.
- Lau, A. W., & Pavett, C. M. (1980). The nature of managerial work: A comparison of public-and private-sector managers. *Group & Organization Management*, 5(4), 453-466.
- Lau, A. W., Newman, A. R., & Broedling, L. A. (1980). The nature of managerial work in the public sector. *Public Administration Review*, 40(5), 513-520.
- Lawshe, C. H. (1975). A quantitative approach to content validity1. *Personnel Psychology*, 28(4), 563-575.
- Lederer, A. L., & Mendelow, A. L. (1988). Convincing top management of the strategic potential of information systems. *MIS Quarterly*, 12(4), 525-534.
- Lee, G., & Xia, W. (2010). Toward Agile: An Integrated Analysis Of Quantitative And Qualitative Field Data On Software Development Agility. *MIS Quarterly*, 34(1).

- Lee, J. H., Shim, H.-J., & Kim, K. K. (2010). Critical success factors in SOA implementation: an exploratory study. *Information Systems Management*, 27(2), 123-145.
- Lee, J., Elbashir, M. Z., Mahama, H., & Sutton, S. G. (2013). Enablers of top management team support for integrated management control systems innovations. *International Journal of Accounting Information Systems*.
- Leonard-Barton, D., & Deschamps, I. (1988). Managerial influence in the implementation of new technology. *Management Science*, 34(10), 1252-1265.
- Levinson, H., Humphrey, J., Evans, D., & Berry, J. K. (1993). Between CEO and COO [and Executive Commentary]. *The Academy of Management Executive*, 71-83.
- Lewis, W., Agarwal, R. & Sambamurthy, V. (2003) Sources of influence on beliefs about information technology use: An empirical study of knowledge workers. *MIS Quarterly*, 657-678
- Ley, A. (1978). *The chief information officer in higher education: A study in managerial roles*. PhD Dissertation, Michigan State University.
- Li, J., & Harrison, J. R. (2008). Corporate governance and national culture: a multi-country study. *Corporate Governance*, 8(5), 607-621.
- Liang, T.-P., Liu, C.-C., Lin, T.-M., & Lin, B. (2007). Effect of team diversity on software project performance. *Industrial Management & Data Systems*, 107(5), 636-653.
- Lim, C. S., & Mohamed, M. Z. (1999). Criteria of project success: an exploratory re-examination. *International Journal of Project Management*, 17(4), 243-248.
- Lim, J.-H., Stratopoulos, T. C., & Wirjanto, T. S. (2012). Role of IT executives in the firm's ability to achieve competitive advantage through IT capability. *International Journal of Accounting Information Systems*, 13(1), 21-40.
- Lim, J.H., Stratopoulos, T. C., & Wirjanto, T. S. (2013). Sustainability of a firm's reputation for information technology capability: The role of senior IT executives. *Journal of Management Information Systems*, 30(1), 57-96.
- Lin, H. F. (2010). An investigation into the effects of IS quality and top management support on ERP system usage. *Total Quality Management*, 21(3), 335-349.
- Lineman, J. (2006). *The chief information officer in higher education: A study in managerial roles*. PhD Dissertation, Capella University.
- Ling, F. Y. Y., Low, S. P., Wang, S. Q., & Lim, H. H. (2009). Key project management practices affecting Singaporean firms' project performance in China. *International Journal of Project Management*, 27(1), 59-71.
- Lipovetsky, S., Tishler, A., Dvir, D., & Shenhar, A. (1997). The relative importance of project success dimensions. *R&D Management*, 27(2), 97-106.
- Liu, S., Zhang, J., Keil, M., & Chen, T. (2010). Comparing senior executive and project manager perceptions of IT project risk: a Chinese Delphi study. *Information Systems Journal*, 20(4), 319-355.
- Loonam, J., & Donagh, A. C. (2005). Exploring top management support for the introduction of enterprise information systems: a literature review. *Information Sharing in Business*, 163-178.
- Looney, C. A., Valacich, J. S., Todd, P. A., & Morris, M. G. (2006). Paradoxes of online investing: Testing the influence of technology on user expectancies. *Decision Sciences*, 37(2), 205-246.
- Lowry, P. B., Gaskin, J. E., Twyman, N. W., Hammer, B., & Roberts, T. L. (2013). Taking "fun and games" seriously: Proposing the hedonic-motivation system

- adoption model (HMSAM). *Journal of the Association for Information Systems*, 14(11), 617-671.
- Lubatkin, M. H., Ndiaye, M., & Vengroff, R. (1997). The nature of managerial work in developing countries: A limited test of the universalist hypothesis. *Journal of International Business Studies*, 711-733.
- Luthans, F. (1988). Successful vs. effective real managers. *The Academy of management EXECUTIVE*, 2(2), 127-132.
- Luthans, F., Rosenkrantz, S. A., & Hennessey, H. W. (1985). What do successful managers really do? An observation study of managerial activities. *The Journal of Applied Behavioral Science*, 21(3), 255-270.
- MacKenzie, S. B., Podsakoff, P. M., & Podsakoff, N. P. (2011). Construct measurement and validation procedures in MIS and behavioral research: integrating new and existing techniques. *MIS Quarterly*, 35(2), 293-334.
- Magal, S. R., Carr, H. H., & Watson, H. J. (1988). Critical success factors for information center managers. *MIS Quarterly*, 413-425.
- Maguire, S., & Redman, T. (2007). The role of human resource management in information systems development. *Management Decision*, 45(2), 252-264.
- Mahaney, R. C., & Lederer, A. L. (2006). The effect of intrinsic and extrinsic rewards for developers on information systems project success. *Project Management Journal*, 37(4), 42-54
- Mahoney, M. L. (2011). *An Examination of the Determinants of Top Management Support of Information Technology Projects*, PhD Dissertation Stevens Institute of Technology, Castle Point on Hudson: ERIC.
- Malhotra, M. K., & Grover, V. (1998). An assessment of survey research in POM: from constructs to theory. *Journal of Operations Management*, 16(4), 407-425.
- Manfreda, A., & Štemberger, M. I. (2014). Factors causing the relationship gap between top management and IS personnel. *Journal of Enterprise Information Management*, 27(2), 107-121
- Maxwell, J. A. (2012). *Qualitative research design: An interactive approach* (Vol. 41): Sage publications.
- McCall, M. W., Segrist, C. A. (1980). In pursuit of the manager's job: Building on Mintzberg: Center for Creative Leadership.
- McLagan, P. (1988). Top management support. *Training*, May, 25(5), 59-62.
- McLean, E., & Smits, S. (2003). *A Role Model of IS Leadership (Invited Presentation)*. AMCIS 2003 Proceedings, 158.
- Mech, T. (1997). The managerial roles of chief academic officers. *Journal of Higher Education*, 68(3), 282-298.
- Medin, D.L., & Smith, E.E. (1984). Concepts and Concept Formation. *Annual Review of Psychology*, 35, 113-138
- Meng, X., & Gallagher, B. (2012). The impact of incentive mechanisms on project performance. *International Journal of Project Management*, 30(3), 352-362.
- Meredith, J. R., & Mantel Jr, S. J. (2011). *Project management: a managerial approach* (8th edition), John Wiley & Sons, Inc, USA
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*: Sage.
- Milliron, M. (2008). *Management roles and the community college Chief Information Officer*. PhD Dissertation, Arizona State University.
- Mingers, J. (2000). Variety is the spice of life: combining soft and hard OR/MS methods. *International Transactions in Operational Research*, 7(6), 673-691.

- Mingers, J. (2001). Embodying information systems: the contribution of phenomenology. *Information and Organization*, 11(2), 103-128.
- Mintzberg, H. (1970). Structured observation as a method to study managerial work. *Journal of Management Studies*, 7(1), 87-104.
- Mintzberg, H. (1971). Managerial work: analysis from observation. *Management Science*, 18(2), B-97-B-110.
- Mintzberg, H. (1973). *The nature of managerial work*: Harper & Row, New York.
- Mintzberg, H. (1975). *The manager's job: folklore and fact*. Harvard Business Review, 53(4), 49-61.
- Mintzberg, H. (1989). *Mintzberg on management: Inside our strange world of organizations*: Simon and Schuster.
- Mintzberg, H. (1994). Rounding out the manager's job. *Sloan Management Review*, 36, 11-11.
- Mintzberg, H., Raisinghani, D., & Theoret, A. (1976). The structure of "unstructured" decision processes. *Administrative Science Quarterly*, 21(2), 246-275.
- Montgomery, J. D. (1986). Life at the apex: the functions of permanent secretaries in nine Southern African countries. *Public Administration and Development*, 6(3), 211-221
- Morse, J. J., & Wagner, F. R. (1978). Measuring the process of managerial effectiveness. *Academy of Management Journal*, 21(1), 23-35.
- Mount, D. J., & Bartlett, A. L. (1999). The managerial role assessment survey: design and test of an instrument measuring Mintzberg's roles among hotel managers. *Journal of Hospitality & Tourism Research*, 23(2), 160-175
- Müller, R., & Jugdev, K. (2012). Critical success factors in projects: Pinto, Slevin, and Prescott—the elucidation of project success. *International Journal of Managing Projects in Business*, 5(4), 757-775.
- Müller, R., & Turner, J. R. (2007). Matching the project manager's leadership style to project type. *International Journal of Project Management*, 25(1), 21-32.
- Münstermann, B., Eckhardt, A., & Weitzel, T. (2010). The performance impact of business process standardization: An empirical evaluation of the recruitment process. *Business Process Management Journal*, 16(1), 29-56.
- Na, K. S., Li, X., Simpson, J. T., & Kim, K. Y. (2004). Uncertainty profile and software project performance: A cross-national comparison. *Journal of Systems and Software*, 70(1-2), 155-163.
- Na, K. S., Simpson, J. T., Li, X., Singh, T., & Kim, K. Y. (2007). Software development risk and project performance measurement: Evidence in Korea. *Journal of Systems and Software*, 80(4), 596-605
- Nah, F. F. H., Lau, J. L. S., & Kuang, J. (2001). Critical factors for successful implementation of enterprise systems. *Business Process Management Journal*, 7(3), 285-296.
- Nandhakumar, J. (1996). Design for success ?: Critical success factors in executive information systems development. *European Journal of Information Systems*, 5(1), 62-72.
- Neuman, L. W. (2007). *Social Research Methods*, 6/E: Pearson Education India.
- Neuman, W. L. (2000). *Social research methods: Qualitative and quantitative approaches*: Allyn and Bacon (Toronto).
- Newsome, S., Day, A. L., & Catano, V. M. (2000). Assessing the predictive validity of emotional intelligence. *Personality and Individual Differences*, 29(6), 1005-1016.

- Ngwenyama, O., & Nørbjerg, J. (2010). Software process improvement with weak management support: an analysis of the dynamics of intra-organizational alliances in IS change initiatives. *European Journal of Information Systems*, 19(3), 303-319.
- Nidumolu, S. (1995). The effect of coordination and uncertainty on software project performance: residual performance risk as an intervening variable. *Information Systems Research*, 6(3), 191-219.
- Nidumolu, S. R. (1996). Standardization, requirements uncertainty and software project performance. *Information & Management*, 31(3), 135-150.
- Odusami, K., Iyagba, R., & Omirin, M. (2003). The relationship between project leadership, team composition and construction project performance in Nigeria. *International Journal of Project Management*, 21(7), 519-527.
- Ofori, D. F. (2013). Project management practices and critical success factors-A developing country perspective. *International Journal of Business & Management*, 8(21), 14-31.
- Olie, R., van Iterson, A., & Simsek, Z. (2012). When do CEOs versus top management teams matter in explaining strategic decision-making processes? *International Studies of Management and Organization*, 42(4), 86-105.
- Olson, E. M., Walker Jr, O. C., Ruekerf, R. W., & Bonnerd, J. M. (2001). Patterns of cooperation during new product development among marketing, operations and R&D: Implications for project performance. *Journal of Product Innovation Management*, 18(4), 258-271.
- Osigweh, C. A. B. (1989). Concept fallibility in organizational science. *Academy of Management Review*, 14(4), 579-594.
- Oswick, C., Fleming, P., & Hanlon, G. (2011). From borrowing to blending: Rethinking the processes of organizational theory building. *Academy of Management Review*, 36(2), 318-337.
- Paolillo, J. G. P. (1987). Role profiles for managers in different functional areas. *Group & Organization Management*, 12(1), 109-119.
- Papke-Shields, K. E., Beise, C., & Quan, J. (2010). Do project managers practice what they preach, and does it matter to project success? *International Journal of Project Management*, 28(7), 650-662.
- Parolia, N., Goodman, S., Li, Y., & Jiang, J. J. (2007). Mediators between coordination and IS project performance. *Information & Management*, 44(7), 635-645.
- Pautasso, M. (2013). Ten Simple Rules for Writing a Literature Review. *PLoS Computational Biology*, 9(7), e1003149.
- Pavett, C. M. (1984). Managerial education and the real world: Foundations for designing educational tools. *Developments in Business Simulation & Experiential Exercises*, 11, 68-71.
- Pavett, C. M., & Lau, A. W. (1983). Managerial work: The influence of hierarchical level and functional specialty. *The Academy of Management Journal*, 26(1), 170-177.
- Perry, C. (1998). A structured approach for presenting theses. *Australasian Marketing Journal (AMJ)*, 6(1), 63-85.
- Petter, S., Straub, D., & Rai, A. (2007). Specifying formative constructs in information systems research. *MIS Quarterly*, 31(4), 623-656.
- Pinsonneault, A., & Rivard, S. (1998). Information technology and the nature of managerial work: from the productivity paradox to the Icarus paradox? *MIS Quarterly*, 22(3), 287-311.

- Pinto, J. K., & Covin, J. G. (1989). Critical factors in project implementation: a comparison of construction and R&D projects. *Technovation*, 9(1), 49-62.
- Pinto, J. K., & Mantel Jr, S. J. (1990). The causes of project failure. *Engineering Management, IEEE Transactions on*, 37(4), 269-276.
- Pinto, J. K., & Prescott, J. E. (1988). Variations in critical success factors over the stages in the project life cycle. *Journal of Management*, 14(1), 5-18.
- Pinto, J. K., & Slevin, D. P. (1988). Project success: definitions and measurement techniques. *Project Management Journal*, 19(1), 67-72.
- PMBOK®Guide. (2008). *Guide to the project Management body of knowledge*. Project Management Institute, Pennsylvania USA.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879.
- Poon, P., & Wagner, C. (2001). Critical success factors revisited: success and failure cases of information systems for senior executives. *Decision Support Systems*, 30(4), 393-418.
- Procaccino, J. D., & Verner, J. M. (2006). Software project managers and project success: An exploratory study. *Journal of Systems and Software*, 79(11), 1541-1551.
- Radner, R. (1992). Hierarchy: The economics of managing. *Journal of Economic Literature*, 30(3), 1382-1415.
- Raghunathan, T. S. (1992). Impact of the CEO's participation on information systems steering committees. *Journal of Management Information Systems*, 8(4), 83-96.
- Ragu-Nathan, B. S., Apigian, C. H., Ragu-Nathan, T. S., & Tu, Q. (2004). A path analytic study of the effect of top management support for information systems performance. *Omega*, 32(6), 459-471.
- Rahab, Sulistyandari, & Sudjono. (2011). The development of innovation capability of small medium enterprises through knowledge sharing process: An empirical study of Indonesian creative industry. *International Journal of Business and Social Science*, 2(21), 112-123.
- Rai, A., Maruping, L. M., & Venkatesh, V. (2009). Offshore information systems project success: The role of social embeddedness and cultural characteristics. *MIS Quarterly*, 33(3), 617-641.
- Ram, J., Corkindale, D., & Wu, M.-L. (2013). Implementation critical success factors (CSFs) for ERP: Do they contribute to implementation success and post-implementation performance? *International Journal of Production Economics*, 144(1), 157-174.
- Ramamurthy, K. & Premkumar, G. (1995) Determinants and outcomes of electronic data interchange diffusion. *Engineering Management, IEEE Transactions on*, 42, 332-351.
- Reel, J. S. (1999). Critical success factors in software projects. *Software, IEEE*, 16(3), 18-23.
- Reichelt, K., & Lyneis, J. (1999). The dynamics of project performance: Benchmarking the drivers of cost and schedule overrun. *European Management Journal*, 17(2), 135-150.
- Remus, U., & Wiener, M. (2010). A multi method, holistic strategy for researching critical success factors in IT projects. *Information Systems Journal*, 20(1), 25-52.

- Rockart, J. F. (1979). Critical success factors. *Harvard Business Review*, 57(2), 81-91.
- Rockart, J. F. (1982). The changing role of the information systems executive: A critical success factors perspective. *Sloan Management Review*, 24(1), 3-13.
- Rockart, J. F. (1988). The Line Takes the Leadership-IS Management in a Wired Society. *Sloan Management Review*, Summer 1988, 57-64.
- Ross, J. W., Beath, C. M., & Goodhue, D. L. (1996). Develop long-term competitiveness through IT assets. *Sloan Management Review*, 38(1), 31-42.
- Sabherwal, R., & Tsoumpas, P. (1993). The development of strategic information systems: some case studies and research proposals. *European Journal of Information Systems*, 2(4), 240-259.
- Sabherwal, R., Jeyaraj, A., & Chowa, C. (2006). Information system success: Individual and organizational determinants. *Management Science*, 52(12), 1849-1864.
- Sambamurthy, V., & Zmud, R. W. (1999). Arrangements for information technology governance: a theory of multiple contingencies. *MIS Quarterly*, 23(2), 261-290.
- Sartori, G. (1970). Concept misformation in comparative politics. *The American Political Science Review*, 64(4), 1033-1053.
- Savolainen, P., Ahonen, J. J., & Richardson, I. (2012). Software development project success and failure from the supplier's perspective: A systematic literature review. *International Journal of Project Management*, 30(4), 458-469.
- Scandura, T. A., & Williams, E. A. (2000). Research methodology in management: Current practices, trends, and implications for future research. *Academy of Management Journal*, 43(6), 1248-1264.
- Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online*, 8(2), 23-74.
- Schultz, R. L., Slevin, D. P., & Pinto, J. K. (1987). Strategy and tactics in a process model of project implementation. *Interfaces*, 17(3), 34-46.
- Schwalbe, K. (2007). *Information technology project management* (5th ed.): Thomson Course Technology.
- Scudder, J. N., & Guinan, P. J. (1989). Communication competencies as discriminators of superiors' ratings of employee performance. *Journal of Business Communication*, 26(3), 217-229.
- Segev, E. (1987). Strategy, strategy- making, and performance in a business game. *Strategic Management Journal*, 8(6), 565-577.
- Seidman, I. (2012). *Interviewing as qualitative research: A guide for researchers in education and the social sciences*: Teachers College Press.
- Sethi, V., & King, W. R. (1991). Construct measurement in information systems research: an illustration in strategic systems. *Decision Sciences*, 22(3), 455-472.
- Shapira, Z., & Dunbar, R. L. (1980). Testing Mintzberg's managerial roles classification using an in-basket simulation. *Journal of Applied Psychology*, 65(1), 87-95.
- Sharma, R., & Yetton, P. (2003). The contingent effects of management support and task interdependence on successful information systems implementation. *MIS Quarterly*, 27(4), 533-556

- Shaul, L., & Tauber, D. (2013). Critical success factors in enterprise resource planning systems: Review of the last decade. *ACM Computing Surveys (CSUR)*, 45(4), 55.
- Shenhar, A. J., Dvir, D., Levy, O., & Maltz, A. C. (2001). Project success: A multidimensional strategic concept. *Long Range Planning*, 34(6), 699-725.
- Shenhar, A. J., Tishler, A., Dvir, D., Lipovetsky, S., & Lechler, T. (2002). Refining the search for project success factors: a multivariate, typological approach. *R&D Management*, 32(2), 111-126.
- Shenhar, A., Dvir, D., & Levy, D. (1997). Mapping the dimensions of project success. *Project Management Journal*, 28(2), 5-13.
- Sicotte, H., & Langley, A. (2000). Integration mechanisms and R&D project performance. *Journal of Engineering and Technology Management*, 17(1), 1-37.
- Smithson, S. (1991). Combining different approaches. *Information Systems Research: Contemporary Approaches and Emergent Traditions*, 365-369.
- Somers, T. M., & Nelson, K. G. (2004). A taxonomy of players and activities across the ERP project life cycle. *Information & Management*, 41(3), 257-278.
- Standish Group (2013). CHAOS Activity News. 8. Retrieved 12 Mar. 2014 from http://www.standishgroup.com/chaos_news/newsletter.php?id=54
- Standish, (2009). The CHAOS Report. Standish Group International
- Štemberger, M. I., Manfreda, A., & Kovačič, A. (2011). Achieving top management support with business knowledge and role of IT/IS personnel. *International Journal of Information Management*, 31(5), 428-436.
- Stephens, C. S., Ledbetter, W. N., Mitra, A., & Ford, F. N. (1992). Executive or functional manager? The nature of the CIO's job. *MIS Quarterly*, 16(4), 449-467.
- Stewart, R. (1975). The manager's job: Discretion vs. demand. *Organizational Dynamics*, 2(3), 67-80.
- Straub, D. W. (1989). Validating instruments in MIS research. *MIS Quarterly*, 13(2), 147-169
- Subramanian, G. H., Jiang, J. J., & Klein, G. (2007). Software quality and IS project performance improvements from software development process maturity and IS implementation strategies. *Journal of Systems and Software*, 80(4), 616-627.
- Sumner, M. (1999). *Critical success factors in enterprise wide information management systems projects*. Paper presented at the Proceedings of the 1999 ACM SIGCPR Conference on Computer Personnel Research.
- Sutterfield, J., Friday-Stroud, S. S., & Shivers-Blackwell, S. L. (2006). A case study of project and stakeholder management failures: lessons learned. *Project Management Journal*, 37(5), 26-35.
- Sutton, S. G., & Arnold, V. (2013). Focus group methods: Using interactive and nominal groups to explore emerging technology-driven phenomena in accounting and information systems. *International Journal of Accounting Information Systems*, 14(2), 81-88.
- Swink, M. (2000). Technological innovativeness as a moderator of new product design integration and top management support. *Journal of Product Innovation Management*, 17(3), 208-220.
- Tai, L., & Phelps, R. (2000). CEO and CIO perceptions of information systems strategy: Evidence from Hong Kong. *European Journal of Information Systems*, 9(3), 163-172.

- Teo, T. S. H., & Ang, J. S. K. (1999). Critical success factors in the alignment of IS plans with business plans. *International Journal of Information Management*, 19, 173-186.
- Teo, T. S. H., & King, W. R. (1997). Integration between business planning and information systems planning: an evolutionary-contingency perspective. *Journal of Management Information Systems*, 14(1), 185-214.
- The Australian and New Zealand Standard Industrial Classification (ANZSIC). 2006. Australian Bureau of Statistics
- Thite, M. (2000). Leadership styles in information technology projects. *International Journal of Project Management*, 18(4), 235-241.
- Thomas, J., Delisle, C. L., Jugdev, K., & Buckle, P. (2002). Selling project management to senior executives: The case for avoiding crisis sales. *Project Management Journal*, 33(2), 19-28.
- Tiwana, A., Wang, J., Keil, M., & Ahluwalia, P. (2007). The bounded rationality bias in managerial valuation of real options: Theory and evidence from IT projects. *Decision Sciences*, 38(1), 157-181.
- Tornow, W. W., & Pinto, P. R. (1976). The development of a managerial job taxonomy: A system for describing, classifying, and evaluating executive positions. *Journal of Applied Psychology*, 61(4), 410.
- Torrington, D., & Weightman, J. (1987). Middle management work. *Journal of General Management*, 13(2), 74-89.
- Trinka, J. A. (2005). What's a manager to do? *Industrial and Commercial Training*, 37(3), 154-159.
- Tsui, A. S. (1984). A role set analysis of managerial reputation. *Organizational Behavior and Human Performance*, 34(1), 64-96.
- Tsui, A. S., & Ohlott, P. (1988). Multiple assessment of managerial effectiveness: Interrater agreement and consensus in effectiveness models. *Personnel Psychology*, 41(4), 779-803.
- Turner, J. R. (1993). *The handbook of project-based management: improving the processes for achieving strategic objectives*: McGraw-Hill Book Co.
- Turner, J. R., & Müller, R. (2004). Communication and co-operation on projects between the project owner as principal and the project manager as agent. *European Management Journal*, 22(3), 327-336.
- Van de Ven, A. H. (2007). *Engaged Scholarship: A guide for organizational and social research*: A guide for organizational and social research: Oxford University Press.
- Van de Ven, A. H., & Delbecq, A. L. (1974). The effectiveness of nominal, Delphi, and interacting group decision making processes. *The Academy of Management Journal*, 17(4), 605-621.
- Varajão, J., Trigo, A., Bulas-Cruz, J., & Barroso, J. (2008). Biggest barriers to effectiveness in CIO role in large Portuguese companies. *Emerging Technologies and Information Systems for the Knowledge Society*, 479-488.
- Vasdekis, V. G., Cagnone, S., & Moustaki, I. (2012). A composite likelihood inference in latent variable models for ordinal longitudinal responses. *Psychometrika*, 77(3), 425-441.
- Venkatesh, V., Brown, S. A., & Bala, H. (2013). Bridging the Qualitative-Quantitative Divide: Guidelines for Conducting Mixed Methods Research in Information Systems. *MIS Quarterly*, 37(1), 21-54.

- Viswesvaran, C., Deshpande, S. P., & Joseph, J. (1998). Job satisfaction as a function of top management support for ethical behavior: A study of Indian managers. *Journal of Business Ethics*, 17(4), 365-371.
- Wallace, L., & Keil, M. (2004). Software project risks and their effect on outcomes. *Communications of the ACM*, 47(4), 68-73.
- Wallace, L., Keil, M., & Rai, A. (2004). How software project risk affects project performance: An investigation of the dimensions of risk and an exploratory model*. *Decision Sciences*, 35(2), 289-321.
- Wang, E. T. G., Chen, H. H. G., Jiang, J. J., & Klein, G. (2005). Interaction quality between IS professionals and users: Impacting conflict and project performance. *Journal of Information Science*, 31(4), 273.
- Wasmund, M. (1993). Implementing critical success factors in software reuse. *IBM Systems Journal*, 32(4), 595-611.
- Watts, D. (2001). CEO's role in IT-driven organizational change. *Journal of Information Technology Theory and Application (JITTA)*, 3(3), 44-55.
- Weber, R. (2004). Editor's comments: The rhetoric of positivism versus interpretivism: a personal view. *MIS Quarterly*, 28(1), iii-xii.
- Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare. *MIS Quarterly*, 26(2), 13-23.
- Westerveld, E. (2003). The Project Excellence Model®: linking success criteria and critical success factors. *International Journal of Project Management*, 21(6), 411-418.
- Williams, J. J., & Ramaprasad, A. (1996). A taxonomy of critical success factors. *European Journal of Information Systems*, 5(4), 250-260.
- Williamson, D.J. (2011), *A correlational study assessing the relationships among information technology project complexity, project complication, and project success*, PhD Dissertation, Capella University.
- Wohlin, C., & Andrews, A. A. (2001). Assessing project success using subjective evaluation factors. *Software Quality Journal*, 9(1), 43-70.
- Wright, K., & Capps, C. (2011). A survey of information systems development project performance. *Academy of Information & Management Sciences Journal*, 14(1), 87-105
- Wu, J. H., Chen, Y. C., & Lin, H. H. (2004). Developing a set of management needs for IS managers: A study of necessary managerial activities and skills. *Information & Management*, 41(4), 413-429.
- Wu, J. H., Shen, W. S., Lin, L. M., Greenes, R. A. & Bates, D. W. (2008) Testing the technology acceptance model for evaluating healthcare professionals' intention to use an adverse event reporting system. *International Journal for Quality in Health Care*, 20(2), 123-129.
- Yang, L. R., Chen, J. H., & Wang, H. W. (2012). Assessing impacts of information technology on project success through knowledge management practice. *Automation in Construction*, 22, 182-191
- Yang, L.-R., Huang, C.-F., & Wu, K.-S. (2011). The association among project manager's leadership style, teamwork and project success. *International Journal of Project Management*, 29(3), 258-267.
- Yap, C. S., Soh, C. P. P., & Raman, K. S. (1992). Information systems success factors in small business. *Omega*, 20(5-6), 597-609.
- Yetton, P., Martin, A., Sharma, R., & Johnston, K. (2000). A model of information systems development project performance. *Information Systems Journal*, 10(4), 263-289.

- Young, R., & Jordan, E. (2008). Top management support: Mantra or necessity? *International Journal of Project Management*, 26(7), 713-725.
- Young, R., & Poon, S. (2013). Top management support—almost always necessary and sometimes sufficient for success: Findings from a fuzzy set analysis. *International Journal of Project Management*, 31(7), 943-957
- Yukl, G., & Mahsud, R. (2010). Why flexible and adaptive leadership is essential. *Consulting Psychology Journal: Practice and Research*, 62(2), 81-93.
- Zwikael, O. (2008a). Top management involvement in project management: A cross country study of the software industry. *International Journal of Managing Projects in Business*, 1(4), 498-511.
- Zwikael, O. (2008b). Top management involvement in project management: Exclusive support practices for different project scenarios. *International Journal of Managing Projects in Business*, 1(3), 387-403.
- Zwikael, O., Levin, G., & Rad, P. F. (2008). Top Management Support: The Project Friendly Organization. *Cost Engineering*, 50(9), 22-30.

APPENDIX A

A.1: Behaviour Based TMS Definitions - Appended

Table A. 1: Top management Support definitions in chronological order

TMS definitions in literature	Key Activities
<i>".... top management's attendance of project meetings; weekly visits to the project office; replying to emails within a day; reading and commenting on project progress reports; meeting the project director and project management; attending project events; promoting the project in meetings and through direct mentioning by informants "</i> (Elbanna, 2013, p. 284)	Attend meetings Visit project office Respond to issues Attend events Promote the project
Top management provision of financial and organisational resources, advocates for and acts on behalf of the venture. Provides valuable knowledge, expertise, and legitimacy to fledgling ventures. Incorporates rules, processes, and procedures, and resolve conflicts and creates a facilitative environment for the venture's ultimate success. (Garrett & Neubaum, 2013).	Provide resources Acts on behalf of the venture Provide knowledge Provide expertise Provide legitimacy Lay the necessary infrastructure for the venture Resolve conflict
<i>"Provision of financial, material and human resource. Structural arrangements. Establishes and enforces a project structure, and an adapted organizational structure that is receptive to the new system. "</i> (Boonstra, 2013, p. 504).	Provide resources Establish and operationalise structures
Provides the required resources, leadership, supervision, and control. (Hwang & Schmidt, 2011).	Provides resources Provides leadership Provides supervision and control.
<i>"the degree to which top management understands the importance of the ERP system and the extent to which top management is involved in ERP implementation"</i> (Lin,2010, p. 339)	Involve Refer information (to understand)
<i>"refers to the amount of support given by top management to the new product development (NPD) project. Top management support can be made visible in a variety of ways: by acting as an executive sponsor, helping a team to surmount obstacles, providing encouragement to a team, maintaining open channels of communication with people involved in NPD, streamlining decision-making processes, and providing adequate capital and human resources"</i> (Carbonell & Rodríguez-Escudero, 2009, p. 30)	Be an executive sponsor Help overcome problems Provide encouragement Open channels of communication Provide resources Streamline decision making
<i>"Top Management Support can take several different forms such as demonstrating commitment, helping teams to overcome obstacles, making things happen, and providing encouragement"</i> (Islam et al.,2009; p. 260)	Demonstrate Commitment Help teams Make things happen Provide encouragement
Willingness to assign additional people to the project, readiness to modify the cash flow, and tolerance of unusual effects that the project might have on the organisation. TMS is also resources that are available for project manager as part of the strategic view of the organisation (Zwikael, Levin, & Rad, 2008).	Make resources available, Allow additional people to the project, Modify cash flow if necessary, Tolerate unusual effects
<i>"1.Appropriate Project manager (PM) assignment 2. Communication between the PM and the organization 3.Existence of project success measurement</i>	Each step is taken as representing

TMS definitions in literature	Key Activities
4.Existences of interactive inter departmental project groups 5.Organisational projects resource planning 6. Use of standard project management software” (Zwikael, 2008a; 2008b, p. 509).	an activity.
“Devoting time to the IS program in proportion to its cost and potential, reviewing plans, following up on results, and facilitating the management of problems involved with integrating ICT with the management process of the business” (Young & Jordan, 2008, p. 715).	Devote time, Review plans, Follow up on results, Integrating ICT with the business management
“perceived level of general support offered by top management”. (Wu et al., 2008, p. 124)	Perceived general support
“Devoting time to the IS program in proportion to its cost and potential, reviewing plans, following up on results, and facilitating the management of problems involved with integrating ICT with the management process of the business” (Young & Jordan, 2008, p. 715).	Devote time, Review plans, Follow up on results, Integrating ICT with the business management
“the degree to which management creates a facilitative climate of support, trust, and helpfulness on performance” (Akgün et al., 2007, p. 630)	Facilitate support, trust and help
Taking action on request, assisting in conflict resolution, and providing continuous feedback (Kerzner, 2006).	Conflict resolution, Continuous feedback
“the senior executives favorable attitude toward, and explicit support for ISs. Facilitating conditions for ISs reflect the processes and resources that facilitate an individual’s ability to utilise information systems”. (Sabherwal et al., 2006, p. 1853)	Provide facilitating conditions
Providing a strong business case, clear business objectives, alignment to business, objective and direction, alignment to IT strategy (Lam,2005)	Providing a strong business case Provide clear business objectives Align IT strategy to business objective Provide direction
“the explicit and active support of the top management towards the introduction and development of new information technology”. (Bruque-Cámara et al., 2004, p.138)	Explicit and active support
“the degree to which top management understands the importance of the IS function and the extent to which it is involved in IS activities”. (Ragu-Nathan et al., (2004, p. 462)	Involve in activities
“Willingness of top management to provide the necessary resources and authority/power for project success” (Belout & Gauvreau, 2004, p. 3)	Provide resources Provide power
Provide resource, symbolic actions of support (Sharma & Yetton, (2003).	Provide resource, Symbolic actions of support
“...extent to which top management intends to pursue business process improvement initiatives and is willing to commit the necessary resources for the development and maintenance of IS networks”. (Bhatt & Stump,2001, p. 35)	Pursue business process improvements Provide resources
“...the extent to which firm’s top corporate management involves and participates in EIS efforts. Top management must play an active role in EIS efforts as their sponsorship and support is critical for success”. (Bajwa et al.,1998, p. 34)	Participate in Systems efforts Involve in systems efforts
“Management support refers to the perceived level of general support offered by top management in small firms” (Igbaria et al., 1997, p. 289)	General support offered
"management support, includes top management encouragement and allocation	Encouragement

TMS definitions in literature	Key Activities
<i>of resources."</i> (Guimaraes & Igbaria, 1997, p. 859)	Allocation of resources
<i>"The extent to which the support was available in terms of equipment selection, hardware difficulties, software difficulties and specialized instruction"</i> (Compeau & Higgins, 1995, p. 197)	Provide resources
<i>"Active involvement and support of top management is capable of providing the appropriate strategic vision and direction besides sending signals to the various parts of the organization about the importance of the (EDI) innovation project".</i> (Ramamurthy & Premkumar, 1995, p. 337)	Provide strategic vision Communicate importance about the project
Providing the money and commitment to operate the company effectively. Involvement, exercised by understanding the complexities of functions and facilitating training for the staff. Also providing leadership (Correll, 1994).	Commitment, Providing Resources, Involvement, Leadership
Top manager promoting the issue-selling behavior of the middle management; also increasing the positive consequences, while minimising negative consequences (Dutton & Ashford, 1993).	Promoting Issue selling
<i>"In this article, we use executive support to encompass both participation and involvement, but..... we consider participation and involvement to be two distinct constructs"</i> (Jarvenpaa & Ives, 1991, p. 206)	Participation Involvement
<i>"Insisting on a training strategy, including training in projects, insisting on involvement, asking for cost benefit analysis, sustain commitment and providing links"</i> (McLagan, 1988, pp. 59-61).	Insist on training strategy, Insist on training in projects, Analyse costs & benefits, Sustain commitment, Provide useful links
Becoming involved in decisions about project issues, monitoring project progress, facilitating information flows to the project and generally showing supportive behavior (Green, 1995; Pinto & Slevin, 1988).	Involvement in project decisions, Monitoring progress, Facilitating information flow

A.2: Project Outcome Notions - Appended

Table A.2: Dimensions specified in some Project Performance / Project Success notions in chronological order

Study	Iron Triangle	Quality	Customer Satisfaction	Contractor Satisfaction	Micro & macro	Overall Product	Profit	Positive Project Outcome	Team Satisfaction	Effectiveness	Learning	Team Performance	Organisational Performance	Efficiency	Success (PS) / Performance(PP)
Di Vincenzo and Mascia, 2011		√					√								PP
Huang and Li, (2011)	√	√						√						Task	PP
Yang et al., (2012)	Cost Time	√				Safety									PS
Chang et al., (2011)	Cost Time	√						√		√				√	PP
Ghapanchi et al., (2011)										√				√	PS
Rai et al., (2009)	Cost		√												PS
Barclay, (2008)	√	√	√				√		√	√	√				PP
Jayaram and Narasimhan, (2007)	Cost Time	√					Business	Technical							PP
Subramanian et al., (2007)	Cost Time							√							PP

Study	Iron Triangle	Quality	Customer Satisfaction	Contractor Satisfaction	Micro & macro	Overall Product	Profit	Positive Project Outcome	Team Satisfaction	Effectiveness	Learning	Team Performance	Organisational Performance	Efficiency	Success (PS) / Performance(PP)
Parolia et al., (2007)	√	√						√							PP
Han and Huang, (2007)	√	√	√			Maintain Reliable									PP
Gemino et al., (2007)	Time Budget	√	√												PP
Jordan and Segelod, (2006)					Reputation		√				√				PP
Beck et al., (2006)	√	√						Goals							PP
Sabherwal et al., (2006)		√	√												System use
Wang et al., (2005)	Cost Time	√						√							PP
Gemünden et al., (2005)	Time Budget	√													PS
Odusami et al., (2003)	Cost Time		√							√					PP
Wallace et al., (2004)	√	√	√			Maintain									PP
Dai and Wells, (2004)	√												√		PP
Na et al., (2004)	√												√		PP
Bonner et al., (2002)	√					√						√			PP

Study	Iron Triangle	Quality	Customer Satisfaction	Contractor Satisfaction	Micro & macro	Overall Product	Profit	Positive Project Outcome	Team Satisfaction	Effectiveness	Learning	Team Performance	Organisational Performance	Efficiency	Success (PS) / Performance(PP)
Howell and Sheab, (2001)	√	√											√		PP
Olson et al., (2001)	√	√	√				Sales								PP
Yetton et al., (2000)	√							√							PP
Sicotte and Langley, (2000)	√	√					√	√							PP
Reichelt and Lyneis, (1999)	√	√													PP
Baccarini, (1999)	√	√	√			√									PS
Lim and Mohamed, (1999)					√										PS
Glass, (1999)						√			√						PS
Atkinson, (1999)	√	√	√	√			√		√	√			√	Product	PS
Lipovetsky et al., (1997)	√		√	√											PS
Cooper and Kleinschmidt, (1987)		√	√	√		√									Product success

APPENDIX B

B.1: Case Information from the Interview Method

Case 1

The organisation (1) is a campus, with own software development centre that uses company standards. They develop software for internal and external customers. The development centre consists of 14 developers, 2 developers were dedicated to the project and 1-2 quality assurance engineers were made available as per the need. The application system developed in the project was for online tea auctioning. The project was given priority by the top management. The project was seen as a success because the customer was satisfied. The scope and budget of the project were met. However, the time frame had to be revised but was accepted by the customer. In this case the PM and a key project member were interviewed.

Case 2

The organisation (2) is a software development centre with many specialised areas branching out as departments. They develop software for external customers. The product strategy is to market a core product and bridge the gap between new customer requirements and the product. Upon a business opportunity a project is employed for this purpose. The project was for the very first foreign customer and was prioritised. The organisation has around one thousand (1000) developers employed. This project had 15 dedicated developers. Separate quality assurance was carried out with the involvement of 4 people. Implementation was done by 5 engineers. The application developed was to assist activities based on insuring people and assets. The project was declared a success; the top manager describes meeting the customer requirements one hundred percent. The customer has returned for new business and is now a reference site. The project constraints for scope, cost and budget were met. The organisation has level 4 certification in Software Engineering Institute's (SEI) Capability Maturity Model Integrated (CMMI) and has also obtained certification by International standards organisation (ISO 9001:2000). The information was retrieved by interviewing the PM of the project and the departmental manager.

Case 3

This is the software development department of a mobile service provider (organisation 3). This software department consists of 35 employees and is the customer. The project was launched when the mobile service provider was switching mobile platforms, which is a rare occurrence. In order to provision the system to the new software environment the mobile service provider and the vendor had to work together on one project. This project is a model example for involvement of multiple stakeholders. In its development phase alone four (4) parties were involved, those being the supplier (with 4 developers), in-house developers (with 3-4 developers), telecom engineers, marketing and customer care. The project was declared a success by the customer. Project manager said that the functional requirements and the time, cost and quality constraints were met. The PM and the departmental manager were interviewed to gather data about this case.

Case 4

The organisation is a highly reputed software development centre. They are CMMI level 4 certified and have a large employee base, i.e. over 3500. The project concerned, handles requests at disaster situations and then handles bills and payments related to the actions taken on those requests. The product was for a foreign customer. This involved 12 developers and 3 quality assurance (QA) engineers. The project was declared a success, primarily because the customer was happy and the internal constraints such as time, cost and scope were met. The organisation also has metrics to monitor a project. These indexes are chosen by the management at project initiation. The operations manager defined the project success as acceptance of the product by the customer, smooth rollout of the production system, high value on the client score card and repeated business with the customer. In this case the PM and the operations manager were interviewed.

Case 5

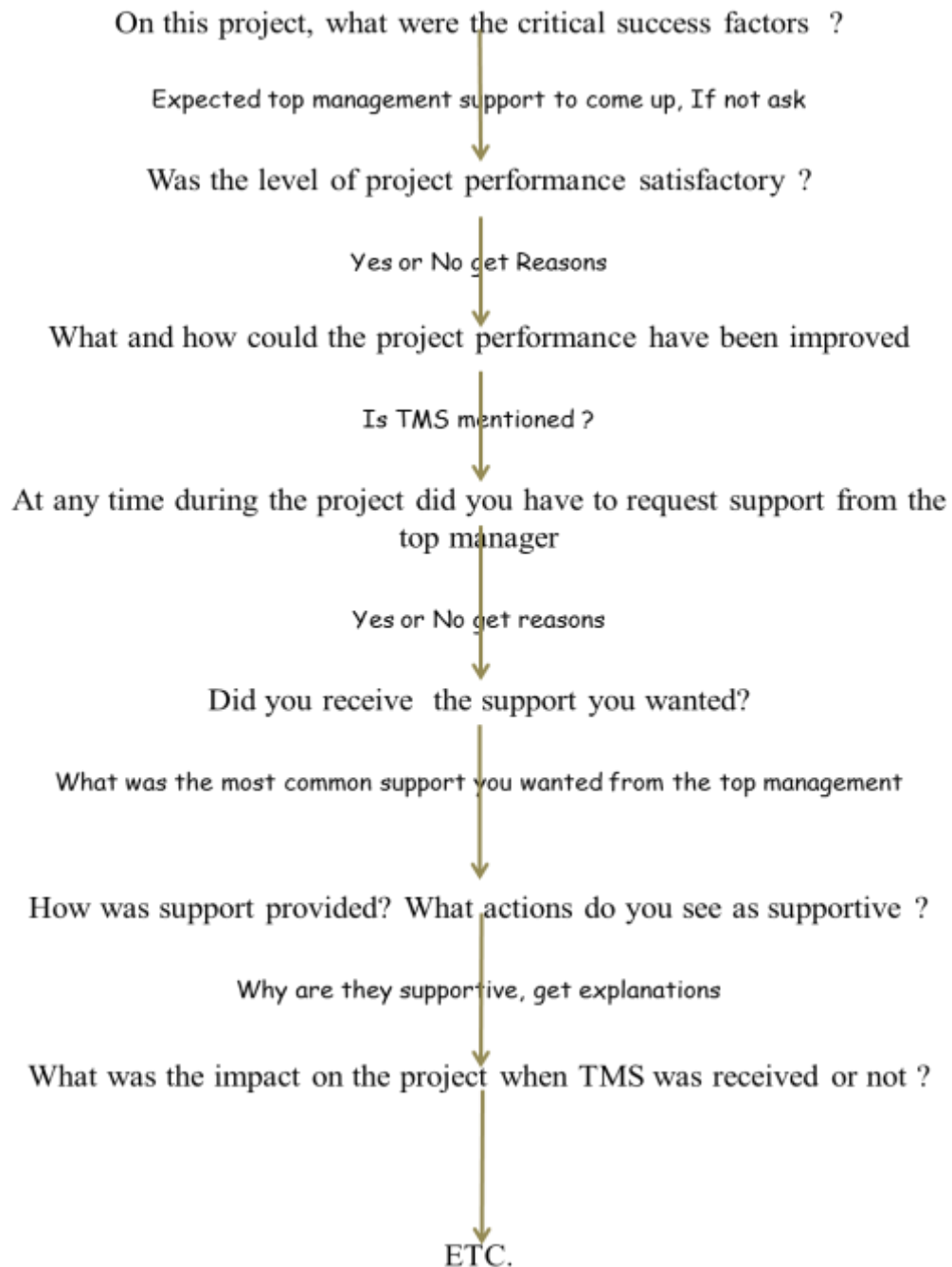
This project is from the same organisation as Case 4; i.e organisation number four (4). The project concerned is a document retention management system. The project manager spoken to was also a senior consultant for delivery, i.e. a higher level manager playing the role of project manager. The project involved 10 developers and 2-3 QA engineers. The project was declared a failure from the customer satisfaction perspective. However the performing organisation's requirements had been met and it was mentioned to be a highly profitable one. Since the PM was also a senior manager in this case a key team member was interviewed for further information.

Case 6

This organisation (5) is an offshore software development centre with the head office in the United States of America. At the time the interviews were conducted they were on the verge of obtaining CMMI level 3. The organisation has around fifty (50) employees, 5 developers were involved in the project. The product is an online stock trading system. The project spoken of had much success in all areas. It had met time, scope, cost and customer satisfaction. This project reported a high level of user participation and support and the director gave much credit to the customer. The director of the company named it as one of their most successful projects. The product was claimed to be very robust that it was later sold to other companies. For the data gathering the PM and the director of the off-shore development centre were interviewed.

B.2: Material Used in the Interview & Focus Group Methods

Interviews: A segment of the semi-structured questions



Interviews: A sample of a supporting questionnaire

Directions

- This questionnaire consists of sections A and B. Both sections need to be completed.
- Please select a recently *completed* project of your choice for the purpose of the questionnaire.
- Questionnaire is to be completed by the Project Manager, of the project being discussed, however; he or she could get input from key team members.
- Please note that a short interview will be conducted to supplement the questionnaire
- Your input for all questions are required and welcomed.

Section A **Critical Success Factors**

1. General Project Information

- 1.1 Name of the project
- 1.2 Business Type eg banking / aviation / payroll
- 1.3 Estimated Project Duration
- 1.4 Estimated Cost (approximately)
- 1.5 Planned Start Date
- 1.6 Actual Start Date
- 1.7 Planned End Date
- 1.8 Actual End Date

Clarify GSM Provisioning System
Telecom
2 months
04-09-03
04-09-03
03-11-03
03-12-03

1.9 Additional Information (optional)

This project was aimed at developing the GSM service provisioning system for Mobil, when they launch their GSM network, by Clarify.

2. How would you rate the importance of the critical success factors given below for the success of the project?

Please choose the number of your choice and enter in the view column.

1	2	3	4	5
Very Low Importance	Below Average	Average	Above average	Very High Importance

	Factor	View
3.	User Involvement	5
	Executive Support	4
1.	Clear Business Objective	5
	Optimizing Scope	5
	Agile Process	4
	Project Management Expertise	4
	Financial Management	3
	Skilled Resources	4
	Formal Project Methodology	3
	Formal Software Development Methodology	3
	Use of Project Management Software	4
	A responsive IT Infrastructure	4
	Ownership	5
	Performance Measurement System	4
	Use of Matrices to keep project on track	4
	Use of Project Management Software	4
	Keeping the team morale high	4
	Cross functional Team collaboration	5
	User centred Design	5
	Continuous development of IS Resources	4

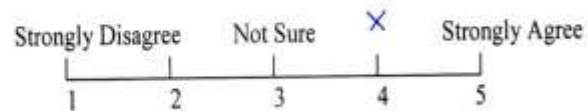
3. Please write down any others which you think are critical to your project in the order of importance.

	Factor
2.	Periodic Review of the status of the project
4.	Timely Completion
	Formal Testing - UAT, Integrated
	Formal Signing off. (Requirement, UAT, etc)

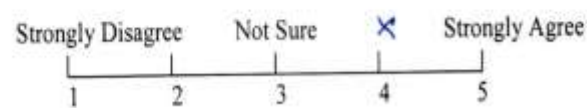
Section B
Project Success

From question 4 – 25 please mark “X” on your choice.

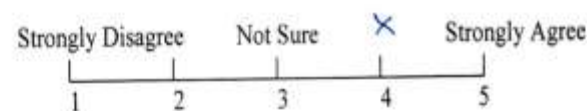
4. The project met the schedule baseline



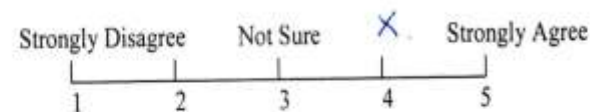
5. The project was completed within the agreed budget.



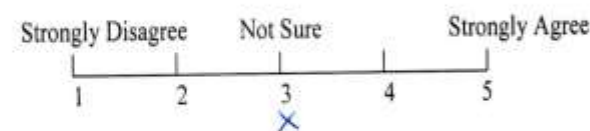
6. The product quality was approved by the quality assurance team/department



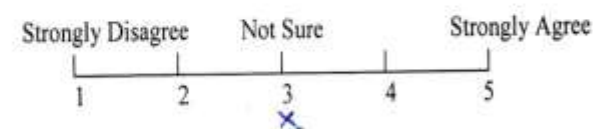
7. The team members displayed the required level of technical skills



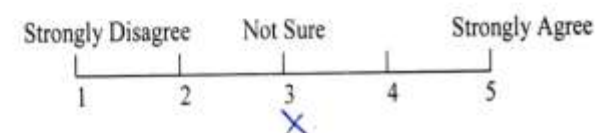
8. The project Team members remained motivated during the project



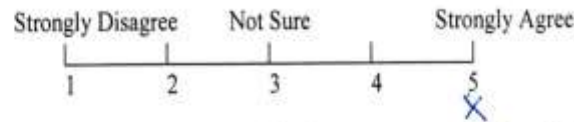
9. Communication protocols were defined for the project.



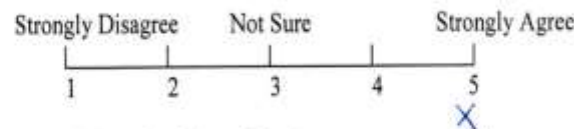
10. The use of the defined communication protocols by the project team was satisfactory



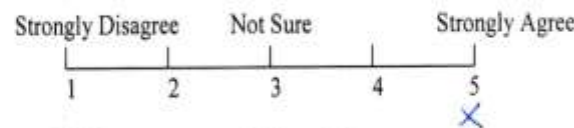
11. Conflict among team members were at an acceptable level



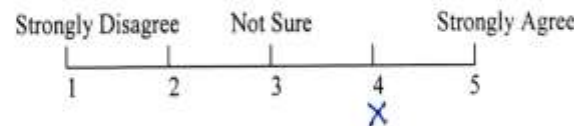
12. The functional specifications were successfully embedded into the product



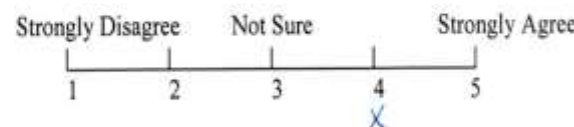
13. The technical specifications were successfully met



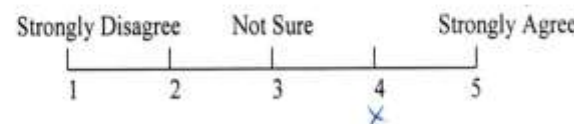
14. Customer accepted the product



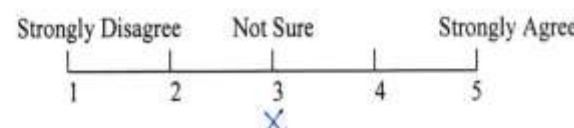
15. The customer has expressed satisfaction on using the product



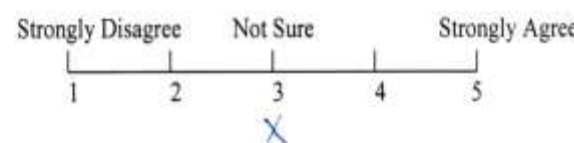
16. The customer agrees that the product fulfils the purpose for which it was built



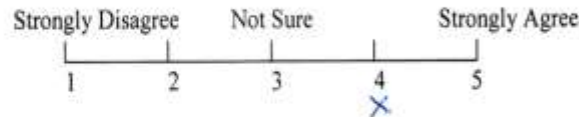
17. The customer has not requested changes to the product after implementation, based on the initially agreed product requirements



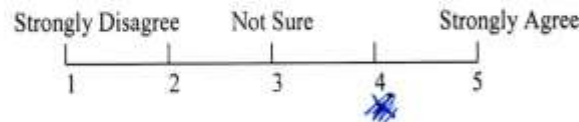
18. The customer has gained competitive advantage among competitors due to the use of the product



19. The project generated important revenue for your organization

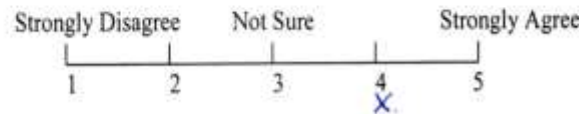


20. The organization gained a large market share with the sale of the product NA.

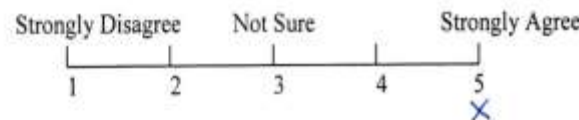


(Market share improved with GSM launch.)

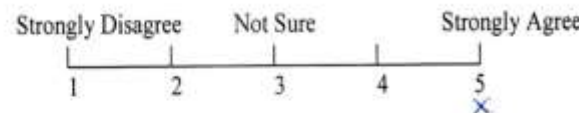
21. More business opportunities are opening up based on the project experience



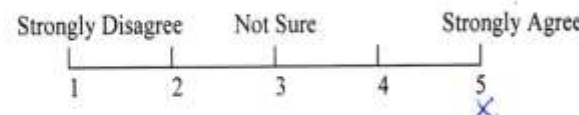
22. The team values lessons learned from the project



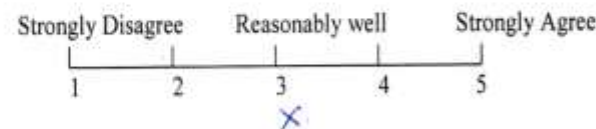
23. The project could be used as a model for future projects



24. The variance between the planned and actual plans were accepted by top management



25. The project performance was at a satisfactory level to the top management



Interviews: A segment of a transcript with the Director – Case 6

Question : Did you think you gave them the best human and other resource to this project.

Answer: I would not the best probably; we did an allocation which the project manager was comfortable with. There was a mix of people all of them were not the stars in the company, but the project manager was a very bright and I would call him a star. He was confident that with this team he could deliver. This is why I marked a 4 for the technical staff. Although they are good to have and we could probably have gone faster. It was not a technically research oriented challenging project so the skill level was not the most important. It was a matter of getting things done in time.

Question : Did you give this project priority amongst other projects in your organization ?

Answer: I would say no. There were parallel things happening at the same time. This had my attention; I did give more time during requirement gathering. This was a product. It was not going to be our flagship product we thought that the market was good, and the revenue share is a good opportunity. May be we could do something with it in the future. It was a good investment opportunity. It still is not our flagship product, it has done well in the sri-lankan market and you never know. We might take it up.

Question : Was the success of this project seen as important for the success of the organization. i.e. if it had failed would there have been a big impact.

Answer: We needed to recover the financials, we could not put it down as experiment or anything. Apart from that as a strategic point of view this was going to be another one in our portfolio. We did not want our <Iron One> to be based on stock markets. However we did spend a significant amount of money on this project in an year, and it would have been a loss if the project did not go right, but it would not have collapsed the company. We had parallel things going on at the time.

Question : Do you think without the level of support that you think you have given the project would have been a success?

Answer: My involvement was mainly at the inception, I think if without my intervention the technical team could not have approached the client and convinced him. In that sense my involvement was key. However the success was of everybody's contribution. Because I could have gone and marketed it but if the PM could not deliver on time that would also have been a failure. So there were critical roles in different time frames. The project managers and mine were critical at two different phases.

Question: Have you had any training in the PM area?

Answer: I haven't done long term courses. Have attended PM short courses also a lot of reading when I started the company. Trial and error was applied too, we tried to put a lot of methods, followed certain methodologies of companies such as Microsoft on how they structure their management styles. So I have done a lot of self training, but not formal.

Question: I understand how ever that you have a bachelors and a master's degree.

Answer: Yes, they are both technical degrees. My basic degree is in Computer Engineering, and masters, was in telecommunications, related to computers. There

Dana R

Interviews: Segment from a transcript –Project Manager Case 2

Answer : eight months , initially seven , then after the requirements study we identified that it could take a month longer, which made it eight months .

Question: do you thing the project was a success?

Answer: yes , it was a success, the project finished on time. The client was also really interested in sticking to the scope and what was required was delivered. Most importantly the client was satisfied. They are giving us more business and it is a good reference site for us.

Question : you have said in the Questionnaire that you think top management involvement of the client organization is very important.

Answer : yes it is. We had tremendous support from the client top management. It helped that the general manager of the client organization has involvements with our organization. He was involved from the beginning and was able to drive the project from the client side.

The client had its own agenda for this project they wanted to become market leaders. They were already near the top but they wanted to be the best so they had a drive from within the organization. They also wanted to increase their market share and introduce themselves into more lines of business through using this product. They knew that insurance was a service sector and through the new product and technology they wanted to increase their level of service.

Question : what you think about top management support from your organization ?

Answer : we are a CMM level four certified organization, so there is always top management support for our projects. They are involved in status meetings and their support is always available.

Question: were there any changes to the initial requirements after you finalized it.

Answer : yes from time to time they had some requests. Mainly because they were not sure of the requirements and sometimes because they understood the requirement better later. However they were made to understand that sticking with the original requirements and schedule was important. They referred to the systems requirements specification as the Bible; therefore it was easier for us. They were fine with the delivery as long as we stuck to the requirements specification document.

Question: why do you think that the customer reacted like that, specifically not being difficult. Do you think it was because they were educated or was it because of some other factor ?

Answer: I think mainly it was due to our Project Management Methodology. Before we started we educate in them about how important it was to have client top management support. They also had some young blood and they have been educated abroad and were quite highly educated, this would also have helped. They were also aware of information technology.

Question: was this project given priority amongst other projects?

Answer : yes it was given a bit of a boost, because it was our first insurance project implementation of our country. Being the first foreign project it was given importance and even the director was seen attending the first meeting.

Focus Group: Agenda

Monday 1st June, 2009

Time	Step	Description
5:30 – 5:40pm	Opening Statement	Welcome address
5:40 – 5:50pm	Introduction	Introductions, Topic & NGT(Nominal Group Technique) introduction, Definition(s)
First Question Session		
5:50 – 5:51pm	First question	First Question ; What is evidence of top management support?
5:51 – 6:00pm	Silent Idea Generation	Individual working time; taking five minutes to list ideas in response to the first question. Please write on the sheet provided.
6:00 – 6:10pm	Round-Robin Recording of ideas	In this step, the instructor will ask participants, one at a time, to share their ideas with other members
6:10 – 6:15pm	Serial discussion of ideas	This involves taking each idea, one at a time and discussing or clarifying the idea prior to the preliminary vote.
6:15 – 6:20pm	Preliminary voting	The participants will begin to select the five most important items from the entire list. Five points for the most important item and one point for the least important on the sheet.
6:20 – 6:25pm	Discussion of Preliminary voting	This brief step is designed to examine items with inconsistent voting patterns and provide an opportunity for a discussion of ideas perceived as receiving too many or too few votes.
BREAK FOR REFRESHMENTS		
Second Question Session		
6:25 – 6:26pm	Second question	Second Question ; What enables top management support?
6:26 – 6:35pm	Silent Idea Generation	Individual working time; taking five minutes to list ideas in response to the second question. Use sheet.
6:35 – 6:45pm	Round-Robin Recording of ideas	In this step, the instructor will ask participants, one at a time, to share their ideas with other members.
6:45 – 6:55pm	Serial discussion of ideas	This involves taking each ideas, one at a time and discussing or clarifying the idea prior to the preliminary vote.
6:55 – 7:00pm	Preliminary voting	The participants will begin to select the five most important items from the entire list. Remember five points for the best in the list.
7:00 – 7:05pm	Discussion of Preliminary voting	This brief step is designed to examine items with inconsistent voting patterns and provide an opportunity for a discussion of ideas perceived as receiving too many or too few votes.

Focus Group: A Sample from the Work Sheets

Question 1)

What is evidence of top management support?

* Please write down a list of your ideas in response to this question;

Management gives priority to something

✓ has reasonable awareness

understands the role they are required to play

✓ gives commitment to that role
demonstrates they have embraced that role

is available for consultation

actively owns any matters escalated to
them (issues, risks)

Top management

- they are enablers

are decision-makers or

effective in influencing decision-
makers

- they do set priorities

- they have the authority to divert / gather
priorities / resources

- are influential

- don't normally get involved in the detail

Question 2)

What enables top management support?

* Please write down a list of your ideas in response to this question;

They have a clear responsibility to provide it

They have been clearly engaged

They have been ~~specifically~~ asked to intervene/
weigh in / provide direction on a
specific matter

They have a KPI^(s) ~~related~~ riding on their support

They are required to report to ^{update} their management

~~For~~ A relationship has been built with them

They have a vested interest, (personal, professional)

There is a higher / ^{broader organizational} imperative

There is a significant dependency


Focus Group: Sample from the Rank Sheets

June
18/15

Question 1)

What is evidence of top management support?


*Please complete the following ranking table for items on the white board. Choose the five most important items.

Importance	Points	Item Code From board	Key Words
Most Important	5	6	Role
	4	2	Vision Strategic
	3	5	Decision-making
	2	7	Informal
Least Important	1	8	Available for consultation

Question 2)

What enables top management support?

*Please complete the following ranking table for items on the white board. Choose the five most important items.

Importance	Points	Item Code From board	Key Words
Most Important	5	2 9	Engagement
	4	4 2	Governance (Swap)
	3	1	Communication
	2	3 4	Success (Swap)
Least Important	1	4 3	Broader org. imperative

Ethics Approval (Protocol 2007/2282) for Interviews, Later Extended for Focus Group Method

—Original Message—

From: aries@anu.edu.au [mailto:aries@anu.edu.au]

Sent: Saturday, 22 December 2007 8:07 AM

To: u4382469@anu.edu.au

Subject: Human Ethics Protocol 2007/2282

THIS IS A SYSTEM-GENERATED E-MAIL. PLEASE DO NOT REPLY. SEE BELOW FOR E-MAIL CONTACT DETAILS.

Dear Ms Ochini Madanayake,

Protocol: 2007/2282

A project manager's perception of the importance of Critical Success Factors

I am pleased to advise you that your Human Ethics protocol received approval by the Chair of the Humanities & Social Sciences DEAC on 21 December 2007.

For your information:

1. Under the NHMRC/AVCC National Statement on Ethical Conduct in Human Research we are required to follow up research that we have approved. Once a year (or sooner for short projects) we shall request a brief report on any ethical issues which may have arisen during your research or whether it proceeded according to the plan outlined in the above protocol.
2. Please notify the committee of any changes to your protocol in the course of your research, and when you complete or cease working on the project.
3. Please notify the Committee immediately if any unforeseen events occur that might affect continued ethical acceptability of the research work.
4. The validity of the current approval is five years' maximum from the date shown approved. For longer projects you are required to seek renewed approval from the Committee.

All the best with your research!

Yolanda

Yolanda Shave

Ethics Officer

Office of Research Integrity

The Australian National University

Chancellery Building 10B

Canberra, ACT 0200

E: human.ethics.officer@anu.edu.au or

yolanda.shave@anu.edu.au

W: <http://www.anu.edu.au/ro/ORI/human.php>

Actions from Mintzberg (1973) Mapped against the Actions found in the Interview Data

Role	Original Description by Mintzberg (1973)	Activities identified and the case	Evidence and supporting excerpts from Interviews	Cases
Interpersonal				
Figurehead	<i>“Symbolic head, obliged to perform a number of routine duties of a legal or social nature”</i> (Mintzberg 1973, pp-92-93)	-----	This role was not mentioned during the interviews. The reason may be that project managers do not look for this specific role in a project environment.	None
Leader	<i>“Responsible for the motivation and activation of subordinates, responsible for staffing, training, and social duties”</i> (Mintzberg 1973, pp- 92-93)	<p>Provide challenging work [2,3]</p> <p>Balance project assignments [2,5]</p> <p>Prioritise [1,2]</p> <p>Boost employee morale [2,3]</p> <p>Accept ownership and gain</p>	<p>Most mentioned role in the interviews. Clearly PMs need their TMs to have leadership quality and render support activities mentioned in the adjoining column.</p> <p>Asked if the project may have been a success without TMS, PM of case 4 said <i>“A clear ‘no’, at the initial stages when the</i></p>	1,2,3,4,5

		<p>better understanding of project work [2]</p> <p>Provide guidance: work tasks [1,3,4]</p>	<p><i>project plans were made we needed support from the TM and we got it.”</i></p>	
Liaison	<p><i>“Maintains self developed network of outside contacts and informers who provide favours and information.” (Mintzberg 1973, pp- 92-93)</i></p>	<p>Liaise with customer [1,2,4,6]</p>	<p>PMs explained that the top level management has a network of friends who are also top managers in other companies. This role was mentioned as influential when obtaining work from these ‘friendly’ companies and communicating a reassuring word regarding pending work as and when necessary. The PM from Case 2 mentioning the connection said <i>“We had tremendous support from the client top management, it helped that the general manager of the client organisation has involvements with our organisation He was involved from the beginning and was able to drive the project</i></p>	1,2,3,4

			<p><i>from the client side.”</i></p> <p>In support of this view TM of case 6 said “<i>I put a lot of time in liaising with the client CEO and getting that trust relationships going</i>”.</p>	
Informational				
Monitor	<p><i>“Seeks and receives wide variety of special information (much of it current) to develop through understanding of organization and environment; emerges as nerve centre of internal and external information of the organization” (Mintzberg 1973, pp. 92-93)</i></p>	<p>Review project plans [1,2,3,6]</p> <p>Watch status [3]</p>	<p>According to the descriptions of Mintzberg Monitor and Disseminator seems quite closely related. They seem to be the two sides of the <i>communication</i> coin, which are gathering and disseminating information.</p> <p>PM of Case 2 said “<i>top managers were involved in status meetings (where the project plans were reviewed) and their support is always available</i>”.</p>	1,2,3,6
Disseminator	<p><i>“Transmits information received from outsiders or from</i></p>	<p>Having clear business objectives and stating them</p>	<p>As mentioned above information handling is expected of the TM as a supportive gesture.</p>	3,4, 5,6

	<i>subordinates to members of the organization; some information factual, some involving interpretation and integration of diverse value positions of organizational influencers” (Mintzberg 1973, pp. 92-93)</i>	[3,5,6] Make necessary information available [4]	According to one key team member (Case 4), it would have been easier to work with better knowledge/information than what was specified. He said “ <i>this would have prevented ambiguity of tasks and would have helped promote the success of the project</i> ”.	
Spokesman	<i>“Transmits information to outsiders on organizational plans, policies, actions results etc., serves as expert on organization’s industry” (Mintzberg 1973, pp. 92-93)</i>	-----	This was not a role that was specifically spelled out by the project managers. They saw it as their responsibility to be the spokesman regarding the project except when top level (major) negotiations were needed. See Negotiator role.	None
Decisional				
Entrepreneur	<i>“Searches organization and its environment for opportunities and initiates ‘improvement projects’ to bring about change; supervises design of certain</i>	Achieve a sustainable business model [5] Build support in the organisational model	This role was also quite frequently mentioned as a required supportive role. TM of Case 6 admits her role and said “ <i>as an entrepreneur, ensuring the cash flow, looking out for more business was her most</i>	2,4,5,6

	<i>projects as well.</i> ” (Mintzberg 1973, pp- 92-93)	[2,4,5,6]	<i>challenging task.</i> ”	
Disturbance Handler	<i>“Responsible for corrective action when organization faces important, unexpected disturbances.”</i> (Mintzberg 1973, pp. 92-93)	<p>Provide challenging work [2,3]</p> <p>Balance project assignments [2,5]</p>	<p>Three organisations have mentioned the need of such support, which is mentioned in the activities column.</p> <p>A key person from case 5 said <i>“I think they gave good support they had project reviews and got involved in resolving the issues”</i></p> <p>PM of Case 4 said <i>“TMS was the key, when decision making. One time we felt that the schedule was going to slip because of the dependencies. In that case the TM got involved and it was resolved. This was crucial to the success of the project.”</i></p>	2,3,5
Resource Allocator	<i>“Responsible for the allocation of organizational resources of all kinds-in effect the making or</i>	<p>Supply resources [1,6]</p> <p>Retention of key employees</p>	Two activities mentioned by PMs in three organisations were seen as belonging to this role.	1,5,6

	approval of all sufficient organizational decisions” (Mintzberg 1973, pp. 92-93)	[5]	PM of Case 3 said, “TM was supporting the project throughout. They were on top of the resource requirements and needed support was given.”	
Negotiator	“Responsible for representing the organization at major negotiations” (Mintzberg 1973, pp. 92-93)	Liaise with customer [1,2,4,6] Participate in scope definitions [1,3,6]	One activity was mentioned by PMs of four organisations. They needed TM to negotiate with customer. TM of case 3 said, “coordinating and prioritizing with stakeholders were tough. So I had to step in. We brought out the importance of a win-win situation, and they showed professionalism and we were able to overcome the obstacles.”	1,2,4,6
Technical				
Technical Expert	“Providing expertise to projects. Serving as a consultant to internal or external projects.” Lau, A. W., A. R. Newman, et al. (1980, p. 516)	Provide guidance: Work tasks [1,2,3,4] Participate in scope definitions [1,3,6]	Case2 In some organisations the top manager had a technical background and the project managers said that this was immensely helpful.	1,2,3,4,6

A new addition from the field study				
Nurturer	Has not been explicitly specified by Mintzberg	Provide guidance : professional growth [1,2,3,4,6]	<p>TM of Case 1 said that “<i>we like to help people upgrade their skill sets, there are instances when we sent them abroad for training. We also have a professional training centre (within the same organisation) this a good thing for us, which means we train can them in house</i>”.</p> <p>TM of Case 2 said, “<i>I get involved in technical and quality aspects. I have implemented quality standards and bringing up our staff proficiency in these standards is something I care to do</i>”. He said that proficiency in quality standards is a must to climb organisational ladders.</p> <p>TM of case 3 recalled an instance he assisted a new recruit to improve skills “<i>He was a new recruit at that time. He was with a</i></p>	1,2,3,4,6

software vendor company before and he had that experience, but at the team lead level. We guided him and ultimately I think he did a fairly good job”.

TM of case 6 said “It generally takes at least 2-3 years get to that level. Sometimes we may give a very small project to someone who we feel has this interest and ability as a way of coaching them. For instance we have overseas projects which have to be self managed where only one or two people are involved. In those cases we utilize the skills to self manage themselves.”

APPENDIX C

C.1: New Reflective Measures

Table C. 1: Construct, Measures and Source – ISPP

Construct	Reflective Measures	Source
Learning	The project helped my organisation to acquire knowledge about key techniques in management and/or technology	Self-developed with reference to the Learning project performance dimension suggested by Nidumolu et al., (1995, p.216)
	The project helped acquire knowledge about strategic best practices to be employed on the project	
	The project helped acquire knowledge about strategic best practices to be	
	The staff acquired knowledge on new technology while working on the project	
Controlled	The staff acquired knowledge on new technology while working on the project	Self-developed with reference to the Controlled project performance dimension suggested by Nidumolu et al., (1995, p.216)
	Project progress issues were immediately resolved when discovered	
	Majority of project objectives were achieved	
	Project's time management was commended by the top management	
	Project was completed within the set time period	
	Major schedule changes were avoided on the project	
Quality of Interaction	Knowledge acquired on the project was shared between staff and users	Self-developed with reference to the Quality of Interaction project performance dimension suggested by Nidumolu et al., (1995, p. 216)
	The project's product produces expected outputs	
	The project's product operates without malfunctioning	
	Customer was satisfied with the technical performance of the product	
Technical Performance	The project's product meets the technical specification	Self-developed with reference to the Operational Performance project performance dimension suggested by Nidumolu et al., (1995, p 216)
	The project's product produces expected outputs	
	The project's product operates without malfunctioning	
	Customer was satisfied with the technical performance of the product	

Flexibility	The project's product could incorporate changes	Self-developed with reference to the Flexibility project performance dimension suggested by Nidumolu et al., (1995, p.216)
	New requirements were incorporated into the product without disruption	
	Product continued to function without failure after change	
	Changes to the project's product can be made without increases to the project cost	
Financial Performance	The project's product is known to have brought in financial gains for the organisation	Self-developed with reference to the Commercial Success project performance dimension suggested by Shenhar et al., (2001, p. 712)
	The financial benefits gained from the project's product satisfied the expectations	
	The project's product ensured financial benefits for the organisation	
	Project's product is considered to be associated with positive financial outputs	

Table C. 2: Construct, Measures and Source – TMS

Construct	Reflective Measures	Source
Top Management Support	Overall, most top company executives understood and supported the project vision	(Akgün, Byrne., Lynn, & Keskin, 2007, p.630)
	Overall, top company management helped surmount rather than create obstacles for this project	
	During team meetings, top company management, if present, frequently made encouraging vs. discouraging remarks	
	When the team members asked for help from top company management, they received it	

Table C. 3: Construct, Measures and Source – Managerial Roles

Construct	Reflective Measures	Source
Figurehead	...extended supportive advice on the project	Self-developed with reference to Mintzberg, (1973), McCall & Sergist, (1980) and Grover et al., (1993)
	... advised staff on project interactions	
	... took time to listen to project information	
	... attended social events organised for project staff	
Leader	...encouraged staff training for the project	Self-developed with reference to Mintzberg, (1973), McCall & Sergist, (1980) and Grover et al., (1993)
	... made efforts to enhance project staff development	
	... led project staff development	
	... boosted project staff motivation	
Liaison	...developed external relationships with regard to the project	Self-developed with reference to Mintzberg, (1973), McCall & Sergist, (1980) and Grover et al., (1993)
	... contacted people outside the organisation with regard to the project	
	... discussed relevant project functions with external stakeholders	
	... regularly kept in touch with external parties with regard to the project	

Nurturer	... encouraged staff to improve skills needed on the project	Self
	... facilitated staff in advancing skills required on the project	Self
	... arranged events to facilitate improving project relevant skills	Self
	... offered advice on skills building with regard to the project	Self
Monitor	... observed milestone presentations with regard to the project	Self-developed with reference to Mintzberg, (1973), McCall & Sergist, (1980) and Grover et al., (1993)
	... assisted the schedule progress of the project	
	... inspected documents to gain an understanding of the project schedule	
	... investigated project cost factors during meetings	
	... attended the meetings to keep an eye on the project costs	
	... advised regarding project costs during project gatherings	
Disseminator	... sent out documents relevant to the project to staff	Self-developed with reference to Mintzberg, (1973), McCall & Sergist, (1980) and Grover et al., (1993)
	... informed staff of functional project specifications	
	... provided the staff with relevant project information	
	... communicated newly acquired information on the project to staff	
Spokesman	...answered customer queries with regard to the project	Self-developed with reference to Mintzberg, (1973), McCall & Sergist, (1980) and Grover et al., (1993)
	... communicated project requirements to the suppliers	
	... passed on news on the project to stakeholders	
	... provided necessary project facts to stakeholders	
Entrepreneur	... improved the current project by initiating change	Self-developed with reference to Mintzberg, (1973), McCall & Sergist, (1980) and Grover et al., (1993)
	... introduced new technology for the benefit of the project	
	... always looked for ways to improve the project	
	... scouted the environment for fresh ideas to enhance the project	
Disturbance Handler	... stepped-in during unexpected disturbances on the project	Self-developed with reference to Mintzberg, (1973), McCall & Sergist, (1980) and Grover et al., (1993)
	... settled disagreements between staff involved in the project	
	... provided a solution when presented with a problem with regard to the project	
	... remedied crisis situations on the project	
Resource Allocator	... provided resources needed for the project	Self-developed with reference to Mintzberg, (1973), McCall & Sergist, (1980) and Grover et al., (1993)
	... solved problems of resource requirements with regard to the project	
	... had an eye for the most suitable resources for the project	
	... looked after resource levelling on the project	

Negotiator	... actively participated in negotiations concerning the project	Self-developed with reference to Mintzberg, (1973), McCall & Sergist, (1980) and Grover et al., (1993)
	... spoke with stakeholders on behalf of the project	
	... was available for negotiations with regard to the project	
	... made time to discuss project matters	
Technical Expert	... rendered guidance on technical matters pertaining to the project	Self-developed with reference to Lau et al., (1980)
	... lent a helping hand when technical problems came up in the project	
	... gave directions on technical aspects pertaining to the project	
	... provided a path of solution for technical crisis on the project	

C.2: Content Validity Sheet

Information for Respondents

This document is part of a questionnaire. The questionnaire is still in the making and needs to identify the most relevant items (questions) to present to the intended respondents. The relevancy of these items has to be selected with reference to the definitions of the constructs.

Respondents are encouraged to look closely at the definition of each construct and respond with reference to these definitions.

- The questions inquire whether each item is reflective of the definition. Reflective items will be highly related to the definition and to each other. In other words the items may be used interchangeably or one item can stand in for the other. An example of a well-defined construct and its reflective items are given below as reference.

Construct -> Social Influence: "Degree to which an individual perceives that important others believe he/she should use the new system" Venkatesh et al (2003,p. 460)

People who influence my behaviour think that I should use the system

People who are important to me think that I should use the system

The senior management of this business has been helpful in the use of the system

- Please read the definition for each construct in questions 1-4 thoroughly and follow the instructions below.
 - If an item is not reflective of the definition - Tick "*Not relevant to the construct*"
 - If an item is reflective of the definition and related to other items- Tick "*Relevant to the construct*"
 - If an item is highly reflective of the definition and highly related to other items- "*Tick Essential to the construct*"
- Choose the best four items for each question and mark on the space provided
- Respondents are also kindly invited to comment on wording of the items and definitions. Your input will be used to enhance the final questionnaire.

Industry Academic Other

Please circle your background:

Date ----/----/2013

E-mail :

Thank you very much for you kind assistance !

The research

- This research investigates how managerial roles played by the top management leads to top management support and how this top management support would affect IT/IS project performance.
- The final version of the questionnaire will target IT/IS staff such as IT Managers/Executives, Program Managers and Project Managers.
- The final questionnaire will contain a demographics section.
- The questions in the final questionnaire will be worded to indicate the respondent's agreement with each statement from (0) Strongly Disagree to (10) Strongly Agree or N/A

Key Terms

- Top management - Will differ according to the organisation or organisational unit being studied.
 - With reference to the organisation - members of the Top Management Team.
 - With reference to a key/functional/strategic unit - Senior Management
- IT/IS project(s) - Examples are software development, software implementation, software upgrade, data migration, IT infrastructure projects, digital media and similar others.
- Product - The output of the IT/IS project e.g.: software, web applications, networks, etc.,
- Staff - The project staff, including the project manager
- Users - The users of the product

Remember: You are evaluating the questions, NOT answering them. You need to evaluate how reflective the questions are of the definitions given. Your selections will assist in the selection of questions for the final questionnaire.

Question 1: Performance of the IT/IS Project – 6 Dimensions

Item is not reflective of the definition - Tick "Not relevant" to the construct,

Item is reflective of the definition and related to other items- Tick "Relevant" to the construct

Item is highly reflective of the definition and highly related to other items- Tick "Essential"

LEARNING: The degree to which the project helped with acquiring knowledge for the organisation that developed the product. (Adapted from Nidumolu et al., 1995)

Items	Not Relevant	Relevant	Essential
1. The project helped my organisation to acquire knowledge about key techniques			
2. The project helped acquire knowledge about best practices to be employed on projects			
3. The project helped acquire knowledge that staff can use in future projects			
4. The knowledge acquired from the project is useful for staff learning			
5. The knowledge gained from the project was documented for future use			
6. The staff acquired knowledge on new technology while working on the project			
The best four			

CONTROL: The extent to which the product development was well managed. (Adapted from Nidumolu et al., 1995)

Items	Not Relevant	Relevant	Essential
1. The project was considered to be on track always			
2. The project did not face unexpected disturbances			
3. The project issues were immediately resolved when discovered			
4. The project constraints were successfully met			
5. The management expressed satisfaction upon project completion			
The best four			

INTERACTION QUALITY: The quality of interaction between the staff and users during the product development process of the project (Adapted from Nidumolu et al., 1995)

Items	Not Relevant	Relevant	Essential
1. The project helped staff and users gain mutual understanding related to project work			
2. Knowledge acquired on the project was shared between staff and users			
3. Staff and users built problem solving techniques together during the project			
4. Meetings intended for project communications between staff and users were very productive			
5. Users correctly conveyed their requirements			
6. The meetings between staff and users were very informative			
The best four			

OPERATIONAL EFFICIENCY: The degree to which the project's product met the required technical performance. (Adapted from Nidumolu et al., 1995)

Items	Not Relevant	Relevant	Essential
1. The project's product is technically reliable			
2. The project's product produces expected outputs			
3. The project's product operates without malfunctioning			
4. Customer expressed satisfaction with the technical performance of the product			
5. The product downtime is negligible			
6. No product failure has been reported so far			
The best four			

FLEXIBILITY: The degree to which the project's product could adapt to changing needs. (Adapted from Nidumolu et al., 1995)

Items	Not Relevant	Relevant	Essential
1. The project's product was built in a way that it could be modified when needed			
2. The project's product design makes adaptation to changes possible			
3. The project's product could incorporate changes			
4. Product Add-ons do not cause the product to malfunction			
5. New requirements were incorporated into the product without disruption			
6. Changes to product does not cause system failure			
7. Changes to the project's product can be made without increases to the project cost			
The best four			

FINANCIAL PERFORMANCE: The degree to which the project was financially beneficial. (Adapted from Shenhar et al., 2001)

Items	Not Relevant	Relevant	Essential
1. The project was a commercial success for the organisation			
2. The project increased organisational revenue			
3. The project enhanced organisational profits			
4. Project is considered a financial success in the organisation			
5. The organisation earned considerable returns via the project			
6. The project boosted organisational income			
The best four			

Question 2: Managerial roles conducted by the top management – 12

Roles

Item is not reflective of the definition - Tick "Not relevant" to the construct,

Item is reflective of the definition and related to other items- Tick "Relevant" to the construct

Item is highly reflective of the definition and highly related to other items- Tick "Essential"

Figurehead Role: The degree to which the top management carry out duties of social nature in relation to the IT/IS project (Adapted from Mintzberg, 1973)

Items (My Top Management...)	Not Relevant	Relevant	Essential
1. ..extended supportive advice on the project			
2. ..attended staff meetings that discussed project issues			
3. ..took time to listen to project information			
4. ..attended social events organised for project staff			
5. ..made it a point to regularly meet project staff			
6. ..advised staff on project interactions			
The best four			

Leader Role: The degree to which the top management promotes staff development (staffing, training, motivating and other associated duties) in relation to the IT/IS project (Adapted from Grover et al., 1993)

Items (My Top Management...)	Not Relevant	Relevant	Essential
1. ..were actively involved in project staff development			
2. ..encouraged staff training for the project			
3. ..made efforts to enhance project staff development			
4. ..led project staff development			
5. ..facilitated staff working on the project			
6. ..boosted project staff motivation			
The best four			

Liaison Role: The degree to which the top management seeks to establish external relationships with regard to the IT/IS project (Adapted from Grover et al., 1993)					
Items (My Top Management...)	Not Relevant		Relevant		Essential
1. ..developed external relationships with regard to the project					
2. ..contacted people outside the organisation with regard to the project					
3. ..built relationships with outsiders with regard to the project					
4. ..communicated with external parties with regard to the project					
5. ..discussed relevant project functions with external stakeholders					
6. ..Kept in touch with external parties for the sake of the project					
The best four					

Nurturer Role: The degree to which the top management assists the staff with sharpening skills used in the IT/IS project (ref: qualitative studies)					
Items (My Top Management...)	Not Relevant		Relevant		Essential
1. ..helped staff to sharpen skills needed for the project					
2. ..encouraged staff to improve skills needed on the project					
3. ..facilitated staff in advancing skills required on the project					
4. ..constantly advised on developing skills needed for the project					
5. ..arranged events to facilitate improving project relevant skills					
6. ..offered advice on skills building with regard to the project					
The best four					

Monitor Role: The degree to which the top management seeks to receive information to understand the IT/IS project (Adapted from Grover et al.,1993)

Items (My Top Management...)	Not Relevant	Relevant	Essential
1. ..observed milestone presentations with regard to the project			
2. ..attended the meetings to keep an eye on the project			
3. ..conducted discussions during project gatherings			
4. ..examined the progress of the project			
5. ..investigated project facts during meetings			
6. ..inspected documents to gain an understanding of the project			
The best four			

Disseminator Role: The degree to which the top management transmits information to organisational members regarding the IT/IS project (Adapted from Grover et al., 1993)

Items (My Top Management...)	Not Relevant	Relevant	Essential
1. ..sent out documents relevant to the project to staff			
2. ..communicated project information to staff			
3. ..informed functional project specifications to staff			
4. ..provided the staff with relevant project information			
5. ..conveyed project matters to staff			
6. ..communed acquired information on the project to staff			
The best four			

Spokesman Role: The degree to which the top management is involved in communicating IT/IS project information to interested outside parties (Adapted from Mintzberg, 1973)

Items (My Top Management...)	Not Relevant	Relevant	Essential
1. ..answered customer queries with regard to the project			
2. ..provided project information to interested parties during projects meetings			
3. ..compiled documents with regard to the project, intended for the stakeholders			
4. ..communicated project requirements to the suppliers.			
5. ..passed on news on the project to stakeholders			
6. .. provided necessary project facts to stakeholders			
The best four			

Entrepreneur Role: The degree to which the top management initiates and designs positive change for/in the IT/IS project (Adapted from Grover et al.,1993)

Items (My Top Management...)	Not Relevant	Relevant	Essential
1. ..instigated changes for the progression of the project			
2. ..improved the current project by initiating change			
3. ..introduced new technology for the benefit of the project			
4. ..always looked for ways to improve the project			
5. .. was on the lookout to introduce new ideas to better the project			
6. ..scouted the environment for fresh ideas to enhance the project			
The best four			

Disturbance Handler: The degree to which the top management apply corrective action during unexpected crises in the IT/IS project (Adapted from Grover et al., 1993)

Items (My Top Management...)	Not Relevant	Relevant	Essential
1. ..applied corrective action during project crises			
2. ..stepped-in during unexpected disturbances on the project			
3. ..settled disagreements between staff involved in the project			
4. ..provided a solution when presented with a problem with regard to the project			
5. .. remedied crisis situations on the project			
6. ..implement counter measures when confronted with problems in regard to the project			
The best four			

Resource Allocator: The degree to which the top management engages in allocating resources for the IT/IS project (Adapted from Grover et al., 1993)

Items (My Top Management...)	Not Relevant	Relevant	Essential
1. ..provided resources needed for the project			
2. ..was responsible for allocating resources for the project			
3. ..solved resource requirements with regard to the project			
4. ..replaced resources on the project during staff turnover			
5. ..had an eye for the most suitable resources for the project			
6. ..looked after resource leveling on the project			
The best four			

Negotiator Role: The degree to which the top management participates in negotiations with regard to the IS/IT project (Adapted from Grover et al., 1993)

Items (My Top Management...)	Not Relevant	Relevant	Essential
1. ..represented the project during negotiations			
2. ..actively participated in negotiations concerning the project			
3. ..spoke with stakeholders on behalf of the project			
4. ..responded to negotiations, representing the project			
5. .. was available for negotiations with regard to the project			
6. .. made time to discuss project matters			
The best four			

Technical Expert: Degree to which the top management provides technical guidance with regard to the IS/IT project (Adapted from Lau et al., 1980)

Items (My Top Management...)	Not Relevant	Relevant	Essential
1. ..provided staff with technical know-how on matters regarding the project			
2. ..rendered guidance on technical matters pertaining to the project			
3. ..assisted project staff with his/her technical knowledge			
4. ..lent a helping hand when technical problems came up in the project			
5. ..gave directions on technical aspects pertaining to the project			
6. ..provided a path of solution for technical crisis on the project			
The best four			

----End of Content Validity----

C.3: The Questionnaire Package

The Cover Letter

----/----/2013,

Invitation to Participate in a Survey

Dear Dr/Mr/Mrs/Ms.....

I would like to invite your esteemed organisation to participate in a research carried out by the University of Wollongong. This survey is part of a study aiming to learn how top management carrying out their managerial roles could lead to top management support, and how such top management support would in turn help achieve better performance in Information Technology and Information Systems (IT/IS) projects.

Your organisation is contacted as it is a well-known and a prestigious professional body that brings together IT/IS professionals from various backgrounds with an interest in project management. I would like to kindly request the participation of personnel such as IT/IS Managers/Executives, Program Managers or Project Managers. The questions are with regard to a recently completed IT/IS project. It is preferred that organisations represented by each participant have at least 15 full time staff and around or over 3 full-time IT staff conducting IT/IS projects. It is also important that the product, result or service the project undertook to deliver has already been accepted by the customer.

The results of the survey will help determine which managerial roles are most important towards obtaining top management support. Therefore organisations will be able to consider a more concentrated approach towards these roles and obtain better levels of IT/IS project performance.

Your participation is much appreciated and is voluntary. You will be assisting Miss. Ochini Madanayake with her PhD research project. Your privacy will be kept intact as the data collected will be stored in a way that the origin could not be traced and only aggregate findings will be published in academic literature.

The University of Wollongong has very stringent ethical considerations toward protecting the participants and therefore the following documents are attached herewith.

- The Information sheet – This will give further information with regard to the research. Participants may retain this.
- The Consent form – This should be carefully read, signed and returned with the participant's signature.
- The Questionnaire – Needs to be completed and returned.

The survey is available online at www.surveymonkey.com, I can also provide as many hard copies as needed. For any queries please contact Ms. Ochini Madanayake on 0404955042 or ocm380@uowmail.edu.au.

Thank you very much for your kind attention.

Ochini Madanayake

PARTICIPANT INFORMATION SHEET

TITLE: Top Management Support and Information Technology/Information Systems Project Performance: A Managerial Role Perspective

PURPOSE OF THE RESEARCH

This study seeks to identify how the organizational top management carrying out managerial roles could lead to top management support and also how this role-based top management support would affect the performance of Information Technology/Information Systems projects

INVESTIGATORS

Miss. Ochini Madanayake
Faculty of Engineering
0404955042
ocm380@uowmail.edu.au

A/Prof Peter Gibson
Faculty of Engineering
024221 5968
peter_gibson@uow.edu.au

Mr. John Flannagan
Sydney Business School
0242605061
grutwr@uow.edu.au

METHOD AND DEMANDS ON PARTICIPANTS

We cordially invite Information Technology/Information Systems managers, executives, project managers and program managers to participate in this research. The questions should be answered with reference to a project that you managed within the last 4 years. The project may be of high or low performance as per your judgment. The project's product should have been handed over to the customer at the time of this survey. We would also like our participants to be from organizations with at least 15 full time employees where at least 3 people were involved in the project being discussed. Most questions presented are to be rated, a typical example of an instruction is: Rate the learning acquired from the IT/IS project. This will be followed by statements that needs to be rated such as: the project helped acquire knowledge that staff can use in future projects -and- the staff acquired knowledge on new technology while working on the project.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS

Apart from the 15-20 minutes of demand of your time, we can foresee no risks for you. Your involvement in the study is voluntary and you may withdraw your participation from the study at any time and withdraw any data that you have provided prior to publication of any findings. Refusal to participate in the study will not affect your relationship with the University of Wollongong.

FUNDING AND BENEFITS OF THE RESEARCH

The findings from this PhD research is expected to shed light on the concept of top management support and help improve IT project performance. Confidentiality for participants is assured. Only aggregate and summary findings will be discussed in thesis, journal and conference publications. All participants will be de-identified from the data before subjecting to analysis.

ETHICS REVIEW AND COMPLAINTS

This study has been reviewed by the Social Sciences Human Research Ethics Committee of the University of Wollongong. If you have any concerns or complaints regarding the way this research has been conducted you can contact the UOW Ethics Officer on (02) 4221 3386 or email rso-ethics@uow.edu.au.

Thank you for your interest in this study.

The Consent Form

CONSENT FORM FOR PARTICIPANTS	
<p>RESEARCH TITLE: Top Management Support and Information Technology/Information Systems Project Performance: A Managerial Role Perspective</p>	
<p>RESEARCHER/S: Miss. Ochini Madanayake, A/Prof. Peter Gibson, Mr. John Flanagan</p>	
<p>I have been given information about the study, "Top management support and Information Technology/Information Systems project performance: a managerial role perspective". I also have the information to assess any risks to me and the possibility to consult for further information, Ms. Ochini Madanayake who is conducting this research as part of a Doctor of Philosophy program supervised by Associate Professor Peter Gibson in the department of Mechanical and Mechatronic Engineering at the University of Wollongong.</p>	
<p>I understand that my participation in this research is voluntary, I am free to refuse to participate and I am free to withdraw from the research at any time. My refusal to participate or withdrawal of consent will not affect my relationship with the University of Wollongong.</p>	
<p>If I have any enquiries about the research, I can contact Ms. Ochini Madanayake or A/Prof. Peter Gibson or if I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on 4221 3386 or email ethics@uow.edu.au.</p>	
<p>By signing below I am indicating my consent to participate and answer the questions as accurately as I can.</p>	
<p>I understand that the data collected from my participation will be used for the purpose of publishing a PhD thesis, conference and journal papers, and I consent for it to be used in that manner.</p>	
Your Details	
Name in lieu of signature:	<input type="text"/>
Today's Date (DD/MM/YYYY) :	<input type="text"/>

The Questionnaire

KEY WORDS TO NOTE

Top management	Senior manager consulted for support in this particular project
IT/IS project	Work undertaken to create software, hardware or related service
Product	The final output of the IT/IS project (i.e software, hardware or service)
Staff	Project manager and the project team
Users	People that use the product
Initiation process	Project authorization and identification of stakeholders
Planning process	Identify the scope of work and plan the necessary time, cost, risk, quality, resources, procurement, and communication required to achieve the scope
Executing process	Implement the plans; communicate with stakeholders and coordinate resources to meet project objectives
Monitoring & Controlling process	Verify plans with actual results achieved and make necessary adjustments
Closing process	Orderly closure of the project



PART 1: PERFORMANCE OF THE IT/IS PROJECT (1.1 - 1.6)

Answer with regard to the performance of an IT/IS project that you managed. Rate the extent to which each of the following outcomes were achieved for the project being discussed, by scoring from (0) Very Poorly to (10) Extremely Well, or N/A where the specified outcome is not applicable.

1.1 Rate the learning acquired from the IT/IS project

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. The project helped my organization to acquire knowledge about key techniques in management and/or technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The project helped acquire knowledge about strategic best practices to be employed on projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The project helped acquire knowledge that staff can use in future projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The staff acquired knowledge on new technology while working on the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

1.2 Rate how well the IT/IS project was managed (Controlled)

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. Unexpected disturbances were avoided	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Project progress issues were immediately resolved when discovered	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Majority of project objectives were achieved	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Project's time management was commended by the top management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Project was completed within the set time period	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Major schedule changes were avoided on the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

1.3 Rate the quality of interaction between the developers and users of the product

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. Knowledge acquired on the project was shared between staff and users	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Staff and users built problem solving techniques together during the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Users correctly conveyed their requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The meetings between staff and users were very productive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

1.4 Rate the technical performance achieved by the project's product

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. The project's product meets the technical specification	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The project's product produces expected outputs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The project's product operates without malfunctioning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Customer was satisfied with the technical performance of the product	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

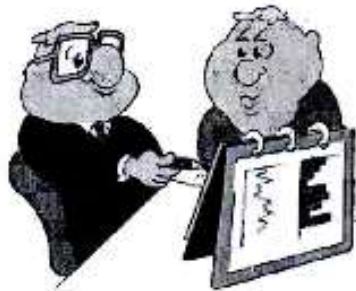
1.5 Rate the flexibility of the product to changing needs

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. The project's product could incorporate changes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. New requirements were incorporated into the product without disruption	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Product continued to function without failure after change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Changes to the project's product can be made without increases to the project cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

1.6 Rate the financial performance of the project's product

1. The project's product is known to have brought in financial gains for the organization
2. The financial benefits gained from the project's product satisfied the expectations
3. The project's product ensured financial benefits for the organization
4. Project's product is considered to be associated with positive financial outputs

0	1	2	3	4	5	6	7	8	9	10	N/A
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



On a scale of 0 to 10, how would you rate the overall performance of this IT/IS project

<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
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PART 2: TOP MANAGEMENT SUPPORT

Each statement specifies a type of supportive action by the top management. Rate the extent to which each of the following supportive actions occurred on the project being discussed, by scoring from (0) Not At All to (10) To The Highest Degree Possible, or N/A where the specified action is not applicable.

2.1 Rate how well the top management supported your IT/IS project

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. Overall, most top company executives understood and supported the project vision	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Overall, top company management helped surmount rather than create obstacles for this project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. During team meetings, top company management, if present, frequently made encouraging vs. discouraging remarks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. When the team members asked for help from top company management, they received it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



On a scale of 0 to 10, how would you rate the top management support you received for this project

☐ 0
 ☐ 1
 ☐ 2
 ☐ 3
 ☐ 4
 ☐ 5
 ☐ 6
 ☐ 7
 ☐ 8
 ☐ 9
 ☐ 10

PART 3: MANAGERIAL ROLES PERFORMED BY THE TOP MANAGEMENT (3.1 - 3.12)

Each statement specifies a type of supportive action resulting from the managerial roles carried out by the top management. Rate the extent to which each of the following supportive actions occurred on the project being discussed, by scoring from (0) Not At All to (10) To The Highest Degree Possible, or N/A where the specified action is not applicable.

3.1 Rate how well the top management performed the following activities. My top Management ...

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. ...extended supportive advice on the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...advised staff on project interactions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...took time to listen to project information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...attended social events organized for project staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the IS/IT project being discussed, when were the above actions carried out by the top management? You may select more than one answer.

☐ Initiation
 ☐ Planning
 ☐ Executing
 ☐ Monitoring & Control
 ☐ Closure
 ☐ All answers above read N/A

3.2 Rate how well the top management performed the following activities. My top Management ...

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. ...encouraged staff training for the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...made efforts to enhance project staff development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...led project staff development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...boosted project staff motivation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the IS/IT project being discussed, when were the above actions carried out by the top management? You may select more than one answer.

☐ Initiation
 ☐ Planning
 ☐ Executing
 ☐ Monitoring & Control
 ☐ Closure
 ☐ All answers above read N/A

3.3 Rate how well the top management performed the following activities. My top Management ...

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. ...developed external relationships with regard to the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...contacted people outside the organization with regard to the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...discussed relevant project functions with external stakeholders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...regularly kept in touch with external parties with regard to the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the IS/IT project being discussed, when were the above actions carried out by the top management? You may select more than one answer.

☐ Initiation
 ☐ Planning
 ☐ Executing
 ☐ Monitoring & Control
 ☐ Closure
 ☐ All answers above read N/A

3.4 Rate how well the top management performed the following activities. My top Management ...

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. ...encouraged staff to improve skills needed on the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...facilitated staff in advancing skills required on the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...arranged events to facilitate improving project relevant skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...offered advice on skills building with regard to the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the IS/IT project being discussed, when were the above actions carried out by the top management? You may select more than one answer.

☐ Initiation
 ☐ Planning
 ☐ Executing
 ☐ Monitoring & Control
 ☐ Closure
 ☐ All answers above read N/A

3.5 Rate how well the top management performed the following activities. My top Management ...

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. ...observed milestone presentations with regard to the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...assisted the schedule progress of the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...inspected documents to gain an understanding of the project schedule	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...investigated project cost factors during meetings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. ...attended the meetings to keep an eye on the project costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. ...advised regarding project costs during project gatherings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the IS/IT project being discussed, when were the above actions carried out by the top management? You may select more than one answer.

☐ Initiation
 ☐ Planning
 ☐ Executing
 ☐ Monitoring & Control
 ☐ Closure
 ☐ All answers above read N/A

3.6 Rate how well the top management performed the following activities. My top Management ...

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. ...sent out documents relevant to the project to staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...informed staff of functional project specifications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...provided the staff with relevant project information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...communicated newly acquired information on the project to staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the IS/IT project being discussed, when were the above actions carried out by the top management? You may select more than one answer.

☐ Initiation
 ☐ Planning
 ☐ Executing
 ☐ Monitoring & Control
 ☐ Closure
 ☐ All answers above read N/A

3.7 Rate how well the top management performed the following activities. My top Management ...

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. ...answered customer queries with regard to the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...communicated project requirements to the suppliers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...passed on news on the project to stakeholders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...provided necessary project facts to stakeholders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the IS/IT project being discussed, when were the above actions carried out by the top management? You may select more than one answer.

☐ Initiation
 ☐ Planning
 ☐ Executing
 ☐ Monitoring & Control
 ☐ Closure
 ☐ All answers above read N/A

3.8 Rate how well the top management performed the following activities. My top Management ...

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. ...improved the current project by initiating change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...introduced new technology for the benefit of the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...always looked for ways to improve the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...scouted the environment for fresh ideas to enhance the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the IS/IT project being discussed, when were the above actions carried out by the top management? You may select more than one answer.

☐ Initiation
 ☐ Planning
 ☐ Executing
 ☐ Monitoring & Control
 ☐ Closure
 ☐ All answers above read N/A

3.9 Rate how well the top management performed the following activities. My top Management ...

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. ...stepped-in during unexpected disturbances on the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...settled disagreements between staff involved in the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...provided a solution when presented with a problem with regard to the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...remedied crisis situations on the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the IS/IT project being discussed, when were the above actions carried out by the top management? You may select more than one answer.

☐ Initiation
 ☐ Planning
 ☐ Executing
 ☐ Monitoring & Control
 ☐ Closure
 ☐ All answers above read N/A

3.10 Rate how well the top management performed the following activities. My top Management...

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. ...provided resources needed for the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...solved problems of resource requirements with regard to the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...had an eye for the most suitable resources for the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...looked after resource leveling on the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the IS/IT project being discussed, when were the above actions carried out by the top management? You may select more than one answer.

☐ Initiation
 ☐ Planning
 ☐ Executing
 ☐ Monitoring & Control
 ☐ Closure
 ☐ All answers above read N/A

3.11 Rate how well the top management performed the following activities. My top Management...

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. ...actively participated in negotiations concerning the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...spoke with stakeholders on behalf of the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...was available for negotiations with regard to the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...made time to discuss project matters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the IS/IT project being discussed, when were the above actions carried out by the top management? You may select more than one answer.

☐ Initiation
 ☐ Planning
 ☐ Executing
 ☐ Monitoring & Control
 ☐ Closure
 ☐ All answers above read N/A

3.12 Rate how well the top management performed the following activities. My top Management...

	0	1	2	3	4	5	6	7	8	9	10	N/A
1. ...rendered guidance on technical matters pertaining to the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...lent a helping hand when technical problems came up in the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...gave directions on technical aspects pertaining to the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...provided a path of solution for technical crisis on the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the IS/IT project being discussed, when were the above actions carried out by the top management? You may select more than one answer.

☐ Initiation
 ☐ Planning
 ☐ Executing
 ☐ Monitoring & Control
 ☐ Closure
 ☐ All answers above read N/A



PART 4: DEMOGRAPHIC INFORMATION

Level of Management you reported on this project was, (select one)

- | | |
|---|---|
| <input type="radio"/> Chief Executive Officer | <input type="radio"/> Senior IT Manager |
| <input type="radio"/> Chief Information Officer | <input type="radio"/> IT Manager |
| <input type="radio"/> Director | <input type="radio"/> Program Manager |
| <input type="radio"/> Other (please specify) | |

No of levels between you and the manager you asked support from?

- ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ More

Approximate number of employees in your organization during the project?

- ☐ <50 ☐ <100 ☐ <500 ☐ <1000 ☐ More

What was the approximate number of personnel employed within the IS/IT functional area?

- ☐ <5 ☐ <10 ☐ <30 ☐ <50 ☐ More

What was the approximate number of personnel employed in the project being discussed

- ☐ <5 ☐ <10 ☐ <30 ☐ <50 ☐ More

What was the approximate project budget?

- ☐ <\$1000 ☐ <\$3000 ☐ <\$5000 ☐ <\$7000 ☐ >\$10,000

Which of the below describes your industry best? (mark your selection)

- | | | |
|--|--|--|
| <input type="radio"/> Information Technology | <input type="radio"/> Hospitality & Food | <input type="radio"/> Entertainment |
| <input type="radio"/> Product Manufacturing | <input type="radio"/> Health care | <input type="radio"/> Construction |
| <input type="radio"/> Education | <input type="radio"/> Housing & Construction | <input type="radio"/> Admin & Consultancy services |
| <input type="radio"/> Finance & Banking | <input type="radio"/> Utility (electricity, Gas) | <input type="radio"/> Transport |
| <input type="radio"/> Other (please specify) | | |

Which of the below describes your project best? (mark your selection)

- | | | |
|---|--|---------------------------------|
| <input type="radio"/> Software development | <input type="radio"/> Software migration | <input type="radio"/> Security |
| <input type="radio"/> Software implementation | <input type="radio"/> Software integration | <input type="radio"/> Digital |
| <input type="radio"/> Software upgrade | <input type="radio"/> Infrastructure | <input type="radio"/> eLearning |
| <input type="radio"/> Other (please specify) | | |

Additional Information

Approximate project start date (dd/mm/yy):

Approximate project end date (dd/mm/yy):

How many years did you serve in the organization where you carried out the project?

How many years have you served in a similar capacity in IS/IT in total (including years before and after the project being discussed)?:

Your Gender (male/female):

Your Age:

Your E-mail (Used only to send aggregate results)

Thank you for your participation !!!

You can obtain a copy of the aggregate results by contacting Miss Ochini Madanayaka, e-mail: ocm380@uowmail.edu.au

C.4: Documents Related to the Ethics Process for the Survey Method

Initial Review Letter



In reply please quote: HE13/291

28 June 2013

A/Professor Peter Gibson
School of Mechanical, Materials & Mechatronic Engineering
Faculty of Engineering & Information Services
University of Wollongong NSW 2522
peterg@uow.edu.au;

Dear Associate Professor Gibson

Thank you for submitting your proposal to the Human Research Ethics Committee.

Ethics Number: HE13/291

Project Title: Top Management Support and Information Systems/Information Technology Project Performance: A Managerial Role Perspective

Researchers: A/Professor Peter Gibson, Ms Ochini Madanayake, Mr John Flanagan

Reviewed Date: 28 June 2013

The Committee has reviewed the application in accordance with the NHMRC *National Statement on Ethical Conduct in Human Research* and has asked for the following additional information/modifications:

1. Please provide written confirmation of the research from PMI and ACS.
2. Please be explicit about the exact location for storage re Question 34(a) and (b).
3. The Participant Information Sheet needs more details, eg sample questions, UOW letterhead. See guidelines and examples at <http://www.uow.edu.au/research/ethics/human/UOW127093.html>
4. Please clarify if the "top management" refers to the person completing the survey or immediate supervisors. If the latter, there is some risk involved. Please clarify.

Please send a written response clearly addressing each point above to the Ethics Officer, Research Services Office, University of Wollongong or email it to rso-ethics@uow.edu.au, along with the revised document/s showing changes by either highlighting or using Track Changes. It is not necessary to revise the application form itself, unless specifically asked to do so.

Ethics Unit, Research Services Office
University of Wollongong NSW 2522 Australia
Telephone (02) 4221 3386 Facsimile (02) 4221 4338
Email: rso-ethics@uow.edu.au Web: www.uow.edu.au

Response to the Initial Review Letter

Responses to the initial review HE13/291

Date received: 8/07/2013 Date resubmitted: 10/07/2013

Research Title: Top management support and information systems/ information technology project performance: A managerial role perspective

Request 1: Please include confirmation letters from PMI and ACS

We initially requested support from two professional bodies to secure a substantial database of respondents. These professional bodies are the Project Management Institute's (PMI) Sydney Chapter and Australian Computer Society's (ACS) NSW branch. We have now been able to contact and receive a positive response from a third organisation, i.e. The Australian Institute of Project Management (AIPM). The three corresponding mails are attached herewith. Once the questionnaire is approved by the Ethics committee we will be able to send it out to these professional bodies.

Please see attachment1 - Letters from professional bodies

Request 2: Please be explicit about the exact location of storage, re Question 34 (a) and (b)

During the project: The main source of data collection is via a web link. This link will lead to an online database on <http://www.surveymonkey.com/>. The password to this account will only be available with Miss Ochini Madanayake and A/Prof Peter Gibson. This web site provides the facility to download the data on to an excel sheet. Therefore, the pre analysis data will be in an excel sheet and will be accessed by the three investigators. The storage media are expected to be the computer hard drive of Miss Ochini Madanayake, and back up DVD drives (one each, two in total) which will be kept with A/Prof Peter Gibson and Mr. John Flanagan. We have given the option of completing the questionnaire on paper which will be collected by Miss Ochini Madanayake. In the rare occasion this takes place, the data will be manually amalgamated into the same excel file mentioned above. The paper copies will be kept with Miss Ochini Madanayake.

On Completion of the project: Analysed and summarised forms of data will be used for thesis, journal and conference publications. The data on Miss Ochini Madanayake's computer hard drive will be deleted after thesis submission. If any hard copies were collected they too will be destroyed. Raw data will remain backed up in to DVD drives and copies will be kept (one each, three in total) with the

three investigators. Two will be in a locked filing cabinet controlled by the senior investigator for up to 5 years; the third will be kept by Miss Ochini Madanayake, also up to five years. This is to facilitate an offsite backup scenario as a precautionary method to prevent any loss of data. The DVDs will be the only available data sources; upon completion of the survey the database on <http://www.surveymonkey.com/> will be deleted.

Request 3: The Participant Information Sheet needs more details, eg sample questions, UOW letterhead. See guidelines and examples at <http://www.uow.edu.au/research/ethics/human/UOW127093.html>

The document given in the link was referred to make sure all relevant information has been included and explained succinctly as possible on one page. The following information explicitly requested in the initial review document has also been included in the updated information sheet.

1. UOW letter head
2. Version number
3. Sample questions
4. Anticipated research contributions

Please see attachment 2 – Updated Information sheet

Request 4: Please clarify if the “top management” refers to the person completing the survey or immediate supervisors. If the latter, there is some risk involved. Please clarify.

We have designed our data collection strategy to have minimal risk on the respondents. In fact, a main strength of our research is that the respondents and therefore the data will be free of bias from overbearing influence of the top managers at the workplace, and this is an essential factor in collecting data for the research. Although the term, “Top Management” refers to the immediate supervisor we are not recruiting respondents via their work places. Our method of securing a substantial database of respondents includes reaching out to professional bodies where professionals attend at their own leisure. Any responses given on the survey will remain free of influence from their top managers and will be de-identified and secure and completely independent of the respondent’s workplace. Therefore, there is no risk that any employer or organisation will be able to associate any response with any employee because there is no association between any of them and the data will be completely confidential to the researchers in any case.

Approval for the Survey by the Ethics Committee



In reply please quote: HE13/291

12 July 2013

A/Professor Peter Gibson
School of Mechanical, Materials & Mechatronic Engineering
Faculty of Engineering & Information Services
University of Wollongong NSW 2522
peterg@uow.edu.au

Dear Associate Professor Gibson

Thank you for your response received 11 July 2013 to the HREC review of the application detailed below. I am pleased to advise that the application has been approved.

Please acknowledge that data must be securely stored for 5 years after which time it can be securely destroyed.

Ethics Number: HE13/291
Project Title: Top Management Support and Information Systems/Information Technology Project Performance: A Managerial Role Perspective
Researchers: A/Professor Peter Gibson, Ms Ochini Madanayake, Mr John Flanagan
Approval Date: 11 July 2013
Expiry Date: 10 July 2014

The University of Wollongong/Illawarra Shoalhaven Local Health District Social Sciences HREC is constituted and functions in accordance with the NHMRC *National Statement on Ethical Conduct in Human Research*. The HREC has reviewed the research proposal for compliance with the *National Statement* and approval of this project is conditional upon your continuing compliance with this document.

A condition of approval by the HREC is the submission of a progress report annually and a final report on completion of your project. The progress report template is available at <http://www.uow.edu.au/research/rso/ethics/UOW009385.html>. This report must be completed, signed by the appropriate Head of School, and returned to the Research Services Office prior to the expiry date.

As evidence of continuing compliance, the Human Research Ethics Committee also requires that researchers immediately report:

- proposed changes to the protocol including changes to investigators involved
- serious or unexpected adverse effects on participants
- unforeseen events that might affect continued ethical acceptability of the project.

Please note that approvals are granted for a twelve month period. Further extension will be considered on receipt of a progress report prior to expiry date.

Ethics Unit, Research Services Office
University of Wollongong NSW 2522 Australia
Telephone (02) 4221 3386 Facsimile (02) 4221 4338
Email: rso-ethics@uow.edu.au Web: www.uow.edu.au

If you have any queries regarding the HREC review process, please contact the Ethics Unit on phone 4221 3386 or email rso-ethics@uow.edu.au.

Yours sincerely

A/Professor Garry Hoban
Chair, Social Sciences
Human Research Ethics Committee

APPENDIX D

D.1: Advertisements Used for the Research

The screenshot shows the homepage of the PMI Sydney Australia Chapter. The header includes the PMI logo, the text 'SYDNEY, AUSTRALIA CHAPTER', and a 'LOGIN' link. A navigation bar contains links: Home, About Us, Membership, Events, Professional Development, Get Involved, Resources, and Contact Us. A search bar is located in the top right corner.

The main content area features a large banner for 'Join PMI today...!' with a membership card graphic and text: 'In a competitive global economy, project managers can't go it alone. So turn to PMI membership to give you the tools and support you need to make your mark on the profession. Discover more about what our membership is and what benefits it offers, and choose the type of membership that's best for you. [read more...](#)'

Below the banner, there are three columns of content:

- Left Column:** Buttons for 'Join PMI', 'Renew your MEMBERSHIP', and 'Login Help?'. Below these is a 'NEW Insurance Facility for PMI Members' by 'Perrymans' with a 'Click for more info' link. At the bottom is a 'STAY INFORMED' section with a form for Name and E-mail, and text: 'Not a member? Stay informed on the exciting events by subscribing here...'
- Center Column:** A section titled 'INVITATION TO PARTICIPATE IN A RESEARCH' with a checklist icon. The research title is 'The Effect of Top Management Support on IT/IS Project Performance: A Managerial Role Perspective'. The text states: 'Contribute your valuable knowledge towards a research carried out as part of a PhD program at the University of Wollongong'. Below this is a 'LAUNCH SURVEY!' link: <https://www.surveymonkey.com/s/TMSone>, a 'SurveyFlyer_-_PMINew (195.43 KB)' download link, and contact information: 'Time: Approximately 15-20 minutes', 'Date: Ends by midnight 28th August 2013', 'Inquiries: Oshini Madanayake (MSc, PMP)', and 'Contact: Mobile - 0404955042, E-mail - oom360@uowmail.edu.au'.
- Right Column:** 'Platinum Sponsors' with logos for 'odds' and 'pokus'. Below is an 'UPCOMING EVENTS' section listing: 'Career Building for Project Managers' (05.08.2013), 'PMI Sydney Toastmasters Club Meeting' (07.08.2013), 'Chapter Event - T.U.R.N.' (08.08.2013), 'Short Course: Stakeholder Management' (10.08.2013), and 'PMP and CAPM Certification Prep Class - Aug (20.08 and 27.08)' (20.08.2013). At the bottom is a 'Bay3000 Corporate Education' logo.

At the bottom of the page, there are three small boxes: 'PMI NEWS' with a cartoon character, 'Upcoming Events' with a calendar icon, and 'PMI AUSTRALIA CONFERENCE 2014' with a leaf graphic.

Figure D. 1: PMI Sydney Chapter advertising the research on their home page



Figure D. 2: AIPM NSW Chapter advertising the research on their survey page

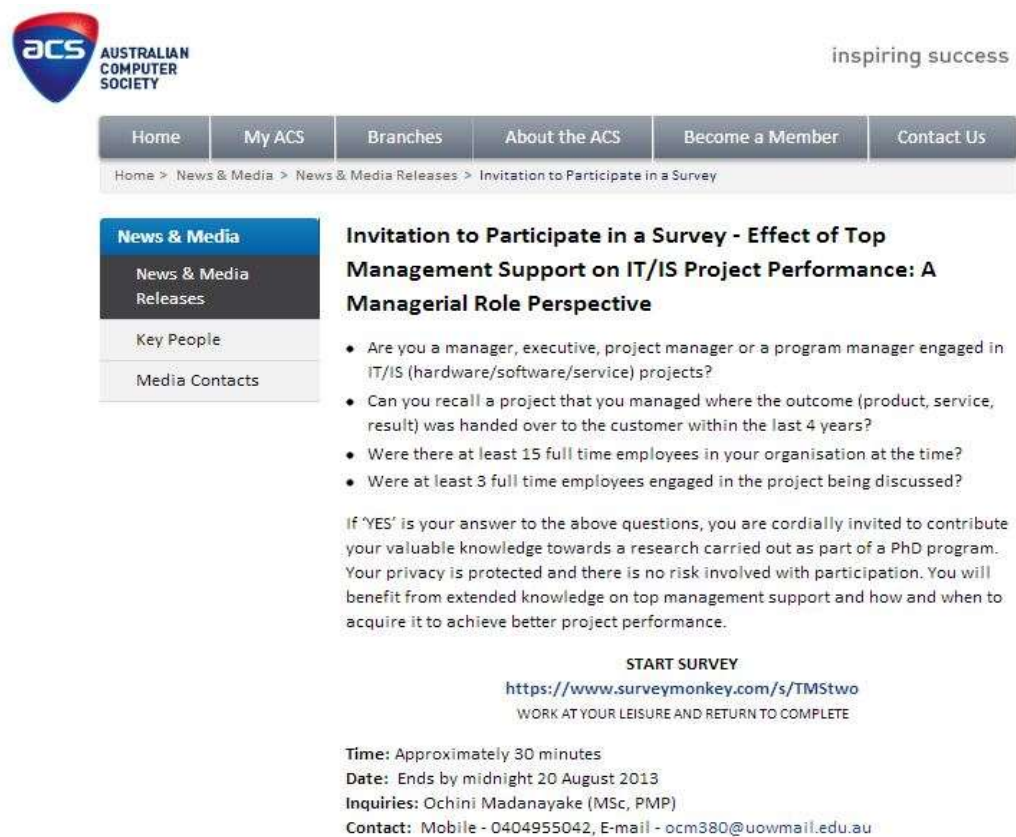


Figure D. 3: ACS sending the survey link via newsletter

INVITATION TO PARTICIPATE IN A RESEARCH
The Effect of Top Management Support on IT/IS
Project Performance: A Managerial Role Perspective



Have you managed IT/IS (hardware/software/service)
projects in the last 4 years?

Were there **15** Full time employees at the time in your organisation

and **3** In the project being discussed



- 1) If 'Yes', please participate in a research conducted as part of a PhD program
- 2) Your **privacy is protected** and there is **no risk** involved with participation
- 3) You will benefit from extended knowledge on top management support and how and when to acquire it to achieve better project performance.

Approx. 15 Minutes

Contact: Ochini on 0404955042 / ochini@hotmail.com

Figure D. 4: Slide used to introduce the research at PMI and AIPM events

D.2: Variable Names Assigned to Questionnaire Items/Measures

Table D. 1: Construct, Measure and Variable Names – ISPP

Construct	Item/Measure	Variable
Learning	The project helped my organisation to acquire knowledge about key techniques in management and/or technology	ISPPL1
	The project helped acquire knowledge about strategic best practices to be employed on the project	ISPPL2
	The project helped acquire knowledge about strategic best practices to be	ISPPL3
	The staff acquired knowledge on new technology while working on the project	ISPPL4
Controlled	The staff acquired knowledge on new technology while working on the project	ISPPC1
	Project progress issues were immediately resolved when discovered	ISPPC2
	Majority of project objectives were achieved	ISPPC3
	Project's time management was commended by the top management	ISPPC4
	Project was completed within the set time period	ISPPC5
	Major schedule changes were avoided on the project	ISPPC6
Quality of Interaction	Knowledge acquired on the project was shared between staff and users	ISPPQ1
	The project's product produces expected outputs	ISPPQ2
	The project's product operates without malfunctioning	ISPPQ3
	Customer was satisfied with the technical performance of the product	ISPPQ4
Technical Performance	The project's product meets the technical specification	ISPPT1
	The project's product produces expected outputs	ISPPT2
	The project's product operates without malfunctioning	ISPPT3
	Customer was satisfied with the technical performance of the product	ISPPT4

Flexibility	The project's product could incorporate changes	ISPPF1
	New requirements were incorporated into the product without disruption	ISPPF2
	Product continued to function without failure after change	ISPPF3
	Changes to the project's product can be made without increases to the project cost	ISPPF4
Financial Performance	The project's product is known to have brought in financial gains for the organisation	ISPPFP1
	The financial benefits gained from the project's product satisfied the expectations	ISPPFP2
	The project's product ensured financial benefits for the organisation	ISPPFP3
	Project's product is considered to be associated with positive financial outputs	ISPPFP4

Table D. 2: Construct, Measure and Variable Names – TMS

Construct	Item/Measure	Variable
Top Management Support	Overall, most top company executives understood and supported the project vision	TMS1
	Overall, top company management helped surmount rather than create obstacles for this project	TMS2
	During team meetings, top company management, if present, frequently made encouraging vs. discouraging remarks	TMS3
	When the team members asked for help from top company management, they received it	TMS4

Table D. 3: Construct, Measure and Variable Names – Managerial Roles

Construct	Item/Measure	Variable
Figurehead	...extended supportive advice on the project	Fig1
	... advised staff on project interactions	Fig2
	... took time to listen to project information	Fig3
	... attended social events organised for project staff	Fig4
		Ldr1
Leader	...encouraged staff training for the project	Ldr2
	... made efforts to enhance project staff development	Ldr3
	... led project staff development	Ldr4
	... boosted project staff motivation	
Liaison	...developed external relationships with regard to the project	Li1
	... contacted people outside the organisation with regard to the project	Li2
	... discussed relevant project functions with external stakeholders	Li3
	... regularly kept in touch with external parties with regard to the project	Li4
Nurturer	... encouraged staff to improve skills needed on the project	Nur1
	... facilitated staff in advancing skills required on the project	Nur2
	... arranged events to facilitate improving project relevant skills	Nur3
	... offered advice on skills building with regard to the project	Nur4
Monitor	... observed milestone presentations with regard to the project	Mo1
	... assisted the schedule progress of the project	Mo2
	... inspected documents to gain an understanding of the project schedule	Mo3
	... investigated project cost factors during meetings	Mo4
	... attended the meetings to keep an eye on the project costs	Mo5
	... advised regarding project costs during project gatherings	Mo6
Disseminator	... sent out documents relevant to the project to staff	Dis1
	... informed staff of functional project specifications	Dis2
	... provided the staff with relevant project information	Dis3
	... communicated newly acquired information on the project to staff	Dis4
S P O	...answered customer queries with regard to the project	SPs1

	... communicated project requirements to the suppliers	SPs2
	... passed on news on the project to stakeholders	SPs3
	... provided necessary project facts to stakeholders	SPs4
Entrepreneur	... improved the current project by initiating change	Ent1
	... introduced new technology for the benefit of the project	Ent2
	... always looked for ways to improve the project	Ent3
	... scouted the environment for fresh ideas to enhance the project	Ent4
Disturbance Handler	... stepped-in during unexpected disturbances on the project	dTr1
	... settled disagreements between staff involved in the project	dTr2
	... provided a solution when presented with a problem with regard to the project	dTr3
	... remedied crisis situations on the project	dTr4
Resource Allocator	... provided resources needed for the project	Res1
	... solved problems of resource requirements with regard to the project	Res2
	... had an eye for the most suitable resources for the project	Res3
	... looked after resource levelling on the project	Res4
Negotiator	... actively participated in negotiations concerning the project	Neg1
	... spoke with stakeholders on behalf of the project	Neg2
	... was available for negotiations with regard to the project	Neg3
	... made time to discuss project matters	Neg4
Technical Expert	... rendered guidance on technical matters pertaining to the project	Tec1
	... lent a helping hand when technical problems came up in the project	Tec2
	... gave directions on technical aspects pertaining to the project	Tec3
	... provided a path of solution for technical crisis on the project	Tec4

D.3: Details on Common Method Bias Examination

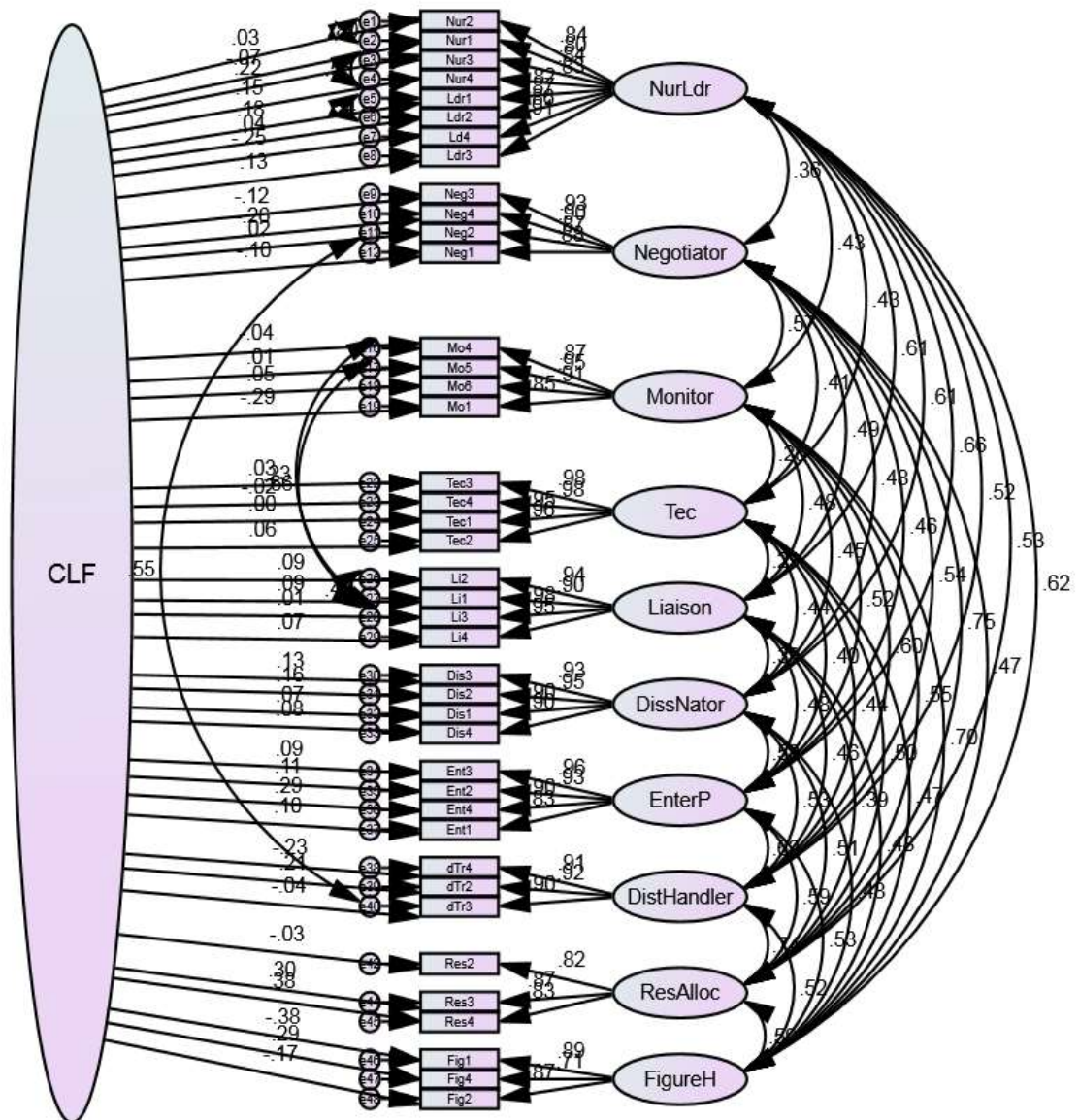


Figure D.5: Common latent factor technique applied to examine for common method bias – Managerial Roles

Table D. 4: Differences in estimates for the models on Managerial Roles - with and without the common latent factor

Variables			Estimate with CLF	Estimate without CLF	Difference in Estimates
Nur2	<---	Nurturing Leader	0.838	0.839	0.001
Nur1	<---	Nurturing Leader	0.802	0.797	-0.005
Nur3	<---	Nurturing Leader	0.839	0.844	0.005
Nur4	<---	Nurturing Leader	0.83	0.837	0.007
Ldr1	<---	Nurturing Leader	0.818	0.804	-0.014
Ldr2	<---	Nurturing Leader	0.874	0.881	0.007
Ld4	<---	Nurturing Leader	0.865	0.835	-0.03
Ldr3	<---	Nurturing Leader	0.914	0.919	0.005
Neg3	<---	Negotiator	0.934	0.945	0.011
Neg4	<---	Negotiator	0.899	0.919	0.02
Neg2	<---	Negotiator	0.87	0.858	-0.012
Neg1	<---	Negotiator	0.878	0.887	0.009
Mo4	<---	Monitor	0.872	0.875	0.003
Mo5	<---	Monitor	0.949	0.945	-0.004
Mo6	<---	Monitor	0.913	0.908	-0.005
Mo1	<---	Monitor	0.853	0.863	0.01
Tec3	<---	Technical Expert	0.982	0.982	0
Tec4	<---	Technical Expert	0.979	0.978	-0.001
Tec1	<---	Technical Expert	0.953	0.954	0.001
Tec2	<---	Technical Expert	0.957	0.958	0.001
Li2	<---	Liaison	0.943	0.946	0.003
Li1	<---	Liaison	0.895	0.899	0.004
Li3	<---	Liaison	0.98	0.978	-0.002
Li4	<---	Liaison	0.945	0.948	0.003
Dis3	<---	Disseminator	0.934	0.944	0.01
Dis2	<---	Disseminator	0.946	0.957	0.011
Dis1	<---	Disseminator	0.903	0.904	0.001
Dis4	<---	Disseminator	0.898	0.901	0.003
Ent3	<---	Entrepreneur	0.957	0.96	0.003
Ent2	<---	Entrepreneur	0.929	0.937	0.008
Ent4	<---	Entrepreneur	0.896	0.922	0.026
Ent1	<---	Entrepreneur	0.826	0.834	0.008
dTr4	<---	Disturbance Handler	0.906	0.932	0.026
dTr2	<---	Disturbance Handler	0.916	0.938	0.022
dTr3	<---	Disturbance Handler	0.9	0.893	-0.007
Res2	<---	Resource Allocator	0.815	0.769	-0.046
Res3	<---	Resource Allocator	0.871	0.937	0.066
Res4	<---	Resource Allocator	0.835	0.888	0.053
Fig1	<---	Figurehead	0.895	0.959	0.064
Fig4	<---	Figurehead	0.715	0.778	0.063
Fig2	<---	Figurehead	0.874	0.883	0.009

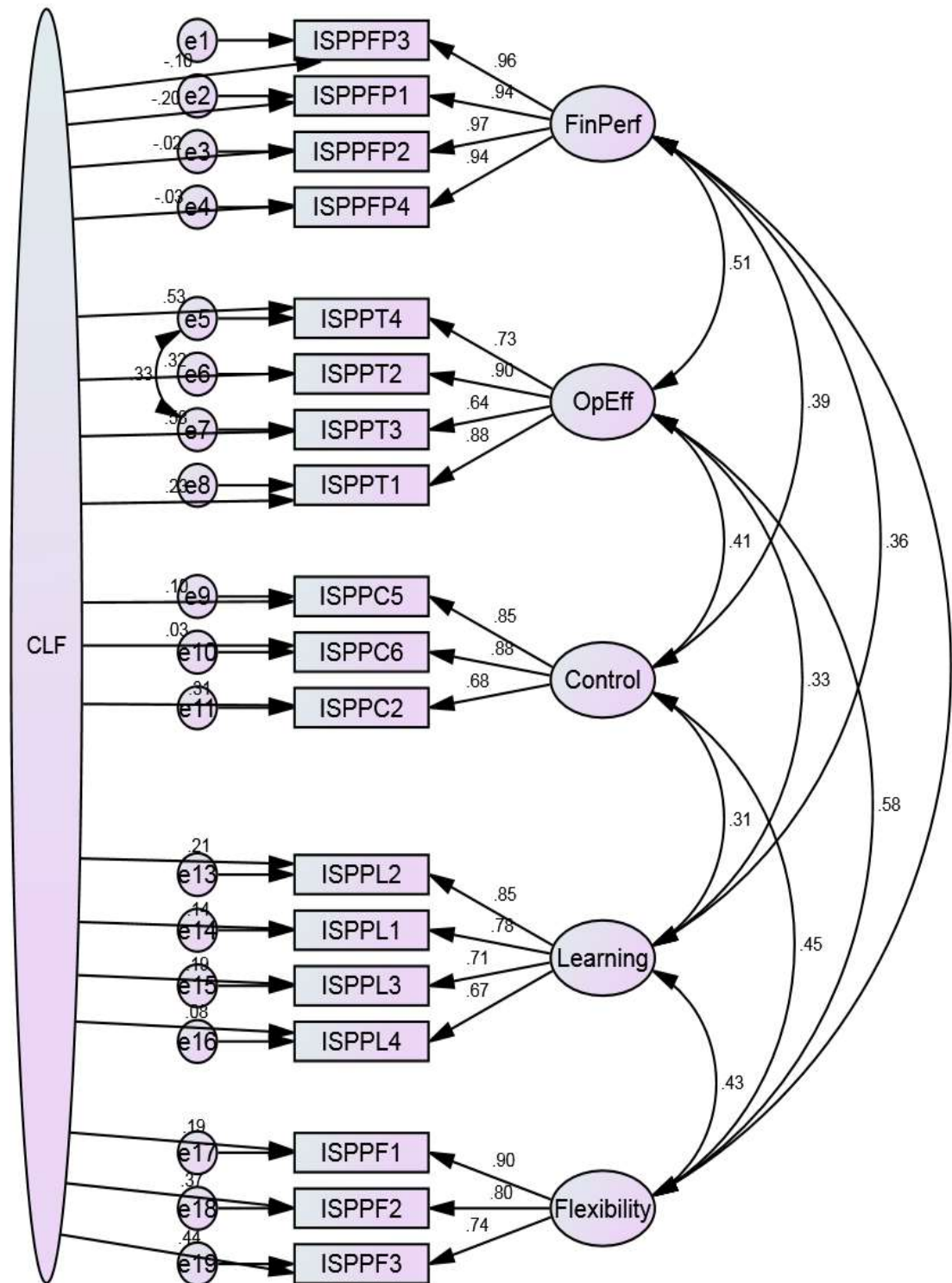


Figure D.6: Common latent factor technique applied to examine for common method bias – Project Performance Dimensions

Table D. 5: The differences in estimates for the models on Project Performance dimensions - with and without the common latent factor

Variables			Estimate with CLF	Estimate without CLF	Difference in Estimates
ISPPFP3	<---	Financial Performance	0.963	0.97	0.007
ISPPFP1	<---	Financial Performance	0.939	0.948	0.009
ISPPFP2	<---	Financial Performance	0.967	0.964	-0.003
ISPPFP4	<---	Financial Performance	0.936	0.937	0.001
ISPPT4	<---	Operational Efficiency	0.728	0.857	0.129
ISPPT2	<---	Operational Efficiency	0.898	0.963	0.065
ISPPT3	<---	Operational Efficiency	0.636	0.782	0.146
ISPPT1	<---	Operational Efficiency	0.877	0.892	0.015
ISPPC5	<---	Control	0.852	0.867	0.015
ISPPC6	<---	Control	0.882	0.866	-0.016
ISPPC2	<---	Control	0.681	0.712	0.031
ISPLL2	<---	Learning	0.849	0.874	0.025
ISPLL1	<---	Learning	0.78	0.792	0.012
ISPLL3	<---	Learning	0.713	0.738	0.025
ISPLL4	<---	Learning	0.675	0.676	0.001
ISPPF1	<---	Flexibility	0.899	0.884	-0.015
ISPPF2	<---	Flexibility	0.804	0.896	0.092
ISPPF3	<---	Flexibility	0.741	0.849	0.108

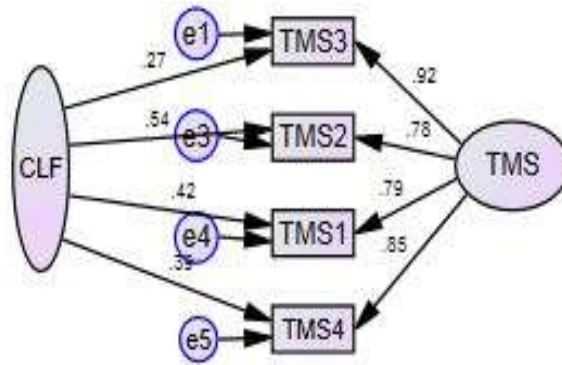


Figure D.7: Common latent factor technique applied to examine for common method bias – Top Management Support

Table D.6: The differences in estimates for the models on TMS - with and without the common latent factor

Variables			Estimate with CLF	Estimate without CLF	Difference in Estimates
TMS3	<---	TMS	0.917	0.936	0.019
TMS2	<---	TMS	0.777	0.912	0.135
TMS1	<---	TMS	0.788	0.884	0.096
TMS4	<---	TMS	0.851	0.936	0.085

APPENDIX E

The questionnaire presented in Appendix C.3 is recommended to be used after removing the following variables/items/measures. An initial list of all variables/items/measures can be found in Appendix D.2.

	Variable	Items/Measures
Project Performance	Quality of Communication Interaction	
	ISPPQ1	Knowledge acquired on the project was shared between staff and users
	ISPPQ2	The project's product produces expected outputs
	ISPPQ3	The project's product operates without malfunctioning
	ISPPQ4	Customer was satisfied with the technical performance of the product
	Flexibility	
	ISPPF4	Changes to the project's product can be made without increases to the project cost
	Control	
	ISPPC1	The staff acquired knowledge on new technology while working on the project
	ISPPC3	Majority of project objectives were achieved
	ISPPC4	Project's time management was commended by the top management

Managerial Roles	Variable	Items/Measures
	Spokesman Role	
	Sps1	...answered customer queries with regard to the project
	SPs2	... communicated project requirements to the suppliers
	SPs3	... passed on news on the project to stakeholders
	SPs4	... provided necessary project facts to stakeholders
	Monitor Role	
	Mo2	... assisted the schedule progress of the project
	Mo3	... inspected documents to gain an understanding of the project schedule
	Figurehead Role	
	Fig3	... took time to listen to project information
	Disturbance Handler Role	
	dTr1	... stepped-in during unexpected disturbances on the project
	Resource Allocator Role	
	Res1	... provided resources needed for the project