

**How transformational leadership and  
advanced technologies foster radical  
innovation: The role of advanced training,  
organisational learning, innovative climate  
and capabilities in large firms**

By

Wafa Abdulllah Ashoor

This thesis is submitted to the  
University of Technology Sydney  
for the degree of Doctor of Philosophy, Management  
UTS Business School  
2019

## **CERTIFICATE OF ORIGINAL AUTHORSHIP**

I, Wafa Ashoor declare that this thesis, is submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the Management/ UTS Business School at the University of Technology Sydney. This thesis is wholly my own work unless otherwise reference or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This research is supported by the Australian Government Research Training Program.

Production Note:

Signed: Signature removed prior to publication.

On: 25 Feb 2019

## ACKNOWLEDGEMENTS

Destiny, they say, is in one's own hands, in the paths chosen and the work undertaken. My PhD is the biggest step that I have taken thus far. Of course, on this path I did not walk alone. Here I would like to acknowledge the support that I have had from various people during this journey.

First of all, I would like to kneel in thanks to Allah Almighty on whom, ultimately, I depend for sustenance and guidance. I acclaim Him for giving me the strength to complete this thesis despite all the ups and downs of my journey. Secondly, I would like to express my gratitude for the generous PhD scholarship funding from the Saudi Arabian Ministry of Higher Education, for without it my continued study would not have been possible.

I would like to most sincerely thank those who have helped to shape my thesis the most: my supervisors, Dr Karen Wang, Dr Paul Wang and Dr Anthony Fee. I am so pleased to have had all of you as my supervisors. You have brought a unique strength to this journey. Your truthful advice throughout my doctoral study has been greatly appreciated, as without your guidance, I don't think I could have submitted a work of this quality.

Thanks go to my principal supervisor, Dr Karen Wang, for the time spent guiding me through the intricacies of moulding my ideas into a research project. I am thankful for all your help and support in providing me with valuable feedback for every single part of this thesis. Without your constant academic support, encouragement and direction I would not have been able to arrive at the end of my doctoral journey. It has been a pleasure to have worked under your supervision. You were so responsive to my academic needs along the way and anxious to ensure that I received all help, support and advice that I needed.

I have also greatly appreciated Dr Paul Wang's invaluable statistical advice, and his comments on the data analysis stage of my research and the time he took to help me become more competent with statistics and to finalise my data analysis. I appreciate every moment we spent on the data analysis for this thesis.

My sincere thanks also go to Dr Anthony Fee. Thank you for your feedback and suggestions on the thesis chapters, for simultaneously being extremely supportive, yet critical, and a perfectionist. I appreciated your constant support, encouragement and direction. Thank you for listening to me and for trying to find solutions for my challenges.

I am also grateful to my friend and supporter Dr Marco Berti, for all our discussions of the theoretical part of my PhD study. Thank you for all your suggestions and encouragement. I would also like to thank Dr John Chelliah, for his support and encouragement throughout my journey. My special thanks to Ms. Elaine Newby who adjusted her time at short notice to help me with the editing of this thesis. I would also like to thank Mr Patrick Tooth for his time and help in referencing to ensure that my final thesis meets recognised standards.

I extend my sincere thanks to UTS, its Graduate Research School (GRS), and to all the generous people from both GRS and UTS Business School who assisted me throughout my journey.

I would like to thank the seven large Saudi Arabian firms for giving me an opportunity to conduct my study and for permitting their employees to participate in this research through an online survey. Next, I would like to thank all the participants for their valuable time in partaking in the survey. My special thanks go to the managers and/or directors who participated in face to face focus groups and provided insight and information for my survey design.

I would like to thank my Mother for her continuing encouragement, support and prayers for me. I would not be here nor have been able to take this step in my life if she had not been here to support me with her prayers.

No words can express my gratitude to my husband Abdulraheem Taleb. I ask you — after Allah Almighty — to accept my greatest thanks and sincere appreciation for having helped me achieve this stage in my life. In times of gladness and sadness over many years,

you have always been by my side supporting my academic endeavours. Thank you from the bottom of my heart. I could not have done this without you. May Allah continue to bless our life with love and happiness. As I conclude this precious thesis, I promise you that we will be next to each other for ever and we will continue achieving our dreams together.

I also want to thank our children, Rayan and Layan, for their support and patience, for as their mother I worked long hours to complete this thesis. I am happy to be able to now devote more time to you. I also would like to thank my brothers and sisters and my mother-in-law for their love, care and strong family support.

Finally, Nisreen Al-Khani and Khaled Al-Zeem thank you for being there for me as my good friends and for looking after me during the toughest times. Thank you for all the laughs and the time we spent together. And thank you for being wonderful and great caring mates here in Australia.

If I have forgotten to mention anyone's kindness, may they please forgive me. I thank all those who have helped me on my journey and in the writing of this thesis and hope that those who read what follows, enjoy it. Please note that the responsibility for any errors that readers encounter is, of course, ultimately mine.

In the loving memory of my dad, Abdullah Ashoor.  
~ I miss you and I wish you were with me to feel proud of my  
achievement ~

## TABLE OF CONTENTS

CERTIFICATE OF ORIGINAL AUTHORSHIP .....	i
ACKNOWLEDGEMENTS .....	ii
TABLE OF CONTENTS.....	vi
LIST OF TABLES.....	ix
LIST OF FIGURES .....	x
ABSTRACT.....	xi
CHAPTER ONE: INTRODUCTION AND OVERVIEW OF STUDY.....	1
1.1 Introduction.....	1
1.2 Research Background and Research Problems .....	2
1.3 Research Questions .....	10
1.4 Research Methodology .....	11
1.5 Significance of the Study .....	11
1.5.1 Theoretical Contributions .....	12
1.5.2 Managerial Contributions .....	15
1.6 The Structure of the Thesis .....	16
1.7 Summary of the Chapter .....	18
CHAPTER TWO: LITERATURE REVIEW AND DEVELOPMENT OF HYPOTHESES .....	20
2.1 Introduction.....	20
2.2 Overview of Large Firms .....	25
2.2.1 Role and Issues for Large Firms Regarding Innovation .....	26
2.3 Innovation in Saudi Arabia .....	28
2.4 Foundational Theory Applied in the Thesis.....	33
2.5 Radical Innovation Overview .....	36
2.5.1 Transformational Leadership and Radical Innovation.....	38
2.5.2 Advanced Technology and Radical Innovation .....	42
2.6 Development of Hypotheses .....	46
2.6.1 Transformational Leadership and Innovation Capability .....	51
2.6.2 Transformational Leadership and Advanced Training .....	51
2.6.3 Advanced Training and Innovative Climate .....	56
2.6.4 The Mediating Effect of Advanced Training.....	61

2.6.5 Transformational Leadership and Organisational Learning .....	62
2.6.6 Organisational Learning and Innovative Climate .....	67
2.6.7 The Mediating Effect of Organisational Learning .....	70
2.6.8 Advanced Technology and Innovation Capability .....	71
2.6.9 Advanced Technology and Advanced Training .....	74
2.6.10 Advanced Technology and Organisational Learning .....	77
2.6.11 Innovative Climate and Innovation Capability .....	80
2.6.12 The Mediating Effect of Innovative Climate .....	83
2.6.13 Innovation Capability and Radical Innovation .....	87
2.7 Overall Theoretical Model .....	90
2.8 Chapter Summary .....	91
CHAPTER THREE: RESEARCH METHODOLOGY .....	93
3.1 Introduction .....	93
3.2 Research Paradigm .....	94
3.3 Research Methods .....	97
3.3.1 The Differences in Quantitative and Qualitative Research Methods .....	98
3.3.2 Justification for the Quantitative Research Method .....	100
3.4 Research Design .....	104
3.4.1 Level of Analysis .....	106
3.5 Sample Design .....	107
3.5.1 Sample of Firms .....	107
3.5.2 Sample of Respondents (Target Population) .....	109
3.5.3 Sample Size .....	109
3.5.4 Demographic Characteristics of Respondents .....	111
3.6 Data Collection .....	113
3.7 Measures .....	114
3.8 Procedure .....	120
3.8.1 Questionnaire Development .....	122
3.8.2 Focus Group (Pilot-Test) .....	127
3.8.3 Survey Instructions .....	128
3.8.4 Survey Structure .....	129
3.8.5 Questionnaire Language .....	129
3.8.6 Creation and Testing of the Online Instrument .....	129

3.9 Ethical Considerations .....	130
3.10 Ethical approval .....	131
3.11 Chapter Summary .....	131
CHAPTER FOUR: DATA ANALYSIS AND RESULTS .....	133
4.1 Introduction.....	133
4.2 Reliability Analysis.....	134
4.2.1 Reliability Analysis for Each Construct.....	135
4.3 Exploratory Factor Analysis .....	138
4.3.1 Kaiser-Meyer-Olkin (KMO) and Bartlett’s Test of Sphericity.....	140
4.3.2 Exploratory Factor Analysis of Each Factor.....	141
4.3.3 Exploratory Factor Analysis: Seven-Factor Solution .....	150
4.4 Common Method Variance (Bias).....	152
4.5 Confirmatory Factor Analysis (CFA).....	153
4.6 Composite Reliability and Average Variance Extracted .....	159
4.7 Descriptive Analysis – Mean Ratings.....	164
4.8 Hypotheses Testing and Model Fit via Structural Equation Modelling.....	166
4.8.1 The Model Fit Testing Via Structural Equation Modeling .....	166
4.8.2 Assessment Indexes .....	167
4.8.3 Assessment of Overall Model Fit.....	171
4.9 Mediation Analysis and Findings .....	173
4.10 Hypotheses Testing and Findings .....	174
4.11 Summary of the Chapter .....	182
CHAPTER FIVE: DISCUSSION AND CONCLUSION.....	184
5.1 Introduction.....	184
5.2 Discussion.....	184
5.2.1 Theoretical Contributions .....	185
5.2.2 Managerial Contributions .....	195
5.5 Limitations and Future Research .....	198
5.6 Conclusion .....	201
REFERENCES .....	203
APPENDICES .....	246

## LIST OF TABLES

Table 1.1	Definition of the Study Constructs.....	9
Table 2.1	The Main Advantages of Large Firms .....	26
Table 3.1	Measures Used in Recent Studies Relating to Transformational Leadership, Advanced Technology and Radical innovation.....	102
Table 3.2	Overview of Research Design_ .....	106
Table 3.3	Descriptive Characteristics of the Seven Large Saudi Arabian Firms .....	108
Table 3.4	Summary of Sample Size.....	110
Table 3.5	Descriptive Statistics of Samples Surveyed.....	111
Table 3.6	Descriptive Statistics of Sample Surveyed .....	112
Table 3.7	Questionnaire Items Adopted in the Study .....	124
Table 4.1	Reliability Results of All Constructs .....	135
Table 4.2	Reliability Analysis for Each Construct.....	136
Table 4.3	EFA Criteria Selected in Dialogue Boxes under Factor Analysis .....	139
Table 4.4	Kaiser- Meyer-Olkin and Bartlett's Test of Sphericity (SPSS Output).....	141
Table 4.19	KMO Measure of Sampling Accuracy and Bartlett's Test of Sphericity .....	151
Table 4.20	Total Variance Explained - All Items .....	152
Table 4.21	The Results of Unconstrained and Zero- Constrained Model.....	155
Table 4.22	Results of Confirmatory Factor Analysis.....	158
Table 4.23	The Results of the Discriminant Validity Test between the Constructs .....	161
Table 4.24	The Correlation between the Factors .....	162
Table 4.25	Highest Shared Variance of the constructs .....	162
Table 4.26	The Summary results of Factor Analysis.....	163
Table 4:27	Descriptive Statistics and Correlations Matrix (N=237).....	165
Table 4.28	Model Fit Assessment Indices .....	171
Table 4.29	Summary Statistics of Model Fit .....	172
Table 4.30	Results of Mediation Analysis Using Bootstrapping.....	173
Table 4:31	Parameter Estimates of the Final SEM Model and the Results of Hypotheses Tests ....	181
Table 4.32	The Results of the Mediation Hypotheses .....	182

## LIST OF FIGURES

Figure 1.1 The Proposed Model of the Development of Radical Innovation in Large Firms.....	8
Figure 1.2 Structure of the Study.....	17
Figure 2.1 The Proposed Model of the Development of Radical Innovation in Large Firms.....	25
Figure 2.2 Economic Phases of Saudi Arabia.....	29
Figure 2.3 The Model for Innovation in Saudi Arabia.....	31
Figure 2.4 The Proposed Model of the Development of Radical Innovation in Large Firms.....	91
Figure 3.1 Four Paradigms for the Analysis of Social Theory .....	95
Figure 3.2 Summary of Data Collection Procedures .....	122
Figure 4.1 Path Diagram with Estimated Path Coefficients (Maximum Likelihood Estimates) ...	157
Figure 4.2 SEM Path Diagram: Testing the Proposed Model of the Development of Radical Innovation in Large Firms .....	166
Figure 4.3 The Proposed Model of the Development of Radical Innovation in Large Firms.....	182

## ABSTRACT

Radical innovation is a key enabler to sustained competitive advantage and long-term success of firms. Despite its importance, there is lack of understanding of what components of a firm are able to best promote this type of innovation in dynamic market environments. Drawing on the dynamic capability theory, this study investigates how transformational leadership as a ‘human factor’ and advanced technology as a ‘machinery factor’ can ‘in parallel’ encourage radical innovation. This study proposes a conceptual framework and empirically tests path-dependent influences of: transformational leadership, advanced technology, advanced training, organisational learning, innovative climate and innovation capability on radical innovation within the specific sphere of large Saudi firms.

To fulfil the purpose of this study, a deductive approach was used, and the unit of analysis was at the individual level to examine the hypothesised relationships between factors. Focus group discussions and a pilot-test are applied to ensure content appropriateness and validity of the measurement items in the tested model. The sample for this study consists of seven large firms in four different sectors. The target population includes only employees working in innovative activities in large firms who have first-hand knowledge of organisational features that contribute to the innovation processes. Data were collected via an online survey from seven large Saudi firms in four different sectors, resulting in 237 usable responses for analysis. The hypotheses were examined by employing Structural Equation Modelling (SEM) with the statistical software program AMOS version 24.

The conceptual framework of the study was affirmed and supported by empirical results. The results indicate that both transformational leadership and advanced technology are two significant determiners for successful radical innovation in large firms. The findings reveal that both transformational leadership and advanced technology enhance the positive effects of organisational learning and advanced training on innovative climate. An improved innovative climate then has a direct positive influence on innovation capability, which promotes radical innovation.

This study contributes to the existing body of the innovation literature by explicating the parallel effect of transformational leadership and advanced technology on cultivation of the innovation capabilities necessary for radical innovation. It enriches the existing literature by explaining how transformational leadership and advanced technology influence organisational learning, advanced training, and innovative climate to create innovation capabilities respectively. Moreover, it contributes to the innovation literature by identifying and addressing that innovative climate is a significant mediating factor on the relationship between both of advanced training and organisational learning on innovation capability. The findings of this study offer a set of implications for practitioners and executives to assist them to support radical innovation outcomes through, for instance, recruiting for and/or developing a preferred leadership style, how technology might be deployed, and ways to configure these in order to produce a more innovative climate in the organisation.

Finally, the current study provides a number of avenues for future research on similar topics, including the suggestion to replicate this study within different settings, including other Arabian Gulf and Middle Eastern countries.

**Keywords:** Radical innovation, transformational leadership, advanced technology, innovative climate, innovation capability, organisational learning, advanced training