

**A Dynamic Capability Perspective on International Technology
Transfer (ITT): The Role of Path Dependencies and ITT
Resources**

By

Amila Suranjeewa Withanaarachchi

B.Sc (Special) in Industrial Management (Kelaniya, Sri Lanka)

Masters in Financial Analysis (La Trobe, Australia)

M. Phil in Industrial Management (Kelaniya, Sri Lanka)

A thesis submitted for the degree of Doctor of Philosophy, Newcastle Business School,
Faculty of Business and Law, University of Newcastle, New South Wales, Australia

July 2020

This research was supported by an Australian Government
Research Training Program (RTP) Scholarship

Statement of Originality

I hereby certify that the work embodied in the thesis is my own work, conducted under normal supervision. The thesis contains no material which has been accepted, or is being examined, for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to the final version of my thesis being made available worldwide when deposited in the University's Digital Repository, subject to the provisions of the Copyright Act 1968 and any approved embargo.

Amila Suranjeewa Withanaarachchi

30 July 2020

Acknowledgements

This thesis is a result of the dedicated effort of many individuals who supported me in many different ways and who immensely encouraged me throughout every step of this PhD journey. Full of gratitude, I wish to take this opportunity to extend my thanks and appreciation to everyone who lent me a helping hand and gave me support during my study.

First and foremost, I am very grateful to my supervisors, Professor Siegfried Gudergan and Associate Professor Hao Tan, for their guidance, advice and support throughout every step of my PhD journey. Specifically, I appreciate all their continuous efforts and valuable time spent refining and shaping my thesis. I am very thankful for the opportunity to work under their supervision, as I have learnt a great deal from their expertise and experience. Without their prompt feedback, constructive comments and intellectual insights, I would not have been able to accomplish this doctoral thesis.

My great appreciation goes to the University of Newcastle for awarding me the UNRSC5050 with UNIPRS scholarship for my PhD studies. I am also very thankful to all the staff at the Newcastle Business School and the entire Faculty of Business and Law for all the support they gave me from my time of enrolment to the day of submission. Specifically, my sincere gratitude goes to Associate Professor Suzanne Rayan, who always encouraged and supported me in every possible way.

I could not have completed my doctoral studies without the unconditional support and encouragement of my loving family. My heart full of gratitude goes to my parents, Bernard Withanaarachchi and Gnana Withanaarachchi, who taught me to stand strong and face challenges in life with confidence. Their guidance, encouragement and, most importantly, unconditional love helped me overcome difficult times in my life, and their inheritance inspired me to help others who require a helping hand in this PhD journey.

Last, but definitely not least, my deepest gratitude goes to the angel of my life, my wife, Kulna Weerakkody. Sacrificing her lucrative future in Sri Lanka, she was with me throughout every step of my PhD journey. Throughout the good times and bad times, she encouraged me, helped me, and most importantly loved me unconditionally. Without her being alongside me on this journey, this doctoral thesis would never have reached a conclusion. My heart full of love and

gratitude goes to her, and I immensely appreciate all the sacrifices she made for me to pursue my academic and career aspirations.

Dedication

I dedicate this thesis to my parents, Bernard Withanaarachchi and Gnana Withanaarachchi, who taught me the value of education and who laid a solid foundation for me to be who I am today. I also dedicate this thesis to my loving wife, Kulna Weerakkody, who fills my life with joy and happiness and who teaches me to smile not only on bright days, but most importantly on gloomy days.

List of Abbreviations

AVE	Average Variance Extracted
CEB	Ceylon Electricity Board
CI	Confidence Interval
CLF	Common Latent Factor
CTA	Confirmatory Tetrad Analysis
DC	Dynamic Capability
DCF	Dynamic Capability Framework
FDI	Foreign Direct Investment
HREC	Human Research Ethics Committee
HTMT	Heterotrait–Monotrait Ratio of Correlations
IB	International Business
IJV	International Joint Venture
IPR	Intellectual Property Rights
IRR	Internal Rate of Return
ITT	International Technology Transfer
MICOM	Measurement Invariance of Composite Models
MNE	Multinational Enterprise
NPV	Net Present Value
OECD	Organisation for Economic Co-operation and Development
PLS-MGA	Partial Least Squares Multi-group Analysis
PLS-SEM	Partial Least Squares Structural Equation Modelling
PUC	Public Utilities Commission
R&D	Research and Development
RBV	Resource-based View
ROA	Return on Assets
SPSS	Statistical Package for the Social Sciences
TR&Cs	Technology Resources and Ordinary Capabilities
UNIDO	United Nations Industrial Development Organization

Contents

Statement of Originality	i
Acknowledgements	ii
Dedication	iv
List of Abbreviations	v
Contents	vi
List of Figures	xi
List of Tables	xii
Abstract	xx
Chapter 1: Introduction	1
1.1 Introduction.....	1
1.2 Background	2
1.3 Literature Review and Research Questions	4
1.3.1 Critical Review of International Business Literature on International Technology Transfer	4
1.3.2 Critical Review of International Technology Transfer Literature	5
1.3.3 Research Questions.....	6
1.4 Summary of Research Hypotheses	7
1.4.1 Chapter 2: International Technology Transfer and Firm-, Industry- and Institution-level Path Dependencies—Evidence from Sri Lankan Renewable Energy Firms	9
1.4.2 Chapter 3: Dynamic Capabilities in International Technology Transfer Contexts—Moderating Roles of Industry and Institution Developments and Environmental Turbulence	10
1.4.3 Chapter 4: Dynamic Capabilities in International Technology Transfer Contexts—Moderating Roles of Internal Specialists and External Intermediaries	11
1.5 Contributions of the Thesis	12
1.5.1 Theoretical Implications	12
1.5.2 Managerial Implications	14
1.6 Limitations and Further Research Directions	15
1.7 Organisation of Thesis	16
Chapter 2: International Technology Transfer and Firm-, Industry- and Institution- level Path Dependencies—Evidence from Sri Lankan Renewable Energy Firms	19
Abstract.....	19
2.1 Introduction.....	20
2.2 Literature Review.....	23
2.2.1 Literature Review on International Technology Transfer Processes and Firm Performance.....	23
2.2.2 Literature Review on Path Dependencies in the International Technology Transfer Context.....	26
2.3 Preliminary Theory	27

2.3.1 Microfoundations of Dynamic Capability–enabled International Technology Transfer	28
2.3.1.1 <i>International Technology Transfer Sensing</i>	28
2.3.1.2 <i>International Technology Transfer Seizing</i>	29
2.3.1.3 <i>International Technology Transfer Reconfiguring</i>	29
2.3.2 Dynamic Capabilities and Path Dependencies	30
2.3.2.1 <i>Firm Level</i>	30
2.3.2.2 <i>Industry Level</i>	31
2.3.2.3 <i>Institution Level</i>	31
2.4 Research Design and Process.....	32
2.4.1 Method	32
2.4.2 Research Setting and Case	34
2.4.3 Research Process.....	35
2.5 Findings.....	41
2.5.1 Firm-level Evidence.....	41
2.5.1.1 <i>Sensing Routines</i>	41
2.5.1.2 <i>Seizing Routines</i>	43
2.5.1.3 <i>Reconfiguring Routines</i>	44
2.5.2 Industry-level Evidence	47
2.5.2.1 <i>Sensing Routines</i>	47
2.5.2.2 <i>Seizing Routines</i>	48
2.5.2.3 <i>Reconfiguring Routines</i>	50
2.5.3 Institution-level Evidence	53
2.5.3.1 <i>Sensing Routines</i>	53
2.5.3.2 <i>Seizing Routines</i>	54
2.5.3.3 <i>Reconfiguring Routines</i>	55
2.6 Discussion and Implications	59
2.6.1 Implications for Theory	61
2.6.2 Implications for Practice.....	64
2.6.3 Limitations and Further Research.....	65
Chapter 3: Dynamic Capabilities in International Technology Transfer Contexts— Moderating Roles of Industry and Institution Developments and Environmental Turbulence.....	66
Abstract.....	66
3.1 Introduction.....	67
3.2 Theory and Hypotheses.....	69
3.2.1 Microfoundations of International Technology Transfer Dynamic Capabilities....	69
3.2.1.1 <i>International Technology Transfer Sensing</i>	69
3.2.1.2 <i>International Technology Transfer Seizing</i>	70
3.2.1.3 <i>International Technology Transfer Reconfiguring</i>	71
3.2.2 Mediating Role of Technology Resources and Ordinary Capabilities	71
3.2.3 Moderating Effect of Technological Development in the Industry	72
3.2.4 Moderating Effect of Institution Development.....	74
3.2.5 Effect of Environmental Turbulence	75
3.2.5.1 <i>Political Turbulence</i>	76
3.2.5.2 <i>Competitor Turbulence</i>	77
3.2.5.3 <i>Technological Turbulence</i>	77
3.2.5.4 <i>Market Turbulence</i>	79
3.3 Research Methodology	80
3.3.1 Data Source.....	80

3.3.2 Sample	83
3.3.3 Constructs and Measurement.....	83
3.3.3.1 <i>Dependent Variable</i>	84
3.3.3.2 <i>Independent Variables</i>	85
3.3.3.3 <i>Control Variables</i>	88
3.3.4 Questionnaire Development	90
3.3.5 Data Collection	91
3.3.6 Analytical Procedure.....	92
3.4 Results.....	93
3.4.1 Preliminary Data Analysis	94
3.4.1.1 <i>Assessment and Treating of Missing Data, Suspicious Response Patterns</i> <i>and Outliers</i>	94
3.4.1.2 <i>Data Distribution Assessment</i>	95
3.4.1.3 <i>Common Method Bias Analysis</i>	95
3.4.2 Assessing the Measurement Models.....	97
3.4.2.1 <i>Internal Consistency</i>	97
3.4.2.2 <i>Convergent Validity</i>	98
3.4.2.3 <i>Discriminant Validity</i>	99
3.4.3 Assessing the Structural Model	100
3.4.4 Testing for Hypothesised Effects of Base Model	101
3.4.5 Testing for Moderating Effects of Industry Development.....	106
3.4.6 Testing for Moderating Effects of Institution Development.....	108
3.4.7 Testing for Moderating Effects of Environmental Turbulence.....	111
3.4.7.1 <i>Testing for Moderating Effects of Political Turbulence</i>	112
3.4.7.2 <i>Testing for Moderating Effects of Competitor Turbulence</i>	114
3.4.7.3 <i>Testing for Moderating Effects of Technological Turbulence</i>	116
3.4.7.4 <i>Testing for Moderating Effects of Market Turbulence</i>	119
3.5 Discussion and Implications	132
3.5.1 Discussion of the Base Model	132
3.5.2 Moderation Effect of Industry Development.....	133
3.5.3 Moderation Effect of Institution Development.....	134
3.5.4 Moderation Effect of Environmental Turbulence.....	134
3.5.4.1 <i>Discussion on Political Turbulence</i>	135
3.5.4.2 <i>Discussion on Competitor Turbulence</i>	135
3.5.4.3 <i>Discussion on Technological Turbulence</i>	136
3.5.4.4 <i>Discussion on Market Turbulence</i>	137
3.5.5 Theoretical Implications	138
3.5.6 Managerial Implications	141
3.6 Conclusion	142
3.6.1 Limitations and Directions for Further Research	142
Chapter 4: Dynamic Capabilities in International Technology Transfer Contexts— Moderating Roles of Internal Specialists and External Intermediaries	144
Abstract	144
4.1 Introduction.....	145
4.2 Theory and Hypotheses.....	146
4.2.1 Microfoundations of International Technology Transfer Dynamic Capabilities..	146
4.2.1.1 <i>International Technology Transfer Sensing</i>	146
4.2.1.2 <i>International Technology Transfer Seizing</i>	147
4.2.1.3 <i>International Technology Transfer Reconfiguring</i>	147
4.2.2 Mediating Role of Technology Resources and Ordinary Capabilities	148

4.2.3 Moderating Effect of Specialised International Technology Transfer Staff.....	148
4.2.4 Moderating Effect of External International Technology Transfer Intermediaries	150
4.3 Research Methodology	153
4.3.1 Data Source and Sample	153
4.3.2 Constructs and Measurement.....	154
4.3.2.1 <i>Dependent Variable</i>	154
4.3.2.2 <i>Independent Variables</i>	155
4.3.2.3 <i>Control Variables</i>	157
4.3.3 Questionnaire Development	159
4.3.4 Data Collection	159
4.3.5 Analytical Procedure.....	160
4.4 Data Analysis and Results	160
4.4.1 Preliminary Data Analysis	161
4.4.1.1 <i>Assessment and Treatment of Missing Data, Suspicious Response Patterns and Outliers</i>	161
4.4.1.2 <i>Data Distribution Assessment</i>	162
4.4.1.3 <i>Common Method Bias Analysis</i>	162
4.4.2 Assessing the Measurement Models.....	162
4.4.2.1 <i>Internal Consistency</i>	162
4.4.2.2 <i>Convergent Validity</i>	163
4.4.2.3 <i>Discriminant Validity</i>	163
4.4.3 Assessing the Structural Model	164
4.4.4 Assessment of Hypothesised Effects of Base Model.....	164
4.4.5 Assessment of Moderating Effects of Specialised International Technology Transfer Staff.....	165
4.4.6 Assessment of Moderating Effects of External International Technology Transfer Intermediaries	167
4.5 Discussion and Implications	174
4.5.1 Moderation Effect of Specialised International Technology Transfer Staff.....	174
4.5.2 Moderation Effect of External International Technology Transfer Intermediaries	175
4.5.3 Theoretical Implications	177
4.5.4 Managerial Implications	178
4.6 Conclusion	180
4.6.1 Limitations and Directions for Further Research	180
Chapter 5: Conclusion.....	182
5.1 Introduction.....	182
5.2 Contribution to Theory	186
5.3 Managerial Implications	187
5.4 Limitations and Further Research Directions	188
References.....	190
Appendices.....	221
Appendix A1: General Supporting Documents, Approvals and Permissions	221
Appendix A2: Questionnaire Development.....	232
Appendix A3: Preliminary Data Analysis	255
Appendix A4: Assessment of Measurement Model	299
Appendix A5: Assessment of Base Model	318
Appendix A6: Measurement Invariance Assessment	331

Appendix A7: Sources of Secondary Data Used in Abductive Study	335
Appendix B: Supplementary Analysis Specific to Chapter 3	344
Appendix C: Supplementary Analysis Specific to Chapter 4	373

List of Figures

Figure 1.1: Theoretical Framework	8
Figure A3.1: Cook's Distance.....	260
Figure A3.2: Latent Factor Added and Connected to All Observed Items.....	271
Figure A4.1: The Measurement Model.....	299
Figure A5.1: Base Model with Control Variables	318
Figure A5.2: Mediation Effect of TR&Cs	319
Figure A5.3: Base Model without Control Variables	323
Figure A5.4: Test for Mediation Effect of TR&Cs without Control Variables.....	326
Figure A6.1: The MICOM Process (based on Schlägel & Sarstedt, 2016)	331
Figure B.1: Model with Control Variables	344
Figure C.1: Model with Control Variables	373

List of Tables

Table 1.1: Summary of Research Questions and Hypotheses	8
Table 2.1: Selected Studies Based on Abductive Research Design that Primarily Relied on Secondary Data Sources	37
Table 2.2: Trustworthiness of the research process	39
Table 2.3: Specific Case Evidence Used to Illustrate DC-enabled ITT Processes Deployed to Break Three Levels of Path Dependencies	41
Table 2.4: Case Evidence of Firm-level Path Dependencies and How Firms Deploy ITT DC Routines to Break Path Dependencies and Leverage Technology Capabilities	46
Table 2.5: Case Evidence on Industry-level Path Dependencies and How Firms Deploy ITT DC Routines to Break Path Dependencies and Leverage Technology Capabilities	51
Table 2.6: Case Evidence on Institution-level Path Dependencies and How Firms Deploy ITT DC Routines to Break Path Dependencies and Leverage Technology Capabilities	57
Table 3.1: Demographic Statistics of Industries and Two Country Contexts.....	81
Table 3.2: Response Rate for the US, Chinese and Combined Data	83
Table 3.3: Assessing Direct Effect of Chinese, US and Combined Data Samples.....	102
Table 3.4: Assessing Mediation Effect of TR&Cs for Chinese, US and Combined Data Samples	103
Table 3.5: Assessing Control Variables for Chinese, US and Combined Data Samples.....	104
Table 3.6: Moderating Effect Based on Low, Medium and High Levels of Industry Subgroups	122
Table 3.7: Moderating Effect Based on Low, Medium and High Levels of Institution Subgroups	123
Table 3.8: Moderating Effect Based on Low, Medium and High Levels of Political Turbulence Subgroups	124
Table 3.9: Moderating Effect Based on Low, Medium and High Levels of Competitor Turbulence Subgroups	126
Table 3.10: Moderating Effect Based on Low, Medium and High Levels of Technological Turbulence Subgroups	128

Table 3.11: Moderating Effect Based on Low, Medium and High Levels of Market Turbulence Subgroups	130
Table 4.1: Moderating Effect and Multi-group Analysis Based on Availability of Specialised ITT Staff	172
Table 4.2: Moderating Effect and Multi-group Analysis Based on Interactions with External ITT Intermediaries.....	173
Table A2.1: Summary of Definitions of Constructs and Related References	233
Table A2.2: Initial Survey Instrument Developed Based on Literature Review	235
Table A2.3: Changes and Refinements Made to Measures for Constructs Following Pre- test.....	242
Table A2.4: Summary of Indicators Deleted at Pilot Stage.....	244
Table A2.5: Summary of Indicators Reworded at Pilot Stage.....	245
Table A3.1: US Data Skewness and Kurtosis.....	261
Table A3.2: Chinese Data Skewness and Kurtosis.....	263
Table A3.3: US and Chinese Combined Data Skewness and Kurtosis	264
Table A3.4: Harman’s Single-factor Test Summary	268
Table A3.5: Harman’s Single-factor Test for US Data.....	268
Table A3.6: Harman’s Single-factor Test for Chinese Data.....	268
Table A3.7: Harman’s Single-factor Test for US and Chinese Combined Data	268
Table A3.8: Standardised Regression Weights with and without CLF	269
Table A3.9: Response Rate for US, Chinese and Combined Data	272
Table A3.10: Demographic Statistics	272
Table A3.11: Indicators of Constructs TT_RECONFIG and MANAGER Included in CTA-PLS	276
Table A3.12: Indicators of the Constructs ENV_COM Included in CTA-PLS	277
Table A3.13: Indicator Correlations for US Data.....	278
Table A3.14: Indicator Correlations for Chinese Data	280
Table A3.15: Indicator Correlations for US and Chinese Combined Data.....	282
Table A3.16: CTA-PLS Results for US Data	284
Table A3.17: CTA-PLS Results for Chinese Data	289
Table A3.18: CTA-PLS Results for US and Chinese Combined Data Sample.....	294
Table A4.1: Cronbach’s Alpha for US, Chinese, and US and Chinese Combined Datasets.	300
Table A4.2: Composite Reliability for US, Chinese, and US and Chinese Combined Datasets.....	300

Table A4.3: Outer Loadings for US, Chinese, and US and Chinese Combined Datasets	301
Table A4.4: AVE of US, Chinese, and US and Chinese Combined Datasets	302
Table A4.5: Loading and Cross-loadings of Constructs for US Dataset	304
Table A4.6: Loading and Cross-loadings of Constructs for Chinese Dataset	306
Table A4.7: Loading and Cross-loadings of Constructs for US and Chinese Combined Dataset	308
Table A4.8: Fornell-Larcker Criterion of Constructs for US Dataset	311
Table A4.9: Fornell-Larcker Criterion of Constructs for Chinese Dataset.....	312
Table A4.10: Fornell-Larcker Criterion of Constructs for US and Chinese Combined Dataset	313
Table A4.11: HTMT Values of Constructs for US Dataset.....	315
Table A4.12: HTMT Values of Constructs for Chinese Dataset.....	316
Table A4.13: HTMT Values of Constructs for US and Chinese Combined Dataset	317
Table A5.1: <i>t</i> -statistics, <i>p</i> -values and CI of Chinese Data Sample	318
Table A5.2: <i>t</i> -statistics, <i>p</i> -values and CI of US Data Sample	319
Table A5.3: <i>t</i> -statistics, <i>p</i> -values and CI of US and Chinese Combined Data Sample.....	319
Table A5.4: Assessing Mediation Effect of TR&Cs at 5% Significance Level for Chinese Data Sample	320
Table A5.5: Assessing Mediation Effect of TR&Cs at 5% Significance Level for US Data Sample	320
Table A5.6: Assessing Mediation Effect of TR&Cs at 5% Significance Level for US and Chinese Combined Data Sample	321
Table A5.7: <i>t</i> -statistics, <i>p</i> -values and CI of Chinese Data Sample (without Control Variables).....	323
Table A5.8: <i>t</i> -statistics, <i>p</i> -values and CI of US Data Sample (without Control Variables) ..	323
Table A5.9: <i>t</i> -statistics, <i>p</i> -values and CI of US and Chinese Combined Data Sample (without Control Variables)	324
Table A5.10: Assessing Direct Effect of Chinese, US and Combined Models with and without Control Variables.....	325
Table A5.11: Assessing Mediation Effect of TR&Cs at 5% Significance Level for Chinese Data Sample (without Control Variables).....	326
Table A5.12: Assessing Mediation Effect of TR&Cs at 5% Significance Level for US Data Sample (without Control Variables)	327

Table A5.13: Assessing Mediation Effect of TR&Cs at 5% Significance Level for US and Chinese Combined Data Sample (without Control Variables)	327
Table A5.14: Assessing Mediation Effect of TR&Cs for Chinese, US and Combined Models with and without Control Variables	329
Table A6.1: Compositional Invariance Assessment (Step 2 of MICOM Procedure).....	332
Table A6.2: Equal Mean Values and Variances Assessment (Step 3 of MICOM Procedure).....	334
Table A7.1: Referred Websites for Secondary Data.....	340
Table B.1: Chinese Data Sample—Moderating Effect Based on Low, Medium and High Levels of Industry Subgroups	345
Table B.2: US Data Sample—Moderating Effect Based on Low, Medium and High Levels of Industry Subgroups	345
Table B.3: US and Chinese Combined Data Sample—Moderating Effect Based on Low, Medium and High Levels of Industry Subgroups.....	346
Table B.4: Chinese Data Sample—Moderating Effect Based on Low, Medium and High Levels of Institution Subgroups	346
Table B.5: US Data Sample—Moderating Effect Based on Low, Medium and High Levels of Institution Subgroups	347
Table B.6: US and Chinese Combined Data Sample—Moderating Effect Based on Low, Medium and High Levels of Institution Subgroups.....	347
Table B.7: Chinese Data Sample—Moderating Effect Based on Low, Medium and High Levels of Political Turbulence Subgroups	348
Table B.8: US Data Sample—Moderating Effect Based on Low, Medium and High Levels of Political Turbulence Subgroups.....	348
Table B.9: US and Chinese Combined Data Sample—Moderating Effect Based on Low, Medium and High Levels of Political Turbulence Subgroups.....	349
Table B.10: Chinese Data Sample—Moderating Effect Based on Low, Medium and High Levels of Competitor Turbulence Subgroups	349
Table B.11: US Data Sample—Moderating Effect Based on Low, Medium and High Levels of Competitor Turbulence Subgroups	350
Table B.12: US and Chinese Combined Data Sample—Moderating Effect Based on Low, Medium and High Levels of Competitor Turbulence Subgroups.....	350
Table B.13: Chinese Data Sample—Moderating Effect Based on Low, Medium and High Levels of Technological Turbulence Subgroups	351

Table B.14: US Data Sample—Moderating Effect Based on Low, Medium and High Levels of Technological Turbulence Subgroups	351
Table B.15: US and Chinese Combined Data Sample—Moderating Effect Based on Low, Medium and High Levels of Technological Turbulence Subgroups	352
Table B.16: Chinese Data Sample—Moderating Effect Based on Low, Medium and High Levels of Market Turbulence Subgroups.....	352
Table B.17: US Data Sample—Moderating Effect Based on Low, Medium and High Levels of Market Turbulence Subgroups.....	353
Table B.18: US and Chinese Combined Data Sample—Moderating Effect Based on Low, Medium and High Levels of Market Turbulence Subgroups	353
Table B.19: High Compared with Medium Industry—Compositional Invariance Assessment for US Data	355
Table B.20: High Compared with Medium Industry—Equal Mean Values and Variances Assessment for US Data	355
Table B.21: High Compared with Medium Industry—Compositional Invariance Assessment for US and Chinese Combined Data	356
Table B.22: High Compared with Medium Industry—Equal Mean Values and Variances Assessment for US and Chinese Combined Data	356
Table B.23: High Compared with Medium Institution—Compositional Invariance Assessment for US Data	357
Table B.24: High Compared with Medium Institution—Equal Mean Values and Variances Assessment for US Data	357
Table B.25: High Compared with Medium Institution—Compositional Invariance Assessment for US and Chinese Combined Data	358
Table B.26: High Compared with Medium Institution—Equal Mean Values and Variances Assessment for US and Chinese Combined Data	358
Table B.27: High Compared with Low Institution—Compositional Invariance Assessment for US and Chinese Combined Data	359
Table B.28: High Compared with Low Institution—Equal Mean Values and Variances Assessment for US and Chinese Combined Data	359
Table B.29: Medium Compared with Low Institution—Compositional Invariance Assessment for US and Chinese Combined Data	360
Table B.30: Medium Compared with Low Institution—Equal Mean Values and Variances Assessment for US and Chinese Combined Data	360

Table B.31: High Compared with Medium Political Turbulence—Compositional Invariance Assessment for US Data	361
Table B.32: High Compared with Medium Political Turbulence—Equal Mean Values and Variances Assessment for US Data.....	361
Table B.33: High Compared with Low Political Turbulence—Compositional Invariance Assessment for US Data	362
Table B.34: High Compared with Low Political Turbulence—Equal Mean Values and Variances Assessment for US Data	362
Table B.35: Medium Compared with Low Political Turbulence—Compositional Invariance Assessment for US Data	363
Table B.36: Medium Compared with Low Political Turbulence—Equal Mean Values and Variances Assessment for US Data	363
Table B.37: High Compared with Medium Political Turbulence—Compositional Invariance Assessment for US and Chinese Combined Data	364
Table B.38: High Compared with Medium Political Turbulence—Equal Mean Values and Variances Assessment for US and Chinese Combined Data	364
Table B.39: High Compared with Low Political Turbulence—Compositional Invariance Assessment for US and Chinese Combined Data	365
Table B.40: High Compared with Low Political Turbulence—Equal Mean Values and Variances Assessment for US and Chinese Combined Data	365
Table B.41: Medium Compared with Low Political Turbulence—Compositional Invariance Assessment for US and Chinese Combined Data	366
Table B.42: Medium Compared with Low Political Turbulence—Equal Mean Values and Variances Assessment for US and Chinese Combined Data	366
Table B.43: High Compared with Medium Competitor Turbulence—Compositional Invariance Assessment for US Data	367
Table B.44: High Compared with Medium Competitor Turbulence—Equal Mean Values and Variances Assessment for US Data.....	367
Table B.45: High Compared with Medium Competitor Turbulence—Compositional Invariance Assessment for US and Chinese Combined Data	368
Table B.46: High Compared with Medium Competitor Turbulence—Equal Mean Values and Variances Assessment for US and Chinese Combined Data	368
Table B.47: High Compared with Medium Technological Turbulence—Compositional Invariance Assessment for US Data	369

Table B.48: High Compared with Medium Technological Turbulence—Equal Mean Values and Variances Assessment for US Data	369
Table B.49: High Compared with Medium Technological Turbulence—Compositional Invariance Assessment for US and Chinese Combined Data	370
Table B.50: High Compared with Medium Technological Turbulence—Equal Mean Values and Variances Assessment for US and Chinese Combined Data	370
Table B.51: High Compared with Medium Market Turbulence—Compositional Invariance Assessment for US Data	371
Table B.52: High Compared with Medium Market Turbulence—Equal Mean Values and Variances Assessment for US Data	371
Table B.53: High Compared with Medium Market Turbulence—Compositional Invariance Assessment for US and Chinese Combined Data	372
Table B.54: High Compared with Medium Market Turbulence—Equal Mean Values and Variances Assessment for US and Chinese Combined Data	372
Table C.1: Chinese Data Sample—Moderating Effect Based on Low, Medium and High Availability of Specialised ITT Staff Subgroups.....	374
Table C.2: US Data Sample—Moderating Effect Based on Low, Medium and High Availability of Specialised ITT Staff Subgroups.....	374
Table C.3: US and Chinese Combined Data Sample—Moderating Effect Based on Low, Medium and High Availability of Specialised ITT Staff Subgroups	374
Table C.4: Chinese Data Sample—Moderating Effect Based on Low, Medium and High Interaction with External ITT Intermediary.....	375
Table C.5: US Data Sample—Moderating Effect Based on Low, Medium and High Interaction with External ITT Intermediary.....	375
Table C.6: US and Chinese Combined Data Sample—Moderating Effect Based on Low, Medium and High Interaction with External ITT Intermediary	376
Table C.7: High Compared with Medium Availability of Specialised ITT Staff— Compositional Invariance Assessment for US Data.....	378
Table C.8: High Compared with Medium Availability of Specialised ITT Staff—Equal Mean Values and Variances Assessment for US Data	378
Table C.9: High Compared with Medium Availability of Specialised ITT Staff— Compositional Invariance Assessment for US and Chinese Combined Data.....	379
Table C.10: High Compared with Medium Availability of Specialised ITT Staff—Equal Mean Values and Variances Assessment for US and Chinese Combined Data...	379

Table C.11: High Compared with Medium Interaction with External ITT Intermediaries—Compositional Invariance Assessment for Chinese Data	380
Table C.12: High Compared with Medium Interaction with External ITT Intermediaries—Equal Mean Values and Variances Assessment for Chinese Data	380
Table C.13: High Compared with Medium Interaction with External ITT Intermediaries—Compositional Invariance Assessment for US Data.....	381
Table C.14: High Compared with Medium Interaction with External ITT Intermediaries—Equal Mean Values and Variances Assessment for US Data	381
Table C.15: High Compared with Low Interaction with External ITT Intermediaries— Compositional Invariance Assessment for US Data.....	382
Table C.16: High Compared with Low Interaction with External ITT Intermediaries— Equal Mean Values and Variances Assessment for US Data.....	382
Table C.17: High Compared with Medium Interaction with External ITT Intermediaries—Compositional Invariance Assessment for US and Chinese Combined Data	383
Table C.18: High Compared with Medium Interaction with External ITT Intermediaries—Equal Mean Values and Variances Assessment for US and Chinese Combined Data	383
Table C.19: High Compared with Low Interaction with External ITT Intermediaries— Compositional Invariance Assessment for US and Chinese Combined Data.....	384
Table C.20: High Compared with Low Interaction with External ITT Intermediaries— Equal Mean Values and Variances Assessment for US and Chinese Combined Data	384
Table C.21: Medium Compared with Low Interaction with External ITT Intermediaries—Compositional Invariance Assessment for US and Chinese Combined Data	385
Table C.22: Medium Compared with Low Interaction with External ITT Intermediaries—Equal Mean Values and Variances Assessment for US and Chinese Combined Data	385

Abstract

Understanding the mechanisms through which international technology transfer (ITT) influences firm performance has received considerable attention in research and practice. Prior studies suggest that ITT is a major managerial challenge because of its inherent complexity. This thesis aims to better explain the ITT process by examining the complexities of this process and explaining it as a dynamic capability (DC) (Teece, 2007). Further, underlining the inconsistent views on the performance implications of ITT, this research examines the role of contingency factors by investigating the moderating effects of internal and external factors on the ITT process. The main body of the thesis comprises three interrelated chapters, which are developed and written as standalone pieces to contribute to the topic of study.

Following Teece's (2007) classification of DCs, this thesis operationalises ITT processes into ITT sensing, seizing and reconfiguring routines. Prior studies argue that the historical trajectories or path dependencies determine the success or failure of ITT processes in an organisation. Derived from the dynamic capability framework (DCF), this thesis advocates the view that, by sensing ITT opportunities, firms identify opportunities to leverage or break their technology paths; by seizing, firms identify which path to leverage or break and how to do so when engaging in ITT; and, finally, by reconfiguring, firms determine how to implement transferred technologies into their operations. This research also elucidates how ITT processes are conditional on the industry- and institution-level path dependencies. Importantly, the findings suggest that DC-enabled ITT processes not only allow firms to leverage and benefit from industry- and institution-level path dependencies, but also to break them. Following an abductive research design with reference to several Sri Lankan renewable energy firms, this thesis clarifies this conceptual framework.

Regarding external factors, this thesis empirically examines the moderation effects of industry and institution development, as well as environmental turbulence, on the relationship between a firm's ITT processes and its expected performance. Regarding internally and externally accessible resources, this thesis examines the moderation effect of specialised ITT staff within a firm and external ITT intermediaries on the effects that a firm's ITT processes have on its expected outcomes. To test these arguments empirically, this thesis draws on survey data from high-technology firms in China and the United States, and performs statistical analyses using partial least squares structural equation modelling (PLS-SEM). In support of the predictions of

the DCF, the findings suggest that ITT DC routines influence firm performance indirectly through the firm's technology resources and ordinary capabilities (TR&Cs).

The findings also suggest that, while industry and institution development moderates the effects of a firm's ITT DCs on its TR&Cs, their contingency effects differ across specific ITT DC routines, as well as across the country context in which the firm operates. Additionally, concerning environment turbulence, the findings suggest that the moderation effect of environment turbulence on the relationship between a firm's DCs and its expected performance may be more complex and is contingent upon the type of turbulence a firm confronts. Regarding internal resources, the findings generally support the hypothesised moderation effect and show that greater availability of specialised ITT staff helps a firm better relate its ITT DC routines to its TR&Cs. While the findings do not substantiate the hypothesised moderation effect of external ITT intermediaries, the results suggest that, apart from internal resources, external resources, such as ITT intermediaries, can play an important role in a firm's ITT processes.

This thesis provides important implications for theory and practice by operationalising ITT processes through the lens of the DCF. Specifically, by theorising and empirically testing the moderation effect of external conditions, such as industry and institution development and environment turbulence aspects, as well as internally and externally accessible resources, such as specialised ITT staff and ITT intermediaries, this thesis nurtures the DC literature while addressing earlier criticisms regarding the DC's ill-defined boundary conditions.