

THE MODERATING EFFECT OF  
ORGANIZATIONAL STRUCTURE AND  
QUALITY PRACTICES ON ABSORPTIVE  
CAPACITY, TECHNOLOGY COMPATIBILITY  
AND TECHNOLOGY TRANSFER  
RELATIONSHIP

SARINA MUHAMAD NOOR

DOCTOR OF PHILOSOPHY  
UNIVERSITI UTARA MALAYSIA  
JANUARY 2010

THE MODERATING EFFECT OF ORGANIZATIONAL  
STRUCTURE AND QUALITY PRACTICES ON  
ABSORPTIVE CAPACITY, TECHNOLOGY  
COMPATIBILITY AND TECHNOLOGY TRANSFER  
RELATIONSHIP

By

SARINA MUHAMAD NOOR

Thesis Submitted to the Centre for Graduate Studies,  
College of Business, Universiti Utara Malaysia  
in Fulfillment of the Requirement for the Degree of Doctor of Philosophy

Permission to use

In presenting this thesis in fulfillment of the requirements for a postgraduate degree from Universiti Utara Malaysia, I agree that the University Library may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor(s) or in their absence, by the Dean of Research and Graduate Studies. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my thesis.

Request for permission to copy or to make use of the materials in this thesis, in whole or in part, should be addressed to:

Dean of Research and Graduate Studies,  
College of Business,  
Universiti Utara Malaysia  
06010 Sintok  
Kedah, Malaysia.

## Abstrak

Pemindahan teknologi merupakan salah satu kaedah bagi meningkatkan perkembangan serta pertumbuhan sesebuah organisasi. Terdapat pelbagai faktor yang menyumbang ke arah prestasi pemindahan teknologi. Namun begitu, hanya sedikit usaha dilakukan bagi meneliti kemampuan pencerapan organisasi terhadap prestasi pemindahan teknologi. Sehubungan dengan itu, kajian ini dilakukan terhadap firma Elektronik dan Elektrik di Malaysia bagi mengenalpasti hubungan di antara kapasiti cerapan firma serta kesuaipadanan teknologi dengan prestasi pemindahan teknologi mereka. Di samping itu, kajian ini juga bertujuan mengenalpasti samada struktur dan saiz firma serta amalan kualiti firma bertindak sebagai moderator dalam hubungan di antara kapasiti cerapan firma, kesuaipadanan teknologi dan prestasi pemindahan teknologi. Kaedah penyelidikan yang dijalankan berbentuk kajian lapangan di mana instrumen yang digunakan adalah soal-selidik. Data dianalisa menggunakan kaedah korelasi Pearson dan regresi berganda. Dapatan kajian menunjukkan terdapat hubungan yang signifikan di antara beberapa dimensi kapasiti cerapan dan kesuaipadanan teknologi dengan prestasi pemindahan teknologi. Di samping itu, beberapa pembolehubah moderator juga bertindak mempengaruhi hubungan di antara kapasiti cerapan dan kesuaipadanan teknologi dengan prestasi pemindahan teknologi. Ujian post-hoc juga telah dijalankan bagi mengenalpasti bentuk moderator dalam kajian ini. Hasil kajian ini dapat menyumbang kepada perkembangan teori dan pengetahuan kerana salah satu dimensi dalam kapasiti cerapan telah dikenalpasti sebagai penting dalam mempengaruhi hubungan terhadap prestasi pemindahan teknologi.

## Abstract

Technology transfer is one of the channels to upgrade development and spur growth. Many factors contributed to the performance of the transferred technology, yet few attempts were made to determine firms' absorptive capacity and technology compatibility towards the transferred technology. This study was conducted on the Electronics and Electrical firms in Malaysia to understand the performance of the transferred technology. The objectives were to determine the relationship between firms' absorptive capacity and technology compatibility in technology transfer performance. In addition, the study also attempted to determine the moderating role of organizational size and structure and its quality practices in the absorptive capacity, technology compatibility and technology transfer performance relationship. The study used survey method. Data was analyzed using Pearson correlation and multiple regression analysis. The findings showed that absorptive capacity dimensions and technology compatibility dimension have several significant relationships with technology transfer performance. Moreover, among organizational structure, size and quality practices, few act as moderators in the relationship between absorptive capacity, technology compatibility and technology transfer performance. Finally, a post-hoc test was conducted to determine the type of moderators involved in this study. The result of this study contributed to knowledge as it discovered additional dimension of absorptive capacity that was also important in influencing the relationship of absorptive capacity, technology compatibility and technology transfer performance relationship.

## Acknowledgements

This study is made possible by the generous funding of University Teknologi MARA. I am indebted to my supervisors, Professor Dr. Rushami Zien Yusof and Associate Professor Dr. Fariza Hashim for their guidance and support. I am also grateful to the number of people who have contributed one way or another to the research. To academic and non-academic staffs of UiTM, UUM and USM, to all participants of this research and to all the people who have helped me in my research, thank you so much. To all my friends, thank you for all the trust and support. Last but not least, I wish to express my gratitude to my husband, Abdul Ghani Hj Ali and my child, Muhamad Zaki for their encouragement and everlasting love.

Permission to Use	i
Abstrak	ii
Abstract	iii
Acknowledgement	iv
Table of Contents	v
List of tables	x
List of figures	xii

## **TABLE OF CONTENTS**

### **CHAPTER 1**

#### **INTRODUCTION OF THE RESEARCH**

1.1 Background of the study	1
1.2 Problem Statement	5
1.3 Research objective and research questions	9
1.4 Contribution of the study	10
1.5 Scope of this study	13
1.6 Definition of terms	13
1.7 Organization of the report	16
1.8 Summary of the chapter	17

### **CHAPTER 2**

#### **TECHNOLOGY, TECHNOLOGY TRANSFER AND RELEVANT THEORIES**

2.1 Technology and Technology Transfer	19
2.1.1 Motive for technology transfer	24
2.1.2 Knowledge	25
2.2 The benefits of technology transfer	27
2.3 Technology transfer in Malaysia	30

2.4 Theories in technology transfer	35
2.4.1 Resource-Based View	35
2.4.2 Information Processing Theory	38
2.5 Summary of the chapter	39

### **CHAPTER 3**

#### **CONCEPTUAL FRAMEWORK AND DEVELOPMENT OF HYPOTHESIS**

3.1 An overview of literatures	41
3.2 Previous research on technology transfer	46
3.3 Absorptive capacity	55
3.3.1 Definitions of absorptive capacity	56
3.3.2 Elements and dimensions of absorptive capacity	58
3.3.3 Organizational studies on absorptive capacity	68
3.3.4 Absorptive capacity and technology transfer	72
3.4 Technology compatibility	78
3.5 Quality practices	85
3.6 Organizational size and structure	89
3.7 Research framework and development of hypotheses	99
3.8 Summary of the chapter	104



## **CHAPTER 4**

### **RESEARCH METHODOLOGY**

4.1 Research design	105
4.1.1 Purpose of research	106
4.1.2 Time dimension of study	106
4.1.3 Research design strategies	107
4.1.4 Unit of analysis	107
4.2 Sampling method	108
4.3 Data collection	109
4.3.1 Administration of questionnaires	110
4.4 Questionnaire design	111
4.4.1 Technology transfer performance construct and dimensions	112
4.4.2 Absorptive capacity construct and dimensions	116
4.4.3 Technology compatibility construct	121
4.4.4 Organization structure constructs and dimensions	122
4.4.5 Quality practices construct and dimensions	127
4.4.6 Measurement and instrument	132
4.4.7 Reliability and validity of the instrument	133
4.4.8 Pilot study	134
4.5 Method of data analysis	135
4.6 Data Cleaning and screening	136
4.7 Test of non-response bias	138
4.8 Summary of the chapter	139

## **CHAPTER 5**

### **FINDINGS**

5.1 Sample of the study	140
5.2 Background of the respondents	142
5.3 Goodness of measure	151
5.4 Restatement of hypotheses	164
5.5 Descriptive statistics of the variables	168
5.6 Test of the hypotheses	170
5.6.1 Pearson Correlation test	171
5.6.2 Multiple regression test	177
5.7 Summary of the findings	204

## **CHAPTER 6**

### **DISCUSSION, CONCLUSION AND RECOMMENDATION**

6.1 Introduction	213
6.2 Overview of the study	213
6.3 Discussion	214
6.4 Implications of the study	224

6.4.1 Theoretical implications	224
6.4.2 Managerial implications	224
6.4.5 Policy implications	228
6.5 Limitations of the study	229
6.6 Future research	230
6.7 Conclusion	230
6.8 Recommendation	232
6.9 Summary of the chapter	232

## **REFERENCES**

## **APPENDICES**

### **APPENDIX A: Measuring instrument**

## LIST OF TABLES

Table 1-1	Malaysia's Competitive Advantages	4
Table 2-1	Benefits of technology transfer	28
Table 2-2	A summary on technology transfer studies in Malaysia	32
Table 3-1	The selected studies that used stages of technology transfer	54
Table 3-2	Past conceptualization of absorptive capacity.	67
Table 3-3	Some selected studies on absorptive capacity from 2000-2007	74
Table 4-1	Questions on technology transfer performance	115
Table 4-2	Questions used on absorptive capacity construct	119
Table 4-3	Questions on transformative capacity	120
Table 4-4	The questions on technology compatibility construct	122
Table 4-5	Questions relating to decision making authority	124
Table 4-6	The questions on formalization	126
Table 4-7	The questions on quality practices	130
Table 4-8	The questions that assesses firms involvement in technology transfer.	131
Table 4-9	The t-test result between early and late respondents	138
Table 4-10	The ANOVA result on firms variables.	139
Table 5-1	Respond rate of selected studies in Malaysia	141
Table 5-2	Respondents demographic factors	143
Table 5-3	The rotated Component Matrix of all questions under technology transfer performance	154
Table 5-4	The rotated Component Matrix of absorptive capacity dimensions.	156

Table 5-5	The rotated Component Matrix of transformative capacity	158
Table 5-6	The rotated Component Matrix of absorptive capacity dimensions with the inclusion of transformative capacity	159
Table 5-7	The rotated Component Matrix of technology compatibility Questions	160
Table 5-8	The rotated Component Matrix of quality practice questions.	161
Table 5-9	The dimensions discovered before and after factor analysis	163
Table 5-10	The mean and standard deviation of the major variables	170
Table 5-11	Pearson Result on the relationship between the independent variables and the dependent variables	172
Table 5-12	Result of Pearson correlation on moderator variables and independent variables	174
Table 5-13	Findings of the hypotheses.	176
Table 5-14	The moderating effect of organization structure and quality practices on the relationship between absorptive capacity dimensions, technology compatibility dimensions and the implementation stage of technology transfer	182
Table 5-15	The moderating effect of organization structure and quality practices on the relationship between absorptive capacity dimensions, technology compatibility dimensions and the integration stage of technology transfer	195
Table 5-16	The predictive power of the variables	198
Table 5-17	Summary of the moderators	202

## LIST OF FIGURES

Figure 3-1	Selected variables in the relationship among absorptive capacity, technology compatibility, organizational structure and technology transfer for the period from 1998 to 2008	45
Figure 3-2	The dynamics of absorptive capacity	62
Figure 3-3	The dimensions of Absorptive capacity	63
Figure 3-4	A typology of organization	95
Figure 3-5	The research framework for this study	99
Figure 4-1	Scatter plots of the variables	137
Figure 5-1	The respondents according to states	144
Figure 5-2	Firms involvement in technology transfer activities	145
Figure 5-3	The methods firms acquire technology	146
Figure 5-4	The beneficiary of transferred technology	147
Figure 5-5	Respondents sub-sector	148
Figure 5-6	Number of employees	149
Figure 5.7	Types of ownership	149
Figure 5-8	Firms' gross annual revenue	150
Figure 5-9	Firms' fixed asset investments	150
Figure 5-10	The re-establishment of research framework	168
Figure 5-11	Framework for identifying moderator variables	180
Figure 5-12	The relationship between knowledge diversification and implementation stage with organization size as a moderator	185
Figure 5.13	The relationship between transformative capacity and the implementation stage with organization size as the moderator.	186

Figure 5-14	The relationship between knowledge diversification and the implementation stage with decision-making as the moderator	187
Figure 5-15	The relationship between transformative capacity and implementation stage with decision-making authority as the moderator.	188
Figure 5-16	The relationship between appropriate technology and the implementation stage with decision-making as the moderator	189
Figure 5-17	The relationship between inappropriate technology and implementation stage with decision-making as the moderator	189
Figure 5-18	The relationship between knowledge diversification and the implementation stage with formalization as a moderator	190
Figure 5-19	The relationship between knowledge diversification and the implementation stage with quality process as the moderator	191
Figure 5-20	The relationship between strategic posture and the implementation stage with quality process as the moderator	192
Figure 5-21	The relationship between transformative capacity and the implementation stage with quality process as the moderator	193
Figure 5-22	The relationship between knowledge diversification and the integration stage with organization size as the moderator.	198
Figure 5-23	The relationship between strategic posture and the integration stage with quality process as the moderator.	199
Figure 5-24	The relationship between relative threat and the integration stage with quality process as the moderator.	201

Figure 5-25 The moderators identified in the study based on typology of specification of variables by Sharma et L. 1981

211



## **CHAPTER 1: INTRODUCTION OF THE RESEARCH**

This chapter starts with a background of the study under Section 1.1, followed by the problem statement in Section 1.2. Research objectives and research questions are then covered under Section 1.3. Several contributions of this study are discussed in Section 1.4. Section 1.5 includes the scope and limitations of this study while Section 1.6 explains the terms used in this study. Finally the chapter concludes with the organization of the report in Section 1.7 and the summary of the chapter in Section 1.8.

### **1.1 Background of the study**

Technology is becoming an important element in social and economic development (Tai-Yue & Shih-Chien, 2007). With technology, it provides a basic requirement to stimulate growth. One of the ways to obtain advanced technology is through technology transfer. Osman-Ghani (1999) suggested that technology transfer is an avenue for firms to increase their technological innovation. Furthermore, firms become involved in technology transfer as they want to increase their technological capabilities (Geeta & Hong 2003). This is important especially when firms' internal R&D is limited.

However, technology transfer is very complex. It involves transferring technology from provider firms, which are private R&D firms, government agencies

The contents of  
the thesis is for  
internal user  
only

## REFERENCES

- Abdul Razak Abdul (1984). Joint ventures between Malaysian and Public corporations and foreign enterprises: An evaluation. In L. L. Lean & C. P. Lim (Eds.), *The Malaysian Economy at the crossroads: Policy adjustments or structural transformation* (pp. 263-299). Kuala Lumpur: Malaysian Economic Association.
- Abibullah Haji Samsudin, Morshidi Sirat, & Kamarulazizi Ibrahim (1994). *Pemindahan teknologi dalam industri elektronik di Malaysia*. Kuala Lumpur: Dewan Bahasa Pustaka.
- Acs, Z. J., & Audretsh, D. B. (1987). Innovation, market structure and firm size. *The Review of Economics and Statistics*, 69(4), 567-574.
- Adams, G. L., & Lamont, B. T. (2003). Knowledge management systems and developing sustainable competitive advantage. *Journal of Knowledge Management*, 7(2), 142-154.
- Ahire, S. L., Golhar, D. Y., & Waller, M. A. (1996). Development and validation of TQM implementation constructs. *Decision Science*, 27(1), 23-54.
- Akubue, A. I. (2002). Technology Transfer: A Third World Perspective. *The Journal of Technology Studies*, Winter-Spring, 4-11.
- Anderson, J. C., Rungtusanatham, M., Schroeder, R. G., & Devaraj, S. (1995). A path analytic model of a theory of quality management underlying the Deming management method: Preliminary empirical findings. *Decision Science*, 26(5), 637-657.
- Askarany, D., & Smith, M. (2003). *The Relationship between Technological Innovation, Activity Based Costing and Business Size*. Paper presented at the InSITE- Where Parallels Intersect.
- Babbie, E. (1990). *Survey research methods*. California: Wadsworth Publishing.
- Baldrige, J. V., & Burnham, R. A. (1975). Organizational Innovation: Individual, Organizational and Environmental Impacts. *Administrative Science Quarterly*, 20(2), 165-176.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Barney, J., Wright, M., & David J. Ketchen, J. (2001). The resource- based view of the firm: Ten years after 1991. *Journal of Management*, 27, 625-641.

**Comment [U27]:** Will go thru them again after printing the hard copy. Need to work on computer that do not have end-notes coz the program keep on up-dating/amending the references. Yg tak directly quote, abis dipadamkan.

- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173-1182.
- Bendig A.W.(1954). Reliability and the number of rating scale categories. *The Journal of Applied Psychology*. Vol. 38(1), 38-40.
- Bennett, D., & Hongyu, Z. (2004). International technology transfer: perceptions and reality of quality and reliability. *Journal of Manufacturing Technology Management*, 15(5), 410-415.
- Bhagat, R. S., Kedia, B. L., Harveston, P. D., & Triandis, H. C. (2002). Cultural variations in the cross-border transfer of organizational knowledge: An integrative framework. *Academy of Management Review*, 27(2), 204-221.
- Birkett, N. J. (1986). *Selecting the number of response categories for a Likert-type scale* Paper presented at the Proceeding of American Statistical Association.
- Black, S. A., & Porter, L. J. (1996). Identification of the critical factors of TQM. *Decision Science*, 27(1), 1-21.
- Boyne, G. A., & Walker, R. M. (2002). Total quality management and performance. *Public Performance & Management Review*, 26(2), 111-131.
- Bozeman, B. (2000). Technology transfer and public policy: a review of research and theory. *Research Policy*, 29, 627-655.
- Bradley, A., McErlean, S., & Kirke, A. (1995). Technology transfer in the Northern Ireland food processing sector. *British Food Journal*, 97(10), 32-35.
- Brass, D. J., & Burkhardt, M. E. (1990). Changing Patterns or Patterns of Change : The Effects of a Change in Technology on Social Network Structure and Power. *Administrative Science Quarterly*, 35.
- Buono, A. F. (1997). Technology transfer through acquisition. *Management Decision*, 35(3), 194-204.
- Butler, R., & Gill, J. (1999). Trust and the Dynamics of Japanese Joint Ventures in Malaysia. In K. S. Jomo, G. Felker & R. Rasiah (Eds.), *Industrial Technology Development in Malaysia* (pp. 301-328). London and New York: Routledge.
- Caccia-Bava, M. d. C., Guimaraes, T., & Harrington, S. J. (2006). Hospital organization culture, capacity to innovate and success in technology adoption. *Journal of Health Organization and Management*, 20(3), 194-217.

- Capannelli, G. (1999). Technology Transfer from Japanese Consumer Electronic Firms Via Buyer-Supplier Relations. In K. S. Jomo, G. Felker & R. Rasiah (Eds.), *Industrial Technology Development in Malaysia* (pp. 191-230). London and New York: Routledge.
- Chew, B., Syaiful Rizal Abdul Hamid, Salleh Yahya, & Mulyaningrum (2006). *Technology transfer practices among Malaysian High Technology Industry*. Paper presented at the IAMOT 2006, Tsianghin China.
- Child, J. (1973). Predicting and Understanding Organization Structure. *Administrative Science Quarterly*, 168-185.
- Chinho, L., Bertram, T., & Shofang, C. (2002). The critical factors for absorptive capacity. *Industrial Management & Data System*, 102(6), 300-308.
- Coakes, S. J. (2005). *SPSS Version 12. Analysis without anguish*. Queensland: John Wiley & Sons Australia Ltd.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Mahwah N.J.: Erlbaum.
- Cohen, W. M., & Levinthal, D. A. (1989). Innovation and learning: The two faces of R&D. *The Economic Journal*, 99(September), 569-596.
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35, 128-152.
- Cohen, W. M., & Levinthal, D. A. (1994a). Fortune favors the prepared firm. *Management Journal*, 40(2), 227 - 248.
- Comrey, A. L., & Lee, H. B. (1992). *A first course in factor analysis* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Congden, S. W. (2005). Firm Performance and the Strategic Fit of Manufacturing Technology. *CR*, 15(1), 14-32.
- Contractor, F. J., & Narayanan, V. K. (1990). Technology development in the multinational firm: A framework for planning and strategy. *R & D Management*, 20(4), 305-322.
- Cook, S. (2005). Ticking the right boxes. *Training Journals*, 42-45.
- Cooper, D. R., & Schindler, P. S. (2001). *Business Research Methods*. New York: Irwin McGraw-Hill.

- Cooper, D. R., & Schindler, P. S. (2006). *Business research methods* (9th ed.). Boston: McGraw Hill
- Correia, E., Lisboa, J., & Yasin, M. (2003). The effectiveness of quality efforts in the Portuguese business culture: An empirical investigation. *Cross cultural management*, 10(2), 24-36.
- Daghfous, A. (2004a). An empirical investigation of the roles of prior knowledge and learning activities in technology transfer. *Technovation*, 24, 939-953.
- Daghfous, A. (2004b). Organizational learning, knowledge and technology transfer: A case study. *The Learning Organization*, 11(1), 67-83.
- Dal Zotto, C. (2003). *Absorptive Capacity and Knowledge Transfer between Venture Capital Firms and their Portfolio Companies*. Paper presented at the Druid Summer Conference on Creating, Sharing and Transferring Knowledge,, Copenhagen Denmark.
- Damanpour, F. (1987). The Adoption of Technological, Administrative and Ancillary Innovations: Impact of Organizational Factors. *Journal of Management*, 13(4), 675-688.
- Damanpour, F. (1992). Organizational Size and Innovation. *Organization Studies*, 13(3), 375-402.
- Davidow W.H.(1986). *Marketing High Technology*. The Free Press.
- De-Bodinat, H. (1975). Influence in multinational corporation: The case of manufacturing companies. Unpublished DBA Dissertation. Harvard University.
- Deeds, D. L. (2001). The role of R&D intensity, technical development and absorptive capacity in creating entrepreneurial wealth in high technology start-ups. *Journal of Engineering and Technology Management*, 18, 29-47.
- Demirbag, M., Tatoglu, E., Tetinkus, M., & Zaim, S. (2006). An analysis of the relationship between TQM implementation and organizational performance. Evidence from Turkish SMEs. *Journal of Manufacturing Technology Management*, 17(6), 829-847.
- Di-Benetto, C. A., Calantone, R. J., & Yang, C. (2003). International technology transfer. *International Marketing Review*, 20(4), 446-462.
- Dias, M. M. K., & Vergueiro, W. (1998). Information and technology transfer in Brazil: evolution and perspectives. *New Library World*, 99(1141), 112-117.

- Dodgson, M. (1993). Organizational learning: A review of some literatures. *Organization Studies*, 14(3), 375-394.
- Duimering, P. R., Safayani, F., & Purdy, L. (1993). Integrated manufacturing in redesign the organization before implementing flexible technology. *MIT Sloan Management Review*, July.
- Eden, L., Levitas, E., & J.Martinez, R. (1997). The production, transfer and spillover of technology: comparing large and small multinationals as technology producers. *Small Business Economics*, 9, 53-66.
- Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, 21(10/11), 1105-1121.
- Else, B., & Fujiwara, A. (2000). *Kaizen* and technology transfer instructors as work-based learning facilitators in overseas transplants: A case study. *Journal of Workplace Learning*, 12(8), 333-341.
- Erensal, Y. C., & Albayrak, Y. E. (2008). Transferring Appropriate Manufacturing Technologies for Developing Countries. *Journal of Manufacturing Technology Management*, 19(2), 158-171.
- Eridilek, A. (1986). Issues in international technology transfer. *Economic Impact*, 4(56).
- Fernandez-Caamano, R., & Johnson, S. D. (2005). Consequences of technology transfer in the Pueblo Viejo gold mine. *Comparative Technology Transfer and Society*, 3(1), 1-34.
- Field, A. (2000). *Discovering Statistic-using SPSS for Windows*. London: SAGE Publications Ltd.
- Finchman, R. G. (1999). The diffusion and assimilation of information technology innovations. In R.W.Zmud (Ed.), *Framing the domains of IT management: Projecting the future... through the past*. (pp. 1-42). Cincinnati OH: Pinnaflex Educational Resources Inc.
- Fiol, M., & Lyles, M. (1985). Organisational learning. *Academy of Management Journal*, 10(4), 803-813.
- Flynn, B. B., Schroeder, R. G., & Sakakibara, S. (1995). The impact of quality management practices on performance and competitive advantage. *Decision Science*, 26(5), 659-691.
- Fosfuri, A., & Tribo, J. A. (2008). Exploring the antecedents of potential absorptive capacity and its impact on innovation performance. *Omega*, 36(2), 173-187.

- Fouraker, L. E., & Stopford, J. M. (1968). Organizational Structure and the Multinational Strategy. *Administrative Science Quarterly*, 48-64.
- Frangou, A. (2002). Promoting a Strategic Approach to TQM using a Case-Based Intelligent System. In J. Anthony & D. Preece (Eds.), *Understanding, Managing and Implementing Quality*. London & New York: Routledge.
- Frazier, P. A., Barron, K. E., & Tix, A. P. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Technology*, 51(1), 115-134.
- Freeman, C., & Hagedorn, J. (1994). Catching Up or Failing Behind: Patterns in International Interfirm Technology Partnering. *World Development*, 22, 771-781.
- Gadenne, D., & Sharma, B. (2005, 16-18 February). *Quality Management Practices, Industry Rivalry, Entry Barriers and Performance: An Investigation of their Relationship*. Paper presented at the 7th International Research Conference on Quality, Innovation and Knowledge Management.
- Galbraith, C. S. (1990). Transferring core manufacturing technologies in high tech firms. *California Management Review*, 32(4), 56-70.
- Ganesan, S., & Kelsey, J. (2006). Technology transfer: international collaboration in Sri Lanka. *Construction Management and Economics*, 24, 743-753.
- Garud, R., & Nayyar, P. R. (1994). Transformative capacity: Continual structuring by intertemporal technology transfer. *Strategic Management Journal*, 15, 365-385.
- Garvin, D. A. (1987). Competing on the eight dimensions of quality. *Harvard Business Review*, Nov-Dec, 101-109.
- Geeta, B., & Hong, T. (2003). *SME Technical Efficiency and its Correlates: Cross-National Evidence and Policy Implications*.: World Bank Institute Working Paper.
- George, G., Zahra, S. A., Wheatley, K. K., & Khan, R. (2001). The effects of alliance portfolio characteristics and absorptive capacity on performance. A study of biotechnology firms. *Journal of High Technology Management Research*, 12, 205-226.
- Geringer, J. M., & Hebert, L. (1991). Measuring performance of international joint ventures. *Journal of International Business Studies*, 2nd quarter, 249-256.
- Geroski, P. A. (2000). Models of technology diffusion. *Research Policy*, 29, 603-625.



- Gibson, D. V., & Niwa, K. (1991). *Knowledge-based technology transfer*. Paper presented at the Portland International Conference on Management of Engineering and Technology :Technology Management: The New International Language.
- Gillespie, D. F., & Mileti, D. S. (1977). Technology and the Study of Organizations: An Overview and Appraisal. *The Academy of Management Review*, 2(1), 7-16.
- Girma, S. (2005). Technology transfer from acquisition FDI and the absorptive capacity of domestic firms: An empirical investigation. *Open Economic Review*, 16, 175-187.
- Glass, A. J., & Saggi, K. (2002). Multinational firms and technology transfer. *Scandinavian Journal of Economics*, 104(4), 495-513.
- Global Competitiveness Report 2006* (2007). Geneva: World Economic Forum.
- Goodhue, D. L., & Thompson, R. L. (1995). Task-technology fit and individual performance. *MIS Quarterly*, 19(2), 213-236.
- Gopalakrishnan, S., & Santoro, M. D. (2004). Distinguishing between knowledge transfer and technology transfer activities: the role of key organizational factors. *IEEE Transactions on Engineering Management.*, 51(1), 57-69.
- Gorg, H., & Greenaway, D. (2004). Much a do about nothing? Do domestic firms really benefit from Foreign Direct Investment. *Research Observer*, 19(2), 171-197.
- Gray, C. (2006). Absorptive capacity, knowledge management and innovation in entrepreneurial small firms. *International Journal of Entrepreneurial Behaviour & Research*, 12(6), 345-360.
- Green, S. B. (1991). How many subjects does it take to do a regression analysis? *Multivariate Behavioral Research*, 26(3), 499-510.
- Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. (2004). Diffusion of innovations in service organizations: systematic review and recommendations. *The Milbank Quarterly*, 82(4), 581-629.
- Grieve, R. H. (2004). Appropriate technology in a globalizing world. *International Journal of Technology Management and Sustainable Development*, 3(3), 173-187.
- Griffith (2000). *Mapping the two faces of R&D productivity growth in a panel of OECD industries*: CEPR Discussion paper.

- Grimes, A. J., & Klein, S. M. (1973). The Technological Imperative: The Relative Impact of Task Unit, Modal Technology and Hierarchy on Structure. *Academy of Management Journal*, 16(4), 583-597.
- Guadagnoli, E., & Velicer, W. (1988). Relation of sample size to the stability of components patterns. *Psychological Bulletin*, 103, 265-275.
- Gupta, A. K., & Govindarajan, V. (2000). Knowledge flows within multinational corporations. *Strategic Management Journal*, 21(4), 473-496.
- Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5th ed.). New Jersey: Prentice-Hall International Inc.
- Hall, R. H. (1972). *Organizations: Structure and process*. New Jersey: Prentice Hall.
- Hansen, G. S., & Wernerfelt, B. (1989). Determinants of firms performance: The relative importance of economic and organizational factors. *Strategic Management Journal*, 10, 399-411.
- Heinbuch, S. E. (1995). A case of successful technology transfer to health care. *Journal of Management in Medicine*, 9(2), 48-56.
- Higgins, S. H., & Hogan, P. T. (1999). Internal diffusion of high technology industrial innovations: An empirical study. *Journal of Business & Industrial Marketing*, 14(1), 61-75.
- Hill, D. J. (1988). *Assessment of the Future of the Semiconductor Industry in Malaysia*. Paper presented at the The Changing Dimensions in the Electronics Industry in Malaysia.
- Hobday, M. (1996). Innovation in South-East Asia: lessons for Europe? *Management Decision*, 34(9), 71-81.
- Hoopes, D. G., Madsen, T. L., & Walker, G. (2003). Guest editors' introduction to the special issue: Why is there a resource-based view? Toward a theory of competitive heterogeneity. *Strategic Management Journal*, 24(10), 889-1003.
- Hopkins, K. D., & Gullickson, A. R. (1989, 27-31 March). *Monetary gratuities in survey research: A meta-analysis of their effects on response rates*. Paper presented at the Annual Meetings of the American Educational Research Association, San Francisco CA.
- Huay, H. L., & Hui, B. T. (2006). Technology Transfer, FDI and Economic Growth in the ASEAN Region. *Journal of the Asia Pacific Economy*, 11(4), 394-410.

- Hussey, J., & Hussey, R. (1997). *Business Research: A practical guide for undergraduate and postgraduate students*. New York: Palgrave.
- Ilias Said (2005). *The implication of ISO 9000 quality management system and business performance of contractors in Malaysia*. Universiti Utara Malaysia, Sintok Kedah.
- Inkpen, A. C. (1998). Learning and knowledge acquisition through international strategic alliances. *Academy of Management Executive*, 12(4), 69-80.
- Inkson, J. H. K., Pugh, D. S., & Hickson, D. J. (1970). Organization context and structure: An abbreviated replication. *Administrative Science Quarterly*, 15, 318-328.
- Ivarsson, I., & Alvstam, C. G. (2005). Technology transfer from TNCs to local suppliers in developing countries: A study of AB Volvo's truck and bus plants in Brazil, China, India and Mexico. *World Development*, 33(8), 1325-1344.
- Jegathesan, J., Gunasekaran, A., & Muthaly, S. (1997). Technology Development and Transfer: Experiences from Malaysia. *International Journal of Technology Management*, 13(2), 196-214.
- Jian, C. G., Chiu, K. M., Yam, R. C. M., Chin, K. S., & Pun, K. F. (2005). Technology transfer and innovation performance: Evidence from Chinese firms. *Technological Forecasting and Social Change*, 13 pages.
- Johnson, S. D., Gatz, E. F., & Hicks, D. (1997a). Expanding the Content Base of Technology Education: Technology Transfer as a Topic of Study. *Journal of Technology Education*, 8(2), 1-16.
- Kartiko Putranto, Stewart D. & Moore G.(2003). Implementing a technology strategy in developing countries. The experience of the Indonesian roling stock industry. *Technological Forecasting & Social Change*, 70(2),163-176.
- Kaufmann, L., & Roessing, S. (2005). Managing conflict of interests between headquarters and their subsidiaries regarding technology transfer to merging markets - a framework. *Journal of World Business* 40, 235-253.
- Kim, J.-O., & Mueller, C. W. (1978). *Factor Analysis-Statistical Methods and Practical Issues* (Vol. 07-014). London: SAGE Publications Ltd.
- Kim, L. (1998). Crisis Construction and Organizational Learning: Capability Building in Catching-Up at Hyundai Motor. *Organization Science*, 9(4), 506-521.
- Kneller, R. (2002). *Frontier technology, absorptive capacity and distance*: The University of Nottingham.

- Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, 3(August), 383-397.
- Kokko, A. (1994). Technology, market characteristics and spillovers. *Journal of Development Economics*, 43(2), 279-293.
- Kokko, A., Ruben, T., & Mario, Z. C. (1996). Local technological capability and productivity spillovers from Foreign Direct Investment in Uruguyan manufacturing sector. *Journal of Development Studies*, 32, 602-611.
- Komorita, S. S., & Graham, W. K. (1965). Number of scale points and the reliability of scales. *Educational and Psychological Measurement*, 25(4), 987-995.
- Kotha, S., & Swamidass, P. M. (2000). Strategy, advanced manufacturing technology and performance: Empirical evidence from U.S. manufacturing firms. *Journal of Operation Management*, 18, 257-277.
- Krejcie, R., & Morgan, D. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30, 607-610.
- Krosnick, J. A. (1999). Survey Research. *Annual Review of Psychology*, 50, 337-367.
- Kuen-Hung, T., & Jiann-Chyuan, W. (2007). A longitudinal examination of performance of two ways innovation in Taiwan: Internal R&D investment and external technology acquisition. *International Journal of Technology Management*, 39(3/4), 235-247.
- Kumar, V., Kumar, U., & Persaud, A. (1999). Building Technological Capability Through Importing Technology: The case of Indonesian Manufacturing Industry. *Journal of Technology Transfer*, 24(1), 81-96.
- Kuznets S. (1966). *Modern economic growth: Rate, structure, spread*. New Haven, CT: Yale University.
- Lado A. A., Vozikis S.(1996). Transfer of technology to promote entrepreneurship in developing countries: An integrtaion and proposed framework. *Entrepreneurship: Theory and Practice*, 21.
- Lai, Y. W. (2001). *Pemindahan teknologi di sektor elektronik dan elektrik di Malaysia: Paras, takat dan kekangan*. Penang: Universiti Sains Malaysia.
- Lai, M.C. & Yap, S.F (2004). Technology development in Malaysia and the newly industrialising economies: A comparative study. *Asia Pacific Development Journal*. Vol. 11( 2), 53-78.

- Lai, Y. W., & Narayanan, S. (1997). The quest for technological competence via MNCs: A Malaysian case study. *Asian Economic Journal*, 11(4), 407-422.
- Lall, S. (2002). FDI and development. Research issues in the emerging context. In B. Bora (Ed.), *Foreign Direct Investment. Research Issues* (pp. 325-345). London: Routledge.
- Lane, J. P. (2003). The state of the science in technology transfer: Implications for the field of assistive technology. *Journal of Technology Transfer*, 28, 333-354.
- Lane, P., Salk, J. E., & Lyles, M. A. (2001). Absorptive capacity, learning and performance in international joint ventures. *Strategic Management Journal*, 22(12), 1139-1157.
- Lane, P. J., Koka, B. R., & Pathak, S. (2006). The reification of absorptive capacity: A critical review and rejuvenation of the construct. *Academy of Management Review*, 31(4), 833-863.
- Lane, P. J., & Lubatkin, M. (1998). Relative absorptive capacity and interorganizational learning. *Strategic Management Journal*, 19, 461-477.
- Large, D., Belinko, K., & Kalligatsi, K. (2000). Building successful technology commercialization teams: Pilot empirical support for the Theory of Cascading Commitment. *Journal of Technology Transfer*, 25, 169-180.
- Lee Z. & Lee J. (2000). An ERP implementation case study from a knowledge transfer perspective. *Journal of Information Technology*, 15(4), 281-288.
- Lee, G., & Xia, W. (2006). Organizational size and IT innovation adoption: A meta-analysis. *Information & Management*, 43(8), 975-985.
- Lenox, M., & King, A. (2004). Prospects for developing absorptive capacity through internal information provision. *Strategic Management Journal*, 25, 331-345.
- Liao, J. H., Welsh, H., & Stoica, M. (2003). Organizational absorptive capacity and firm responsiveness: An empirical investigation of growth-oriented firms. *Entrepreneurship Theory and Practice*, Autumn, 63-85.
- Lim, K. (2004). *The many faces of absorptive capacity*. Singapore: National University of Singapore.
- Lindsey, C. W. (1986). Transfer of technology to the Asean region by U.S. Transnational corporations. *Asean Economic Bulletin*, 3(2), 225-247.

- Lorentzen, J., Mollgaard, P., & Rojec, M. (2003). Host-Country Absorption of Technology: Evidence from Automotive Supply Networks in Eastern Europe. *Industry and Innovation, 10*(4), 415-432.
- Lundquist, G. (2003). A rich vision of technology transfer. Technology value management. *Journal of Technology Transfer., 28*, 265-284.
- Lyles, M. A., & Salk, J. E. (1996). Knowledge acquisition from foreign parents in international joint ventures: An empirical examination in the Hungarian context. *Journal of International Business Studies, 27*, 1-17.
- MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power Analysis and Determination of Sample Size for Covariance Structure Modeling. *Psychological Methods, 1*(2), 130-149.
- MacCallum, R. C., Widaman, K. F., Preacher, K. J., & Hong, S. (2001). Sample Size in Factor Analysis: The Role of Model Error. *Multivariate Behavioral Research, 36*(4), 611-637.
- Madanmohan, T. R., Kumar, U., & Kumar, V. (2004). Import-led technological capability: A comparative analysis of Indian and Indonesian manufacturing firms. *Technovation, 24*, 979-993.
- Makadok, R. (2001). Toward a synthesis of the resource-based and dynamic capability views of rent creation. *Strategic Management Journal, 22*(5), 387-401.
- Matell, M.S. & Jocyby, J.(1971). Is there an optimal number of alternatives for Likert scales items? Reliability and validity. *Educational & Psychological Measurement. Vol. 31*(3), 657-674.
- Malaysia (2001). *Eight Malaysia Plan 2001-2005*. Kuala Lumpur: Unit Perancangan Ekonomi.
- Malaysia (2006). *Rancangan Malaysia kesembilan 2006-2010*. Putrajaya: Unit Perancangan Ekonomi.
- Malaysia International Trade & Industry Report 2001* (2002). Kuala Lumpur: MITI.
- Malaysia International Trade and Industry Report 2005* (2006). Malaysia: Ministry of International Trade and Industry Malaysia.
- Marcotte, C., & Niosi, J. (2000). Technology Transfer to China. The Issues of Knowledge and Learning. *Journal of Technology Transfer, 25*(1), 43-57.

- Masters, J.R. (1974). The relationship between number of response categories and reliability of Likert-type questionnaires. *Journal of Educational Measurement in Education*. Vol. 11(1). pp 49-53.
- Mattoo, A., Olarreaga, M., & Saggi, K. (2004). Mode of foreign entry, technology transfer, and FDI policy. *Journal of Development Economics*, 75, 95-111.
- Md Zahidatul Islam (2001). *Organisation structure and the success of technology transfer in Malaysian firms*. Unpublished Dissertation, Universiti Sains Malaysia, Penang.
- Meyer, A. D., & Goes, J. B. (1988). Organizational Assimilation of Innovations: A Multilevel Contextual Analysis. *Academy of Management Journal*, 31(4), 897-923.
- Meyers, L. S., Gamst, G., & Guarino, A. J. (2006). *Applied Multivariate Research*. California: Sage Publications Inc.
- Miller, C. C., Glick, W. H., Wang, Y.-D., & Huber, G. P. (1991). Understanding technology-structure relationships: Theory development and meta-analytic theory testing. *Academy of Management Journal*, 34(2), 370-399.
- Miller, D. (1987). The Structural and Environmental Correlates of Business Strategy. *Strategic Management Journal*, 8(1), 55-76.
- Miller, D. (1988). Relating Porter's business strategies to environment and structure: Analysis and performance implications. *Academy of Management Journal*, 31(2), 280-308.
- Miller, D., & Droge, C. (1986). Psychological and Traditional Determinants of Structure. *Administrative Science Quarterly*, 31, 539-560.
- Millman, A. F. (1983). Technology transfer in international market. *European Journal of Marketing*, 17(1), 26-47.
- Minbaeva, D., Pedersen, T., Bjorkman, I., Fey, C., & Park, H. (2003). MNC knowledge transfer, subsidiary absorptive capacity and HRM. *Journal of International Business Studies*, 34, 586-599.
- Miroudot, S. (2006). *The linkages between open services markets and technology transfer* (OECD Trade Policy Working Paper No. 29 TD/TC/WP(2005)9/FINAL): OECD.
- Mohd Nazari Ismail (1999). Foreign Firms and National Technological Upgrading: The Electronics Industry in Malaysia. In K. S. Jomo, G. Felker & R. Rasiah (Eds.),

- Industrial Technology Development in Malaysia* (pp. 21-37). London and New York: Routledge.
- Mowery, D. C., Oxley, J. E., & Silverman, B. S. (1996). Strategic alliances and interfirm knowledge transfer. *Strategic Management Journal*, 17(Winter Special Issue), 77-91.
- Mun-Chow, L., & Su-Fei, Y. (2004a). Technology development in Malaysia and the newly industrializing economies: A comparative analysis. *Asia Pacific Journal Management*, 11(2), 53-77.
- Myong-Hun, C., & Harrington Jr., J. E. (2000). Centralization vs, Decentralization in a Multi-Unit Organization: A Computational Model of a Retail Chain as a Multi-Agent Adaptive System. *Management Science*, 46(11), 1427-1440.
- Nandakumar, S. (2000). *Factors influencing success of technology transfer in Malaysian manufacturing firms in the Northern Peninsula*. Unpublished Dissertation, Universiti Sains Malaysia, Penang.
- Narasimhan, O., Rajiv, S., & Dutta, S. (2006). Absorptive capacity in high-technology markets: The competitive advantage of the haves. *Marketing Science*, 25(5), 510-524.
- Narayanan, S., & Lai, Y. W. (1993). Human resource constraints on technology transfer: An empirical analysis of the electronics and electrical sector in Penang, Malaysia. *The Singapore Economic Review*, 38(2), 155-165.
- Narayanan, S., & Lai, Y. W. (2000). Technological maturity and development without research: The challenge for Malaysian manufacturing. *Development and Change*, 31, 435-437.
- Narayanan, S., & Rasiah, R. (1992). Malaysian Electronics: The Changing Prospects for Employment and Restructuring. *Development and Change*, 23(4), 75-99.
- Neuman, W. L. (1997). *Social research methods. Qualitative and quantitative approaches* (3rd ed.). MA: Allyn & Bacon.
- Nieto, M., & Quevedo, P. (2005). Absorptive capacity, technological opportunity, knowledge spillovers and innovative effort. *Technovation*, 25, 1141-1157.
- Nik Maheran Nik Muhamad, & Haslina Che Yaacob (2008). Export competitiveness of Malaysian electrical and electronics (E&E) products: Comparative study of China, Indonesia and Thailand. *International Journal of Business and Management*, 3(7), 65-75.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14-37.



- Nonaka, I., Takeuchi, H., & Takeuchi, H. (1995). *The Knowledge Creating Company : How Japanese Companies Create the Dynamics of Innovation*. London: Oxford University Press.
- Nonaka, I., & Toyama, R. (2007). Why do firms differ? The theory of the knowledge creating firm. In K. Ichijo & I. Nonaka (Eds.), *Knowledge creation and management. New challenges for managers*. New York: Oxford University Press.
- Norlela Ariffin, & Figueiredo, P. N. (2004). Internalization of innovative capabilities: Counter evidence from the electronics industry in Malaysia and Brazil. *Oxford Development Studies*, 32(4), 559-583.
- Nunnally, J. C. (1978). *Psychometric Theory* (2nd ed.). New York: McGraw Hill.
- Onwuegbuzie, A. J., & Daniel, L. (2002). Uses and misuses of the correlation coefficient  
*Research in the Schools*, 9, 73-90.
- Osman-Gani, A. A. M. (1999). International Technology Transfer for Competitive Advantage: A Conceptual Analysis of the Role of HRD. *Competitiveness Review*, 9(9).
- Phang, H. E. (1998). *Foreign Direct Investment: A study at Malaysia's balance of payments positions*. Selangor Darul Ehsan: Pelanduk Publications.
- Pierce, J. L., & Delbecq, A. L. (1977). Organization Structure, Individual Attitudes and Innovation. *The Academy of Management Review*, 2(1), 27-47.
- Polanyi, M. (1962). Tacit knowledge: Its bearing on some problems of philosophy. *Reviews of Modern Physics*, 34(4), 601-615.
- Porter, M. E. (1985). Technology and competitive advantage. *Journal of Business Strategy*, 5(3), 60-78.
- Powell, T. C. (1995). Total Quality Management as Competitive Advantage: A Review and Empirical Study. *Strategic Management Journal*, 16(1), 15-37.
- Prahalad, C. K., & Hamel, G. (1990). The core competence of the organization. *Harvard Business Review*, May-June, 79-91.
- Prescott, J. E. (1986). Environment as Moderators of the Relationship between Strategy and Performance. *The Academy of Management Journal*, 29(2), 329-346.

- Pugh, D. S., Hickson, D. J., Hinings, C. R., & Turner, C. (1968). Dimensions of Organization Structure. *Administrative Science Quarterly*, 65-105.
- Pugh, D. S., Hickson, D. J., Hinings, C. R., & Turner, C. (1969). The Context of Organization Structures. *Administrative Science Quarterly*, 91-114.
- Quazi, H. A., & Bartels, F. L. (1998). Application of TQM principles in the international technology transfer process of industrial production plants. *British Journal of Management*, 9, 289-300.
- Rasiah, R., & Jomo, K. S. (1999). Introduction. In K. S. Jomo, G. Felker & R. Rasiah (Eds.), *Industrial technology development in Malaysia. Industry and firm studies*. London: Routledge.
- Razib Arshad, & Tee, T. J. (2006). *Hindrance to technology transfer through MNCs R&D activities in parent-subsidiary relationship*. Paper presented at the IAMOT 2006.
- Reagan, J. (2003). Research Basics: Choosing a Data-Gathering Technique and Crafting Questionnaires. *Communication World*, 20(1), 8-11.
- Rebentisch, E. S. (1995). *Knowledge in flux: The transfer of technology and practice in an international joint venture*. Unpublished Dissertation, MIT.
- Rebentisch, E. S., & Ferretti, M. (1995). A knowledge asset-based view of technology transfer in international joint ventures. *Journal of Engineering and Technology Management*, 12, 1-25.
- Reisman, A. (2005a). Comparative Technology Transfer. A tale of development in neighbouring countries, Israel and Turkey. *Comparative Technology Transfer and Society*, 3(3), 322-370.
- Reisman, A. (2005b). Transfer of technologies: A cross taxonomy. *The International Journal of Management Science*, 33, 189-202.
- Robey, D., Bakr, M. M., & Miller, T. (1977). Organizational Size and Management Autonomy: Some Structural Discontinuities. *Academy of Management Journal*, 20(3), 378-397.
- Rogers, E. M. (1983). *Diffusion of Innovations*. New York: The Free Press.
- Santikarn, M. (1981). *Technology transfer*. Singapore: Singapore University Press.
- Santrock, J. W. (1997). *Life-span Development* (6th ed.). Madison: Brown and Benchmark Publishers.

- Saraph, J. V., Benson, P. G., & Schroeder, R. G. (1989). An instrument for measuring the critical factors of quality management. *Decision Science*, 20, 810-829.
- Savory, C. (2006). Translating knowledge to build technological competence. *Management Decision*, 44(8), 1052-1075.
- Schendel, D. (1994). Introduction to the summer 1994 special issues-strategy: Search for new paradigms. *Strategic Management Journal*, 15(2), 1-4.
- Schroer, B. J., Farrington, P. A., Messimer, S. L., & Thornton, J. R. (1995). Measuring technology transfer performance: A case study. *Technology Transfer*, 39-47.
- Seely, B. E. (2003). Historical patterns in the scholarship of technology transfer. [Conceptual]. *Comparative Technology Transfer and Society*, 1(1), 7-48.
- Sekaran, U. (2005). *Research methods for business. A skill building approach* (4th ed.). NY: John Wiley & Sons Inc.
- Sexton, M., & Barrett, P. (2004). The role of technology transfer in innovation within small construction firms. *Engineering, Construction and Architectural Management*, 11(5), 342-348.
- Sharma, S., Durand R.M. & Gur-Arie, O.(1981). Identification and analysis of moderator variables. *Journal of Marketing Research*. Vol. XIII .pp 291-300.
- Shiowattana, P. (1991). Technology transfer and Japan-Thai relations. In S. Yamashita (Ed.), *Transfer of Technology and Management to the ASEAN Countries* (pp. 169-193). Tokyo: University of Tokyo Press.
- Shuell, T. J. (1986). Cognitive conceptions of learning. *Review of Educational Research*, 56, 531-548.
- Sinani, E., & Meyer, K. E. (2004). Spillover of technology transfer from FDI: the case of Estonia. *Journal of Comparative Economics*, 32(3), 445-466.
- Singh, K. (1997). The impact of technological complexity and interfirm cooperation on business survival. *Academy of Management Journal*, 40(2), 339-365.
- Siti Norezam Othman, Norizah Mohammad, & Nooh Abu Bakar (2005). Technology transfer for developing suppliers technological capability. *Journal of Technology Management and Entrepreneurship*, 3(2), 1-18.
- Smilor, R. W., & Gibson, D. V. (1991). Accelerating technology transfer in R&D consortia. *Research Technology Management*, 34(1), 44 - 49.
- Souder, W. E. (1987). *Managing New Product Innovations*. Mass.: Lexington Books.

- Souder, W. E., & Padmanabhan, V. (1989). Transferring new technologies from R&D to manufacturing. *Research Technology Management*, 32(5), 38-43.
- Southon, F. C. G., Sauer, C., & Grant, C. N. (1997). Organizational impediments to successful technology transfer and diffusion. *Journal American Medical Informatics Association*, 4(2), 112-124.
- Spann, M. S., Adams, M., & Souder, W. E. (1995). Measures of technology transfer effectiveness: Key dimensions and differences in their use by sponsors, developers and adopters. *IEEE Transactions on Engineering Management*, 42(1), 19-28.
- Steele, L. W. (1988). Evaluating the technical operation. *Research Technology Management*, 31(5), 11 -18.
- Stewart, C. T., & Nihei, Y. (1992). *Technology transfer and human factors*. USA: D.C. Heath and Company Lexington Books.
- Stewart, R. A., & Waroonkun, T. (2007). Benchmarking construction technology transfer in Thailand. *Construction Innovation*, 7(3), 218-239.
- Stock, G. N., & Tatikonda, M. V. (2008). The joint influence of technology uncertainty and interorganizational interaction on external technology integration success. *Journal of Operations Management*, 26(1), 65-80.
- Story, J., & Loroz, P. S. (2005). Technological congruence and perceived quality of brand extensions. *Journal of Product and Brand Management*, 14(7), 438-447.
- Suhaimi Mhd Sarif, & Yusof Ismail (2006). The Search for Indigenous Technology within Malaysian Economic Policies. *Journal of Technology Management and Entrepreneurship*, 5(2), 71-87.
- Sunaoshi, Y., Kotabe, M., & Murray, J. Y. (2005). How technology transfer really occurs on the factory floor: a case of a major Japanese automotive die manufacturer in the United States. *Journal of World Business*, 40, 57-70.
- Sung, T. K., & Gibson, D. (2000). *Knowledge and technology transfer: Levels and key factors*. Paper presented at the 4th International Conference on Technology Policy and Innovation.
- Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management Journal*, 17(Winter Special Issue), 27-43.

- Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics* (5 ed.). Boston: Pearson.
- Tai-Yue, W., & Shih-Chien, C. (2007). The influences of technology development on economic performance- The example of ASEAN countries. *Technovation*, 27, 471-488.
- Tarek Khalil (2000). *Management of Technology. The key to competitiveness and wealth creation*. Singapore: McGraw-Hill Higher Education.
- Tatikonda, M. V., & Stock, G. N. (2003). Product technology transfer in the upstream supply chain. *The Journal of Product Innovation Management*, 20, 444-467.
- Teasley, R. W., Almeida, J. G., & Robinson, R. B. (1996, 18-20 August). *Managing technology transfer for value creation and competitive advantage: Toward a contingency-based information processing model*. Paper presented at the International Conference on Engineering and Technology Management.
- Teece, D. J. (1976). *The multinational corporation and the resource cost of international technology transfer*. MA: Ballinger Cambridge.
- Teece, D. J. (1977). Technology transfer by multinational firms: The resource cost of transferring technological know-how. *The Economic Journal*, 87(June), 242-261.
- Teece, D. J. (2000). *Managing intellectual capital*. New York: Oxford University Press.
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.
- Tushman, M. L., & Nadler, D. A. (1978). Information processing as an integrating concept in organizational design. *Academic of Management Journal*, 3(3), 613-624.
- Tyre, M. (1991). Managing the introduction of new process technology: International differences in a multi-plant network. *Research Policy*, 20(1), 57-76.
- Tyre, M. J., & Orlikowski, W. J. (1994). Windows of opportunity: Temporal patterns of technological adaptation in organization. *Organization Science*, 5(1), 98-118.
- Udy, S. H. (1965). The Comparative Analysis of Organizations. In J. G. March (Ed.), *Handbook of Organizations*. Chicago: Rand McNally.
- Ungan, M. C. (2007). Manufacturing Best Practices: Implementation Success Factors and Performance. *Journal of Manufacturing Technology Management*, 18(3), 333-348.

- Van-den-Bosch, F. A. J., Volberda, H. W., & de-Boer, M. (1999). Coevolution of firm absorptive capacity and knowledge environment: Organizational forms and combinative capabilities. *Organization Science*, 10(5), 551-568.
- Vance, C. M., & Paik, Y. (2005). Forms of host-country national learning for enhanced MNC absorptive capacity. *Journal of Managerial Psychology*, 20(7), 590-606.
- Whangthomkum, N., Igel, B., & Speece, M. (2006). An empirical study of the relationship between absorptive capacity and technology transfer effectiveness. *International Journal of Technology Transfer and Commercialization*, 5(1/2), 31-55.
- Wiersma, W. (1993). *Research methods in education: An introduction* (5th ed.). Boston: Allyn & Bacon.
- Woolfolk, A. E. (1988). *Educational Psychology* (7th ed.). MA 02194: Allyn & Bacon.
- Xu B. (2000). Multinational enterprise, technology diffusion and host country productivity growth. *Journal of Development Economy*, 32, 1258 -1274.
- Zaafaran Hassan (1999, 16 - 17 July). *Managerial Innovativeness: An Exploratory Study of Middle Level Managers in Malaysian Financial Services Companies*. Paper presented at the The 3rd Asian Academy of Management Conference Kuala Terengganu Malaysia.
- Zahra, S. A. (1996). Technology Strategy and Financial Performance: Examining the Moderating Role of the Firm's Competitive Environment. *Journal of Business Venturing*, 11, 189-219.
- Zahra, S. A., & George, G. (2000). *Absorptive capacity: A review and reconceptualization*. Paper presented at the Academy of Management Proceedings, 1-6.
- Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualization and extension. *Academy of Management Review*, 27(2), 185-203.
- Zahra, S. A., & Nielsen, A. P. (2002). Sources of Capabilities, Integration and Technology Commercialization. *Strategic Management Journal*, 23(5), 377-398.
- Zaidah Mustaffa, Md. Zabid Abdul Rashid, & Murali Sambasivan (2007). Strategic roles of foreign multinational subsidiaries in Malaysia. *International Journal Management and Decision Making*, 8(2/3/4), 268-289.
- Zainal Abidin Sanusi (2004, 3-7 April ). *Technology transfer and the roles of firm-host government coordination: An empirical analysis based on Japaneses-affiliated*

*manufacturing firms in Malaysia*. Paper presented at the IAMOT 2004, Washington D.C.

Zhao, L., & Reisman, A. (1992). Toward Meta Research on technology transfer. *IEEE Transactions on Engineering Management*, 39(1), 13-21.

Zikmund, W. G. (1994). *Exploring marketing research* (5th ed.). TX: The Dryden Press.

Zmud, R. W. (1982). Diffusion of Modern Software Practices: Influence of Centralization and Formalization. *Management Science*, 28(12), 1421-1431.