Management of Innovation Networks in Technology Transfer

by
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Abstract

Network management is a critical concept in innovation and technology transfer. Linkages among network members are fundamental in the innovation process which has been heralded for its contribution to wealth creation in economies increasingly characterized by both globalization and technological connectivity. Innovation networks involve relationships among members of governments, businesses and universities that collaborate continuously to achieve shared scientific goals. This study focuses on identifying the key management factors operating in such networks and on determining the process through which these lead to successful technology transfer. This is of increasing interest for many countries seeking to foster innovation, technology transfer and, in turn, international competitiveness.

The study integrates the technology transfer and network research streams in order to provide a unique contribution towards understanding key network factors that are important in technology transfer. Extant technology transfer literature predominantly provides a perspective of a focal organization or, at best, that of inter-organisational relationships while its empirical investigation from a network perspective remains limited. In order to develop a more holistic network perspective, this study draws on the network literature and in particular that of the Industrial Marketing and Purchasing (IMP) group. Although neither a comprehensive network management theory nor suitable measures at the network level of analysis currently exist, the network literature is quickly evolving and has highlighted several concepts that contribute to achieving network outcomes, albeit in a conjectural fashion. Therefore, this study applies these concepts towards contributing to network management theory development in both the network and technology transfer fields.

This study adopts a multi-method research approach. Qualitative exploratory research was necessary as concepts from the technology transfer and network management literatures were combined in a novel way. It was also essential in developing appropriate scales. Quantitative research then followed in order to test these scales by applying exploratory factor analysis and reliability testing. The developed scales were then employed to advance theory development, using confirmatory factor analysis via structural equation modelling. The study predominantly investigates networks within several industries that are relevant internationally and consistent with some of Australia's national research priorities. Consequently, a pilot study was conducted in the wine industry to purify scales followed by full field work undertaken in the information and communications technology and biotechnology/nanotechnology industries.

Common patterns that emerge within different industries strengthen theory development and lead to generalizations to other related industries while differences lead to industry-specific implications. A number of patterns were uncovered. Evidence was provided for the significant impact of power distribution, trust, coordination and harmony on achieving network outcomes in the ICT and the biotechnology/nanotechnology industries. While both communication and R&D efficiencies were deemed important in achieving network effectiveness, the specific relationships among these factors varied between industries. The study contributes to advancing theory on network management and offers practical management implications particularly for the industries under investigation.

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List of Abbreviations

Abbreviation	Term
α	Cronbach's Coefficient Alpha
AGFI	Adjusted Goodness-of-Fit
AMOS	Analysis of Moment Structures
ARA	Actor – Resource – Activity
ARC	Australian Research Council
B/N	Biotechnology/Nanotechnology
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CRC	Corporative Research Centre
DEST	Department of Education, Science and Training
DNA	Deoxyribonucleic Acid
ICT	Information and Communications Technology
IEEE	Institute of Electrical and Electronic Engineers
IMP	Industrial Marketing and Purchasing
IP	Intellectual Property
NM	Network Management
NPD	New Product Development
R&D	Research and Development
RBV	Resource Based View
RM	Relationship Marketing
RMSEA	Root Mean Square Error of Approximation
RNA	Ribonucleic Acid
SNA	Social Network Analysis
SEM	Structural Equation Modelling
SRMR	Standardized Root Mean-square Residuals
TCE	Transaction Cost Economics
TLI	Tucker Lewis Index
TT	Technology Transfer
UNCTAD	United Nations Conference on Trade and Development

Statement of Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

I give consent to this copy of my thesis, when deposited in the University Library, being available for loan and photocopying.

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Giselle Rampersad

September, 2008.

Publications from this Thesis since Enrolment

Evidence of the journal publications is provided in Appendix A.

Refereed Journal Articles:

Rampersad, Giselle, Quester, Pascale, and Troshani, Indrit (In-Press) "Management of Networks involving Technology Transfer from Public to Private Sector: A Conceptual Framework", International Journal of Technology Transfer and Commercialisation, forthcoming for a special issue on Public to Private Sector Technology Transfer, acceptance date: February 18, 2008.

Rampersad, Giselle, Quester, Pascale, and Troshani, Indrit (In-Press) "Developing and Evaluating Scales to Assess Innovation Networks", International Journal of Technology Intelligence and Planning, forthcoming for a special issue on Measuring R&D, acceptance date: March 3, 2008.

Refereed Conference Proceedings:

Rampersad, Giselle, Quester, Pascale, and Troshani, Indrit (2007) "Managing Innovation Networks: An Exploratory Study", Proceedings of the Australia and New Zealand Marketing Academy (ANZMAC) Conference, University of Otago, Dunedin, New Zealand, 03-05 December.

Rampersad, Giselle, Quester, Pascale, and Troshani, Indrit (2007) "Towards More Reliable Network Scales", Proceedings of the Australia and New Zealand Marketing

Academy (ANZMAC) Conference, University of Otago, Dunedin, New Zealand, 03-05 December.

Rampersad, Giselle, Quester, Pascale, and Troshani, Indrit (2007) "Management of Multi-sectoral Innovation Networks", Proceedings of the 8th Continuous Innovation Network (CINet) Conference, Chalmers University of Technology, Gothenburg, Sweden, 09-11 September

Rampersad, Giselle, Quester, Pascale, and Troshani, Indrit (2007) "Network Management of Multi-Sectoral Innovation", Proceedings of the 23rd Industrial Marketing and Purchasing (IMP) Conference, Manchester Business School, Manchester University, United Kingdom, 30 August-01 September.

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