Cooperative Performance:
Factors Affecting the Performance of International Technological Cooperation

by

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Factors Affecting the Performance of
International Technological Cooperation

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Declaration

I declare that no portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university, or other institution of learning.

The following papers have been presented in conferences as parts of the research.

The following paper has been submitted to an institute as a part of the research.
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Abstract

Technological cooperation is not only costly and time consuming, but also has a high attrition rate. Most literature on strategic cooperation focuses mainly on issues related to cooperation formation and the reasons why firms form these cooperative partnerships. However, a successfully formed cooperation is not always managed well enough to achieve a satisfactory performance. The knowledge of cooperative formation is necessary, but insufficient to achieve a satisfactory performance. The literature suggests that scholars know little about the underlying factors affecting cooperative performance.

A comprehensive literature review was conducted to establish the possible effects of key factors on the performance of international technological cooperation, and the possible relations between key factors. A qualitative pilot study was implemented to verify the practical relevance of those 12 key factors, of which 6 factors have a relatively more significant effect on performance than the other 6 factors. By applying theoretical modeling techniques, the research framework was then constructed according to the postulated relations between 7 key factors (6 relatively more significant factors and the focal concept, performance). Strictly based on the definition of key factors, measurement items of each key factor were carefully reviewed and selected. Following the process of structural equation modeling, the structural equation model in this research was constructed. Unlike most previous cooperation studies, a structural equation model allows researchers to examine simultaneously all the relations amongst key factors. The data were collected from managers who had experience in managing a technological cooperative project with foreign partners, and were then analyzed by LISREL, a longstanding and widely distributed structural equation modeling computer program.

The result suggests that symmetric opinions, commitment, dependence, relationships, partner analyses, and rewards have effects on the performance of international technological cooperation, which confirms the results of the thorough and comprehensive literature review and of the qualitative pilot study. In addition, in the structural equation model of this research, relationships and rewards have effects on commitment, and partner analyses and rewards have effects on dependence, which are also consistent with the literature review. The findings have contributed to theory advancement in cooperation studies, and to the knowledge of international business. Managerial implications from the findings also provide advices, which managers can proactively take, to avoid the odds of success.
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Chapter 1 Introduction

In this chapter,

- Section 1.1 briefly describes this research, including the general trend in international technological cooperation, a major gap in the literature, and the main goal of this research.

- Section 1.2 describes the structure of this thesis, including the focus of each section from Chapter 2 to Chapter 7. Then, the main sections and the structure of this thesis are summarized, illustrated and explained in Figure 1.2.
1.1 Research introduction

In recent years, international technological cooperation between companies in developed and developing countries have increased rapidly (Contractor, 1986; Feulner, 1992). Most technological cooperation is conducted internationally. International technological cooperation is particularly favored in developing countries, where multinationals are looking to establish a presence through technological cooperation with their local partners. In addition, multinationals are frequently encouraged by local governments to form technological cooperation with local companies (Uimonen, 1996). Hence, since the mid 1980s there has been growing recognition of cooperative efforts in international business and of negotiated cooperation between two or more firms (Littler and Wilson, 1991). Hence, there has been increasing emphasis on cooperative activities in the literature.

Technological cooperation are often costly and time consuming for participating firms, however the failure rates of cooperation are disturbingly high (Dacin et al., 1997; Park and Ungson, 1997). Most researchers of strategic cooperation focus mainly on issues related to cooperation formation (Spekman et al., 1998). Despite of their efforts, cooperation failure rates remain as high as 60% – 70% (Ertel, 2001).

“Well begun is half done”, an old saying by Aristotle (384 – 322 BC), is frequently emphasized by many cooperation researchers. However, a key question in cooperation studies is “How about the other half?” A successfully formed cooperation is not always managed well enough to achieve a satisfactory performance (Dacin et al, 1997). The knowledge of
cooperative formation is necessary, but insufficient to achieve a satisfactory performance. It becomes critically important to understand the key factors on performance. Saxton (1997) suggests that scholars know little about the underlying factors affecting cooperative performance.

This research investigates the effects of important factors on the performance of international technological cooperation by studying the managerial perspective from individual managers of international technological cooperation between Taiwanese technology intensive companies and foreign companies. Most samples studied were alliances in the electronics and chemical engineering industries. A survey was used to gather data from respondents, while the time horizon of the research is cross-sectional.

This research contributes to the knowledge of international technological cooperation by providing evidence on the effects of important factors on cooperative performance, and identifying the inter-relations between these factors and their effects on performance. A structural equation model is built up to examine simultaneously these effects and to clarify the management of the performance of international technological cooperation.
1.2 Organization of the thesis

There are 7 chapters in this thesis.

Chapter 2 is a review of the literature. The research background is described in the first section, including motives, formation, and management issues. Cooperative performance is discussed in the second section. The evaluation of cooperative performance is highlighted as the main issue investigated. In the third section, an overview of underlying factors affecting cooperative performance is introduced, based on a preliminary literature review. The details of important management issues and their possible effects on cooperative performance are analyzed and discussed. An initial theoretical framework is developed to illustrate and explain the relations between important factors. Based on the preceding sections, the research problems and objectives are discussed and fine-tuned in Section 2.4.

In Chapter 3 the pilot study is discussed. This was conducted in order to identify relatively relevant factors. The objective of this pilot study is described in the first section. The methodological issues of pilot study are offered in the second section, including the sample selection, interview questions, and key concepts used in conducting interviews and recording. Major techniques of analysis are discussed in the third section. A very important and widely applied analysis technique, content analysis, is implemented in this study. Following the process of content analysis, the results are discussed in conjunction with the review of the literature to form the research framework and the hypotheses.
In Chapter 4 the research framework and hypotheses are discussed. In the first section, important factors derived from the literature review in Chapter 2 and the results of the pilot study in Chapter 3 are analyzed to verify the importance and relevance theoretically and empirically in order to justify the research propositions. Then, the important factors are refined and research propositions are developed in the second section to form the research framework based on concepts of theoretical modeling. From the knowledge of hypothesis and concepts of theoretical modeling, the research hypotheses are developed in the third section.

Chapter 5 outlines the research methodology. There are 5 sections in this chapter: research design, measurements, structural equation modeling, sampling design, and data collection. In the first section, the research design describes the characteristics of this research. The key issues of research design described include the purpose of the study, types of investigation, researcher interference, study setting, unit of analysis, and time horizon (Sekaran, 2000). Measurements of each factor are discussed in the second section. Following the process of structural equation modeling, a structural equation model path diagram is constructed, and model specification and model identification are also completed in Section 5.3. The fourth section discusses the selection of an appropriate sampling technique, the specific issues regarding the chosen sampling technique, the sample size issues, and the sample frame. Data collection issues, including questionnaire construction and survey implementation are discussed in the fifth section. The completion of data collection in this chapter allowed this research to analyze data, to test hypotheses, and to discuss the result in the following chapter, Chapter 6.
Chapter 6 outlines data analysis, hypotheses testing, and discussion. In the first section, key issues of confirmatory data analyses in this research are implemented step by step, including sample structure, multivariate normality, goodness of measures, parameter estimation, and assessment of model fit. In the second section, hypotheses are tested, based on the original structural equation model. In the third section, key issues of exploratory data analyses including model modification, model comparison, and model cross-validation are conducted. In the fourth section, the final structural equation model is discussed first. Then, the new added parameters, suggested by model modifications, are discussed.

Chapter 7 covers research conclusions and managerial implications. In the first section, the research conclusion is described from 4 aspects, main contributions, methodological suggestions, limitations, and research evaluation. In the second section, managerial implications are discussed, based on important management issues in the performance of international technological cooperation. Finally, following the sequence of topics in this thesis, future research directions are outlined one by one.

The main sections and the structure of this thesis are summarized in Figure 1.2 as follows. The structure of this thesis also explains the implemented approach towards solving the key research problems.
Figure 1.2 Organization of the thesis

- 2.1 Research background
- 2.2 Cooperative performance
- 2.3 Key factors
- 2.4 Research problems and objectives
- 3. Pilot study
- 3.1 Objectives
- 3.2 Methodology
- 3.3 Analysis
- 4.1 Research propositions
- 4.2 Research framework
- 4.3 Hypotheses
- 5.1 Research design
- 5.2 Measurements
- 5.3 Structural equation modeling
- 5.4 Sampling design
- 5.5 Data collection
- 6.1 Data analysis (confirmatory)
- 6.2 Hypotheses testing
- 6.3 Data analysis (exploratory)
- 6.4 Discussion
- 7.1 Conclusion
- 7.2 Implications
- 7.3 Future directions
- 7.4 Analysis
1.3 Conclusion

In this chapter, the general trend in international technological cooperation, a major gap in the literature, and the main goal of this research has been described briefly in the first section. In the second section, the focus of each main section, from Chapter 2 to Chapter 7 in this thesis was also reported. Figure 1.2 was used to summarize, illustrate and explain the main sections and structure of this thesis.