

Title	タイ国の製造企業の文脈における企業の技術的能力向上のための内部および外部の人的資源管理の調整
Author(s)	TIENG, KIMSENG
Citation	
Issue Date	2020-09
Type	Thesis or Dissertation
Text version	ETD
URL	http://hdl.handle.net/10119/16993
Rights	
Description	Supervisor:神田 陽治, 先端科学技術研究科, 博士

Coordination of Internal and External Human Resource Management for Upgrading Firm Technological Capabilities in the Context of Manufacturing Firms in Thailand

Tieng Kimseng
(1720420, Kohda-Lab)

Graduate School of Advanced Science and Technology
Japan Advanced Institute of Science and Technology
[Knowledge Science]

Abstract

1. Research content

Understanding human resource management (HRM) practices based on the contexts are crucial for an organisation to provide appropriate solutions for technology upgrading and innovation. Arnold et al. (2000) defined four stages of firm technological capabilities, i.e., technology use and operation, technology acquisition and assimilation, technology upgrading and reverse engineering, and research and development (R&D); arranging them in ascending order of difficulties. In their study, they defined states of firms for each stage, but they did not identify coordination of internal and external HRM practices to upgrade firm technological capabilities for one stage to another. This deficiency leads us to adopt qualitative analysis to identify coordination of internal and external HRM practices to upgrade firm technological capabilities in the context of manufacturing firms in Thailand.

The results from the qualitative analysis indicate that to be on the first stage of technology use and operation, firms need to adopt internal training and collaborate with suppliers and related partners for plant setup and operation. Then firms need specific recruitment procedures and precise training and development plans so that they can move to the second stage of technology acquisition and assimilation. Also, firms need to adopt cross-functional teams and project-based teams before they can upgrade to the third stage of technology upgrading and reverse engineering. Lastly, firms need key R&D gurus, e.g., highly qualified personnel with

master and Ph.D. degrees, from internal and external sources to upgrade their capabilities to the last stage of R&D. The results from case studies provide us insight knowledge on coordination of internal and external HRM practices to upgrade firm technological capabilities from the fundamental stage of technology use and operation to the complex stage of R&D.

Knowledge from case analysis motivates us to proceed with further empirical study. From the literature review, researchers mainly study effects of HRM practices on innovation and performance. Although relationships between HRM practices and innovation have been extensively studied, these relationships have not been fully understood. Researchers have not identified precise configurations of HRM practices and main mentors for promoting product innovation across different stages of firm technological capabilities. They mainly generalised conclusions through conventional methods by analysing effects or relationships of a single or group of variables on an outcome. Results from these studies may not fully represent and explain, where different combinations of HRM practices may lead to a presence or an absence of innovation. Also, researchers do not compare configurations of HRM practices for promoting product innovation across different stages of firm technological capabilities, e.g., formal R&D firms – firms that allocated at least some portions of their sale budgets for the purpose of R&D – and non-formal R&D firms. These deficiencies lead us to adopt fuzzy-set qualitative comparative analysis (fs/QCA) to identify configurations of HRM practices and main mentors that lead firms to achieve high levels and cause firms to result in low levels of product innovation across different stages of firm technological capabilities.

The results from the empirical fs/QCA are presented in formal and non-formal R&D firms, where the former indicate four main findings, i.e., (1) R&D personnel development helps formal R&D firms to achieve high levels of product innovation, and if formal R&D firms do not adopt R&D personnel development, they need to collaborate with customers and suppliers; (2) QCCs do not help formal R&D firms to achieve high levels of product innovation, but it is somehow helpful after including supply chain collaboration; (3) QCCs cause formal R&D firms to result in low levels of product innovation. Even with a presence of customer and supplier collaboration in addition to QCCs, formal R&D firms still result in low levels of product innovation if they do not adopt in-house training, engineer rotation, and R&D personnel development; and (4) top management is the main mentors for promoting product innovation, and s/he needs to work with heads of R&D departments.

The latter results on non-formal R&D firms also indicate four main findings, i.e., (1) there is not enough evidence to prove how important R&D personnel development is in helping firms to achieve high levels of product innovation even with a presence or an absence of

customer and supplier collaboration; (2) QCCs are somehow helpful for non-formal R&D firms as shown before and after including supply chain collaboration; (3) non-formal R&D firms result in low levels of product innovation if there is an absence of R&D personnel development. Even with a presence or an absence of customer and supplier collaboration, non-formal R&D firms still result in low levels of product innovation if firms do not adopt R&D personnel development; and (4) top management is the main mentors for promoting product innovation, and s/he needs to work with managers of cross-functional teams.

2. Research Purpose

The results from the qualitative analysis and fs/QCA contribute to the literature review by, first, identifying coordination of HRM practices to upgrade firm technological capabilities in the context of manufacturing firms in Thailand. Second, firms should adopt R&D personnel development such that they can achieve more product innovation. If firms do not adopt R&D personnel development, they should at least collaborate with customers and suppliers to acquire new knowledge for promoting innovation. Even some configurations in non-formal R&D firms do not show precise evidence on the significance of R&D personnel development, firms mainly result in low levels of product innovation if they do not adopt R&D personnel development. Third, adopting only QCCs may cause firms to result in low levels in promoting product innovation, so firms should adopt other related practices, e.g., in-house training, engineer rotation, R&D personnel development, or collaborate with supply chain partners. Fourth, the top-management is recognised as the main mentors for promoting innovation, and this study proves that the top management needs to work with heads of R&D departments for formal R&D firms and managers of cross-functional teams for non-formal R&D firms.

For practical implication, first, the managers need to understand the technological capabilities of their firms so that they can introduce appropriate HRM practices for technology upgrading and innovation. Second, understanding the best HRM practices from the global context is useful, but the managers should not fully adopt those practices. They need to find the best fits of HRM practices in accordance with the current states of their firm. Third, pathways for promoting innovation across different stages of firm technological capabilities can occur through various configurations, so understanding the right combination of HRM practices could help firms for technology upgrading and innovation. Fourth, knowledge sharing from related personnel in various positions within the organisation does not cause firms to result in low levels of innovation, so the managers should motivate their employees to join in innovative activities for knowledge sharing and knowledge co-creation.

3. Research Accomplishment

Papers submitted and published in journals

Tieng Kimseng, Amna Javed, Jeenanunta Chawalit, and Youji Kohda. (2020) Applications of Fuzzy Logic to Reconfigure Human Resource Management Practices for Promoting Product Innovation in Formal and Non-Formal R&D Firms, *Journal of Open Innovation: Technology, Market, and Complexity*, 6(2), 38.

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Tieng Kimseng, Amna Javed, Jeenanunta Chawalit, and Youji Kohda. (2020) [Accepted], “Mechanisms for Engineers to Promote Product and Process Innovation: Thai Manufacturing Context”, *International Journal of Management Practices*.

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Oral and poster presentations

Tieng Kimseng., Jeenanunta Chawalit., and Youji Kohda. (2018) “Do engineers’ capabilities and their involvement in different departments create values for firms’ innovation? An empirical study of the Thai manufacturing industry”, *the First Global Conference on Creation Value*, De Montfort University, Leicester, UK, May 23-24, 2018. [Oral Presentation]

Tieng Kimseng, Jeenanunta Chawalit, and Youji Kohda. (2018), “Human resource management for innovation in production networks: Towards effective uses of internal and external resources based on firm technological capabilities”, *the First Global Conference on Creation Value*, De Montfort University, Leicester, UK, May 23-24, 2018. [Poster Presentation]

Tieng Kimseng, Jeenanunta Chawalit, and Youji Kohda. (2020), “Revisiting internal mechanisms of HRM practices in creating values for product innovation: An application of fuzzy set QCA”, *the 11th International Conference on Applied Human Factors and Ergonomics (AHFE 2020)*, Hilton San Diego Bayfront, San Diego, California, USA, July 16-20, 2020. [Oral Presentation]

Keywords: Case studies; formal R&D; fuzzy-set qualitative comparative analysis; human resource management practices; main mentors; non-formal R&D; supply chain collaboration; technological capabilities; innovation