A NETWORK APPROACH FOR THE INFLUENCES OF TRUST ON KNOWLEDGE INFLOWS/OUTFLOWS ON INNOVATION

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ABSTRACT

Recently, many studies have discussed that MNC subsidiary operations rely not solely on their parent company’s knowledge instillation but their own generation from combining local experience and knowledge inflows. And this new knowledge will then trigger further innovation. Our model for this study is aimed at testing the impacts of knowledge inflows/outflows on subsidiaries’ innovation, as well as the moderating effect of trust on the above relationship. According to the results of this study, several conclusions were made as followings:

(1) For MNC’s subsidiaries, not only knowledge inflows from parent firms or peer firms but also knowledge outflows to parent firms or peer firms did have significantly positive impact on subsidiaries’ innovation.

(2) It was also found that trust did not show significant moderating effects on the interrelationship between knowledge inflows/outflows and MNC’s innovation.

Keywords: Knowledge inflows, knowledge outflows, trust, innovation, MNC operation

INTRODUCTION

In recent, many studies discuss that MNC’s subsidiaries rely not solely on their parent company’s resources instillation but their own generation from combining local experience and resource inflows. Subsidiaries can play as a knowledge exploration role to provide knowledge for other units in the network to improve the company’s performance [1-2]. Although there are plenty of studies that discussing about the interrelationship between knowledge inflows/outflows and innovation, the empirical validation about this research issue is limited. Further validations are required.

In addition, the moderating effect that affects the relationships between knowledge inflows/outflows, and innovation have created a lot of attention. For example, Szulanski [3] asserts that one of the most important barriers to the transfer of best practices within organizations is the poor relationship between the source and recipient. At this instance, the importance of trust is significant. According to Tsai and Ghoshal [4], trust can alleviate exchange partner’s opportunistic behavior, and the two parties are willing to share their resources without worrying about being taken advantage of by the other one. As a result, trust assists resource exchange and combination in the entire network. Szulanski [3] also asserts that knowledge is “sticky” and often difficult to spread across different units within an organization if preexisting relationship among units are absent. Thus trust may serve as a moderating variable for the relationships between knowledge inflows/outflows, innovation and performance.

The purpose of this study is to connect this gap and provide meaningful information for MNC operations in the overseas marketplaces. Specifically, the objectives of this study are as follows:
1. To verify effects of knowledge inflows /outflows on innovation of an MNC subsidiary.
2. Taking the level of trust as the moderating variable to explore its effects on the relationships between knowledge inflows/outflows, and innovation of an MNC subsidiary.

LITERATURE REVIEW

The Effects of Knowledge Inflows on Innovation and Performance of a Subsidiary

Vertical inflows mean the knowledge inflows from the parent corporation. And horizontal inflows mean the knowledge inflows from peer subsidiaries. With knowledge inflows within intra-organizational network, the subsidiary in host country does not have to rely solely on local knowledge development. By receiving and accumulating knowledge, the knowledge stock of a subsidiary is enhanced. Knowledge stock then is not only the result of local development but also inflows from the rest of the organization. With abundant knowledge stock in host country, firms’ subsidiaries can deal with problems they encounter and facilitate innovation. Hence, the following hypotheses are proposed:

H1a : The knowledge inflows from peer firms will be positively associated with MNC subsidiary’s innovation.
H1b : The knowledge inflows from the parent firms will be positively associated with MNC subsidiary’s innovation.

The Effects of Knowledge Outflows on Innovation of a Subsidiary

In previous studies, there are two kinds of knowledge outflows, including vertical outflows and horizontal outflows [5-7]. Vertical outflows mean the knowledge outflows to the parent corporation. And horizontal outflows mean the knowledge outflows to peer subsidiaries. These knowledge outflows can generate substantial benefits for MNC through leveraging knowledge created by individual subunits and facilitating innovations [8]. It is expected that if subsidiaries can provide the precious assets for the multinational system, parent firms should invest more resources in these subsidiaries to exploit the benefits of innovation, that in turn enhance the innovation ability and competitive advantage of subsidiaries.

H2a : The knowledge outflows to peer firms will be positively associated with MNC subsidiary’s innovation.
H2b : The knowledge outflows to the parent firms will be positively associated with MNC subsidiary’s innovation.

Moderating Effects of Trust

Szulanski [3] asserts that one of the important barriers to the transfer of best practice within organizations is the poor relationship between the source and recipient. Although subsidiaries embed in the MNC’s network, they disperse around the world. Distance and special local environment make the situation more complicated and uncertain. In this case, the importance of trust is significant. Trust can alleviate exchange partner’s opportunistic behavior, and the two parties are willing to share their resources without worrying about being taken advantage of by the other one. When developing the relationship of trust in the network, actors also build up reputations of trustworthiness that may become important information for other actors in the
network [4]. As a result, trust assists resource exchange and combination in the entire network. Tsai and Ghoshal [4] also find that trust between functional units will facilitate the exchange of knowledge. Because of the expectation of trust and reciprocity, it provides assurance that knowledge transfer will be used to the mutual benefits of both parties [9].

In the view of knowledge inflows, if the initial level of trust between the subsidiary and parent firm is low, incremental path of trust will enhance the trustworthiness and interdependence between the parent firm and the subsidiary. Then the subsidiary will be willing to be engaged in innovation activities that are related to the mutual benefits. In such a case, the moderating effect of trust will be higher. If the level of trust between the subsidiary and its parent firm is too high, the subsidiary may too rely solely on the parent firm’s knowledge inflows to go into innovation activities. In such a case, the moderating effects of trust will be lower.

H3a : The effects of knowledge inflows on MNC subsidiary’s innovation would be weaker if the trust between headquarter and subsidiary becomes higher.

In the view of knowledge outflows, if the initial level of trust between the subsidiary and parent firm is low, the subsidiary will worry about its know how and technology skills to be imitated or expropriated by other units of the MNC group companies, then the subsidiary’s specific advantage will be vanished. Thus, the subsidiary may be unwilling to provide knowledge outflows to the parent or peer firms. In such a case, the moderating effects of trust will be lower. On the other hand, if the initial level of trust between the subsidiary and its parent firm is high, the subsidiary is willing to outflow its knowledge to the parent firm and peer firms. Resources from the parent firm will continuously instill into the focal subsidiary. Then the innovation process could be the endless loop.

H3b : The effects of knowledge outflows on MNC subsidiary’s innovation would be stronger if the trust between headquarter and subsidiary becomes higher.

**RESEARCH DESIGN AND METHODOLOGY**

**Measurement of Research Variables**

In this study, we reviewed the questionnaire items used by previous studies to determine the variables for this study. The definitions of the factors are shown in Table 1.
<table>
<thead>
<tr>
<th>Factors</th>
<th>Measurement</th>
<th>Definition</th>
<th>Prior Related Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical inflows</td>
<td>7 point Likert</td>
<td>Vertical inflows mean the knowledge inflows from the parent corporation. Knowledge includes technology knowledge, marketing/sales knowledge, and strategy knowledge.</td>
<td>Schulz (2003), Gupta and Govindarajan (1993)</td>
</tr>
<tr>
<td>Horizontal inflows</td>
<td>7 point Likert</td>
<td>Horizontal inflows mean the knowledge inflows from peer subsidiaries. Knowledge includes technology knowledge, marketing/sales knowledge, and strategy knowledge.</td>
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</tr>
<tr>
<td>Horizontal outflows</td>
<td>7 point Likert</td>
<td>Horizontal outflows mean the knowledge outflows to peer subsidiaries. Knowledge includes technology knowledge, marketing/sales knowledge, and strategy knowledge.</td>
<td>Schulz (2001, 2003), Gupta and Govindarajan (1993)</td>
</tr>
<tr>
<td>Innovation</td>
<td>7 point Likert</td>
<td>Innovation is defined as any product, manufacturing process, or administrative system that is new for the subsidiary. Anything new to the adopting units qualifies as an innovation, even if it is not new to the world as such.</td>
<td>Bishop and Crookell (1986), Ghoshal and Bartlett (1988), Birkinshaw (1995), Birkinshaw, Hood, and Jonsson (1998)</td>
</tr>
<tr>
<td>Trust</td>
<td>7 point Likert</td>
<td>Trust is a common belief within the subsidiary that its parent: (1) makes good-faith efforts to behave in accordance with commitments, both explicit and implicit, (2) is honest in whatever discussions preceded such commitments, (3) does not take excessive advantage of the subsidiary, even when the opportunity is available.</td>
<td>Kostova and Roth (2002), Cummings and Bromiley (1995)</td>
</tr>
</tbody>
</table>

In addition, there are four control variables included, it terms of nationality, industry sector, subsidiary size, and subsidiary age.

**Sampling Plan**

The following sources of the lists of MNC subsidiaries and local firms were used as the sampling firms of this study:


**RESEARCH ANALYSIS AND RESULTS**

**Characteristics of Respondents’ Firms**

Among 900 questionnaires which were mailed to the subsidiaries of multinational corporations in Taiwan, 101 were valid, producing a usable response rate of 11.2%. More than 41.5% of the subsidiary firms have a subsidiary age more than 25 years. More than 42.6% of the subsidiary firms have an employee size less than 150 employees. 74% of the firms belong to manufacturing industry.
Factor Analysis of the Major Variables

Factor analysis is utilized to examine the patterns or dimensions underlying the data. Its main purpose is to condense or summarize the key features of a large number of variables for further analysis. A principal component for analysis associated with varimax rotation is used in the procedure. The results of the factor analysis for the key variables including knowledge inflows, knowledge outflows, trust, and innovation are shown in Table 2, and all research variables within a factor tended to have very high factor loadings.

<table>
<thead>
<tr>
<th>Factors</th>
<th>No. of Items</th>
<th>Factor Loading</th>
<th>Item-to-total Correlation</th>
<th>Cronbach's α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Inflows from Peer Firms</td>
<td>3</td>
<td>0.880-0.945</td>
<td>0.799-0.899</td>
<td>0.934</td>
</tr>
<tr>
<td>Knowledge Inflows from Parent Firms</td>
<td>3</td>
<td>0.780-0.855</td>
<td>0.568-0.782</td>
<td>0.829</td>
</tr>
<tr>
<td>Knowledge Outflows to Peer Firms</td>
<td>3</td>
<td>0.882-0.910</td>
<td>0.743-0.885</td>
<td>0.914</td>
</tr>
<tr>
<td>Knowledge Outflows to Parent Firms</td>
<td>2</td>
<td>0.923-0.934</td>
<td>0.809-0.809</td>
<td>0.894</td>
</tr>
<tr>
<td>Trust</td>
<td>7</td>
<td>0.799-0.897</td>
<td>0.745-0.867</td>
<td>0.950</td>
</tr>
<tr>
<td>Innovation</td>
<td>6</td>
<td>0.784-0.849</td>
<td>0.689-0.762</td>
<td>0.899</td>
</tr>
</tbody>
</table>

Effects of Knowledge Inflows on Innovation

To test H1a and H1b, hierarchical regressions with Ordinary Least Squares (OLS) parameter estimation method were performed on full sample data. In these models, innovation is dependent variable. Four control variables are initially entered in first stage ($R^2=0.064$, $F=1.240$, $P=0.297$, $D-W=2.064$). Sequentially research variables of knowledge inflows (including KIS and KIP) are added after four control variables. This results indicate that knowledge inflows is a significant impact variable to innovation. Model with knowledge inflows is more explainable to innovation than without adding knowledge inflows. Significantly positive sign of knowledge inflows shows that knowledge inflows benefits innovation ($R^2=0.111~0.202$, $F=1.240~3.117$, $P=0.105~0.006$, $D-W=2.039~2.043$). Thus H1a and H1b are strongly supported.

Effects of Knowledge Outflows on Innovation

H2a and H2b state that there are significant effects of knowledge outflows (including KOS and KOP) on subsidiary firms’ innovation. To test the hypotheses, hierarchical regressions were performed on full sample data. In these models, innovation is dependent variable. Four control variables are initially entered in first stage ($R^2=0.064$, $F=1.240$, $P=0.297$, $D-W=2.064$). Sequentially research variables of knowledge outflows are added after four control variables. It is indicated that both two kinds of knowledge inflows have significant impact on innovation ($R^2=0.109~0.176$, $F=1.746~2.603$, $P=0.120~0.018$, $D-W=2.036~2.024$). Thus H2a and H2b are strongly supported.

Moderating Effects of Trust to Effect of Knowledge Inflows and Outflows on Innovation

Hypothesis 3a states that there is a negatively significant moderating effect of trust on the relationships between knowledge inflows and innovation. To test this hypothesis, this study adopts multiple regression analysis using innovation as the dependent variable and research
variables of knowledge inflows (including KIS and KIP) as the independent variables and interaction between knowledge inflows and trust as the moderator. The results indicate that the moderating effect of trust is not significant in the model. Further validation should be conducted to verify the issue.

Hypothesis 3b states that there is a significant moderating effect of trust on the relationships between knowledge outflows and innovation. To test this hypothesis, this study adopts multiple regression analysis using innovation as the dependent variable and research variables of knowledge outflows (including KOS and KOP) as the independent variables and interaction between knowledge outflows and trust as the moderator. The results also reveal that the moderating effect of trust is not significant in the model. Further validation should be conducted to verify the issue.

**CONCLUSION**

The major objectives of this study have been to identify the interrelationships among knowledge inflows/outflows, and innovation. Furthermore, trust is also adopted as a moderator to test its moderating effects. Based on the results of this study, several conclusions can be drawn.

From this research, there are significant relationships between knowledge inflows/outflows and innovation of MNC’s subsidiaries. This study shows that the MNC subsidiaries receiving knowledge inflows greatly from peer subsidiaries and their parent firms tend to possess good innovation. The results are in accordance with previous studies [10-11]. And this research also indicates that the MNC subsidiaries executing knowledge outflows greatly to peer subsidiaries and parent firms are inclined to have good innovation. Therefore, for managers in MNC, it is an important issue to make good knowledge management in order to run the operation in global markets.

Through verifying the interrelationships among research variables, there are some suggestions given to MNC managers. If MNC would like to run operations in global markets, providing sufficient supports of knowledge for its subsidiaries are necessary to earn plentiful innovation. Furthermore, the role of foreign subsidiaries is no longer limited to be a knowledge recipient. From our research, it indicates that foreign subsidiaries are able to contribute to the MNC’s specific advantages and become centers of excellence which are related to higher levels of innovation. As a result, managers of MNC could try to foster these centers of excellence to leverage the benefits of foreign subsidiaries in its global network. In addition, it is suggested that building trust between the subsidiaries and parent firms is an important issue for managers in MNC to motivate reciprocity activities which will lead to improvement of innovation.

Finally, in this study, research variable of trust is brought into the model to test its moderating effects to the interrelationships between knowledge inflows/outflows and innovation of MNC’s subsidiaries. The results do not show significant impacts. Maybe future research could use trust as the independent variable, knowledge inflows/outflows as the mediator, and innovation/performance as the dependent variable to test the interrelationships.
REFERENCES


