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A Location Model of a Firm's Organizational Mode under Moral Hazard

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ABSTRACT

This paper explores the role of incomplete contracts when firms take into account their locations when deciding on their organizational form. For each of its activities, a firm faces the decision of whether to vertically integrate or to outsource, choosing the less costly of these two organizational forms. The firm vertically integrates or outsources in the location that minimizes the associated organizational costs. Location therefore becomes a source of motivation for outsourcing. Given that the firm chooses to outsource, incomplete contracting arises because of asymmetric information. This paper uses a principal-agent model to analyze the notion of asymmetric information, specifically moral hazard. In this model, the principal is the firm and the agent is the supplier of the intermediate input. This paper proposes that the principal-agent problem can be solved if the firm incorporates the moral hazard problem in its production decision. This paper shows that location and the risk appetites of the contracting parties determine the structure of the contract. Thus, we construct a location model of organizational mode under moral hazard.

I. Introduction

Advances in transportation and communications technology have facilitated the fragmentation of the production process, changing the structure of international trade. When instructions can be delivered instantaneously, intermediate components and unfinished goods becomes more mobile, and when the output of many tasks can electronically be conveyed, firms can take advantage of the cost differences across

countries. This becomes the basis for international outsourcing. According to the World Trade Organization (WTO, 2014) more than 25% of world manufactured goods imports are represented by intermediate imports (parts and components) in 2013. The share of imports of parts and components within total imports remained relatively constant between 25% and 29% from 1996 to 2012, as the increase in trade in parts and components has been very similar to the growth of total imports. More advanced economies contributed to almost two-thirds of the world imports of intermediate inputs in 1996, decreasing to less than half in 2012. This can largely be attributed to the increase of imports of G-20 developing economies,

China being the main driver of this trend, increasing its share from around 3% in 1996 to more than 15% in 2012.

In the context of a globalized economy, this gives rise to a global value chain (GVC). It is becoming increasingly feasible to separate tasks in time and space, described as "trade in tasks" by Grossman and Rossi-Hansberg (2008). This translates to the notion that specialization is no longer based on the comparative advantage of an economy in producing a final good, but on the comparative advantage of "tasks" that this economy completes at specific steps along the GVC. World trade in parts and components is at 48.5% of gross exports, which indicates world participation in GVCs. This is higher for developing economies, with 51% of gross exports connected to GVCs. Fragmentation therefore deepens the interdependency of trade relations, and has many implications for how we understand trade policy (WTO and IDE-JETRO, 2011). This increasing fragmentation of production motivated researchers to incorporate concepts from industrial organization and contract theory into international trade theory that explain the organizational form of the firm.

For each of the many activities undertaken by a firm, it faces a "make-or-buy" decision: it must decide whether to undertake the activity in-house, i.e. to vertically integrate, or to obtain an input or service from the outside, i.e. to outsource. A tradeoff exists between production and governance costs of running a larger and less specialized organization due to vertical integration, and costs that arise from search frictions and incomplete contracting due to outsourcing. In a globalized economy, firms face a decision on whether to engage in vertical foreign direct investment (FDI), where firms locate different stages of production in different countries, or to internationally outsource. The existing trade-off between vertically FDI and outsourcing boils down to the issue of internalization. A body of literature has been developed that uses tools from the theory of the firm as started by Coase (1937). This recent literature clarifies the role of transactions costs, property rights, asset specificity, and incomplete

contracts in guiding a firm's choice of organizational mode, whether to vertically integrate or outsource (e.g. Williamson, 1971/1983/1998; Grossman & Hart, 1986; McLaren, 2000; Antrás, 2003; Antrás & Helpman, 2004; Grossman & Helpman, 2002/2003/2005). The costs associated with vertical FDIs and outsourcing can be determined by location, as stated in the ownership, location, and internalization (OLI) model of Dunning (1988). Location is relevant because fragmentation of production is done geographically. Hence, a firm decides to engage in vertical FDIs or to outsource in a location that minimizes the respective costs, whether within the home country or abroad. The location of vertical FDIs or outsourcing depends on the cost advantages of each location; a particular location is more advantageous for a firm if it is less costly for the firm to send FDIs or outsource therein. Location therefore can influence the trade-off between vertically integrating and outsourcing.

Given that the firm chose to outsource, the problem of incomplete contracts arises because the action of the supplier of the intermediate inputs or services may be observable to himself and not observable to firm. Further, because the supplier has private information about his action, his action cannot be specified as a part of the contract. A moral hazard problem therefore arises, and even if there exist cost advantages across locations, outsourcing activities may not take place because of the resulting incomplete contracts. This paper focuses on the scenario in which the final producer incorporates the moral hazard problem in his organizational decision. Now, this paper contributes to the existing literature by focusing on how a contract is particularly written based on location advantages and the risk appetites of the contracting parties in the determination of the structure of the contract given that the final producer chooses to outsource. Specifically, this paper shows how the power of the contract, or the responsiveness of an incentive provided by a principal to an agent to changes in output, is determined by location parameters in the case of outsourcing.

The rest of the paper is organized as follows. A benchmark model is provided in the next section. In Section III, we incorporate location in the organizational mode decision of a firm. We posit that firms move to a location, which can be across countries, which will give them a location advantage in producing the good (Markusen, 1995). Section IV incorporates the notion of moral hazard using a principal-agent model in which the principal is the firm and the agent is the supplier of intermediate inputs or services needed for the final good produced by the firm. The last section concludes and makes some recommendations.

II. The Model

Williamson (1979) proposed that the organizational mode adapted is the one that economizes on transaction costs. These are based on the degree to which transaction-specific investments are involved, the two main alternatives being markets and hierarchies. Furthermore, there are two types of transactions: occasional and recurrent. Occasional transactions involving non-specific investments are efficiently organized by markets. Parties enter a contract enforced by a third-party enforcer in cases of transaction-specific investments. In recurrent transactions entailing transaction-specific investments, a transaction-specific governance structure will prevail, either through mutual, follow-on obligational contracting, or through vertical integration. Grossman and Helpman (2002) pioneered the transaction costs model of the boundaries of the firm, where vertical integration and outsourcing are treated as multi-industry equilibrium phenomena, hence concentrated on the industrial structure arising from the organizational decisions of the firms. Grossman and Helpman (2003) meanwhile focused on the actual determinants of organizational mode, dealing with the trade-off between vertically integrating and outsourcing in a closed economy.

In contrast to recent literature, we focus on the production side. As in the literature, the model proposed assumes a monopolistically competitive market in which differentiated goods can be produced either by vertically integrated firms or by pairs composed of a final good producer and a specialized intermediate input supplier. As in Grossman and Helpman (2005), this final good is differentiated in two respects. First, as in Krugman (1979), consumers regard them as imperfect substitutes. Second, varieties require different intermediate inputs for production. The model proposed is based on a lecture of Antràs (2007) with some modifications. The differentiated final good requires a specialized intermediate input, either a special task requiring a certain amount of labor, or a type of intermediate component. Vertically integrated firms produce their own intermediate components, or perform their own special tasks. Such firms face relatively high production costs due to lack of complete specialization, and have additional governance costs associated with extensive organizations. For the vertically integrated firm $i, i = 1,2 \ldots I$, maximizes its total payoff from entering the market and vertically integrating, facing the programming problem

$$\Pi_i(a_i) = R_i(a_i) - \gamma_i a_i \qquad (1)$$
$$R_i{}'(a_i) > 0, R_i{}''(a_i) \leq 0; \gamma_i > 1$$

where $R_i(a_i)$ is the revenue function of final producer i vertically integrating; a_i is the amount of relation-specific investment that has to be made ex-ante by firm i for the production of the specialized intermediate input. The higher the level of investment, the better the quality of the intermediate input, and the more costly it is for the firm. γ_i is the marginal cost of making the relation-specific investment by vertically integrating, associated with lack of specialization and more complex organizational governance to coordinate production. Assume further that $R_i(a_i) = 0$ if the final producer does not enter the market. Differentiating with respect to a_i, the first order condition (FOC) is

$$R_i{}' = \gamma_i \Longrightarrow a_i^V \qquad (2)$$

This gives the optimal level of production of the final good produced by the integrated firm i. We see

from (2) that the higher the value of γ_i, the higher the value of R_i' and consequently the lower the value of a_i^V, hence lower $\Pi_i(a_i^V)$. If γ_i is sufficiently large, then there is no incentive to produce, and it is better to obtain the specialized intermediate input from an independent supplier if the latter can produce the former at a lower cost.

The unintegrated final producer must search for a suitable supplier of inputs, while an intermediate input supplier must search for a potential buyer. Firms unable to find a partner exit the market. We use a simple principal-agent model to analyze the relationship between the final producer and the intermediate supplier. After the search process, the final producer, the principal, writes a contract stipulating the terms with the intermediate supplier, the agent. The final producer faces a contract design problem

$$\Pi_i(a_j, T_i) = R_i(a_j) - T_i - c_i \tag{3}$$

subject to

$$\Pi_j(a_j, T_i) = R_j(T_i) - v_j a_j - c_j \geq 0 \tag{4}$$
$$R_j'(T_i) > 0, R_j''(T_i) \leq 0$$

$R_j(T_i)$ is the revenue function of intermediate supplier j. T_i is the transfer from the final producer i to the intermediate supplier j when purchasing the intermediate component or hiring labor for the special task. v_j is the production cost. $c_\iota, \iota = i, j$, is the transaction cost of associated with forming and maintaining the relationship. (4) is the participation constraint (PC) ensuring that the intermediate supplier will accept the contract. The final producer maximizes a Lagrangian function, λ being the corresponding Lagrangian multiplier for constraint (4). Differentiating with respect to T_{ij} and a_j, the FOCs are

$$\left(\frac{1}{R_j'}\right) = \lambda > 0 \tag{5}$$

$$R_i' = \lambda v_j \tag{6}$$

Plugging in (5) to (6) yields

$$R_i' = \frac{v_j}{R_j'} \tag{7}$$

From (5), we see that the PC binds. (6) shows that increasing the size of T_i decreases R_j', thereby increasing R_i'. This decreases the level of a_j, and therefore decrease profits. (5) will give T_{ij}^O, the optimal level of transfer the final producer will provide for the intermediate supplier, and (6) will give a_j^O, the optimal level of quality that the intermediate input will have.

III. Factoring in Location

Location has also been seen as an important strand of literature on outsourcing. Grossman and Helpman (2005) focused on the determinants of the location of outsourcing, constructing a general equilibrium model of production and trade, while Grossman and Rossi-Hansberg (2008) provided an alternative perspective of outsourcing, focusing on tradeable tasks, presenting production as involving a number of tasks performed by each production factor. A firm can perform the tasks required in assembling its product either close to headquarters or at a different location. There is incentive to offshore if some factors are cheaper abroad than at home. Outsourcing tasks, however, entails additional monitoring and coordinating costs. Doh et al. (2009) did empirical work on the location determinants of outsourcing activities. The multinational enterprise (MNE) literature was also a substantial contribution as it delved into the concept of the internalization of international transactions. This was pioneered by Ethier (1986), and further extended in Ethier and Markusen (1996), Markusen et al. (1996), Markusen and Venables (1998/2000), and Ekholm and Forslid (2001).

Movements of vertical FDIs and international outsourcing can then be explained by organizational costs being a function of location. Firms choose the corresponding optimal location to minimize costs. The location of vertical integration or outsourcing depends

on each location's advantages; lower organizational costs in a specific location are the latter's advantage. Firms then may send vertical FDIs or undertake new relationship-specific investments in another country if the optimal location is there. The firm therefore simultaneously faces decisions on its organizational mode and where this will be carried out. The technique used to model location is based on the model described in Grossman and Rossi-Hansberg (2008).

To model location advantages, we index locations by $\rho \in [0,1]$ and order them so that location cost advantages are non-decreasing; the higher the value of ρ, the more advantageous it is to locate there. The orderings of ρ varies across final producers. A final producer in its initial location $\bar{\rho}$ that vertically integrates in another location ρ faces the programming problem

$$\Pi_{i\rho}(a_{i\rho})$$
$$= R_{i\rho}(a_{i\rho}) - \gamma_{i\rho}\beta_i\tau_i(\rho)a_i \qquad (8)$$
$$\tau_i(\bar{\rho}) = 1, \tau_i(\rho) > 1 \ \forall \rho \neq \bar{\rho}, \ \beta_i > 1, \ \tau_i'(\rho) \geq 0$$

$\tau_i(\rho)$ is the input requirement, being a function of location. $\bar{\rho}$ is the initial location of the final producer. Assume that $\tau_i(\bar{\rho}) = 1$. β_i is the organizational "movement" cost, or the cost of setting up a subsidiary in another location given that the final producer vertically integrates.

A final producer located in $\bar{\rho}$ that finds a partner in ρ has to maximize

$$R_{i\rho}(a_{j\rho}) - \beta_i T_{i\rho} - c_i \qquad (9)$$

subject to

$$R_{j\rho}(T_{i\rho}) - v_{j\rho}\tau_j(\rho)a_{j\rho} - c_j \geq 0 \qquad (10)$$

Note here that the organizational movement cost β_i is the parametric purchasing cost if the final producer outsources in another location. We now state the results.

Proposition 1:
In the case of vertical integration, there is an incentive for the final producer located in $\bar{\rho}$ to

send vertical FDIs in another location ρ if $\gamma_{i\bar{\rho}} > \beta_i\tau_i(\rho)\gamma_{i\rho}$.

Proof:
If the final producer integrates in its initial location, the FOC for an interior solution reduces to that in (2) because it does not incur the movement cost. Hence,

$$R_{i\bar{\rho}}' = \gamma_{i\bar{\rho}} \qquad (11)$$

Differentiating (8) with respect to a_j gives

$$R_{i\rho}' = \beta_i\tau_i(\rho)\gamma_{i\rho} \qquad (12)$$

If $\gamma_{i\bar{\rho}} > \beta_i\tau_i(\rho)\gamma_{i\rho}$, then from (11) and (12)

$$R_{i\bar{\rho}}' = \gamma_{\bar{\rho}} > \beta_i\tau_i(\rho)\gamma_{i\rho} = R_{i\rho}' \Rightarrow R_{i\bar{\rho}}' > R_{i\rho}'$$
$$\Rightarrow a_{i\bar{\rho}}{}^V < a_{i\rho}{}^V$$
$$\Rightarrow \Pi_{i\bar{\rho}}(a_{i\bar{\rho}}{}^V) < \Pi_{i\rho}(a_{i\rho}{}^V)$$
$$\text{Q.E.D.}$$

The condition $\gamma_{i\bar{\rho}} > \beta_i\tau_i(\rho)\gamma_{i\rho}$ demonstrates the advantage of another location over the initial location. This shows that the organizational cost in $\bar{\rho}$ is greater than that in ρ taking into account the movement cost and the additional input requirement in operating in another location. We now show the second result.

Proposition 2:
In the case of outsourcing, there is an incentive for the final producer located in $\bar{\rho}$ to outsource in another location if $v_{j\bar{\rho}} > \beta_i\tau_j(\rho)v_{j\rho}$.

Proof:
The argument is essentially the same as in Proposition 1. By symmetry, if the final producer outsources in its initial location, the FOCs reduces to that in (5) and (6). Hence,

$$\left(\frac{1}{R_{j\bar{\rho}}'}\right) = \lambda > 0 \qquad (13)$$

$$R_{i\bar{\rho}}' = \frac{v_{j\bar{\rho}}}{R_{j\bar{\rho}}'} \qquad (14)$$

Differentiating (9) with respect to T_i and a_j yields

$$\beta_i = \lambda R_{j\rho}{}' \Rightarrow \beta_i \left(\frac{1}{R_{j\rho}{}'}\right) = \lambda$$
$$> 0 \qquad (15)$$

$$R_{i\rho}{}' = \lambda \tau_j(\rho) v_{j\rho} \Rightarrow R_{i\rho}{}'$$
$$= \frac{\beta_i \tau_j(\rho) v_{j\rho}}{R_{j\rho}{}'} \qquad (16)$$

If $v_{j\bar{\rho}} > \beta_i \tau_j(\rho) v_{j\rho}$, then from (14) and (16),

$$R_{i\bar{\rho}}{}' = \frac{v_{j\bar{\rho}}}{R_{j\bar{\rho}}{}'} > \frac{\beta_i \tau_j(\rho) v_{j\rho}}{R_{j\rho}{}'} = R_{i\rho}{}' \Rightarrow R_{i\bar{\rho}}{}' > R_{i\rho}{}'$$
$$\Rightarrow a_{i\bar{\rho}}{}^0 < a_{i\rho}{}^0$$
$$\Rightarrow \Pi_{i\bar{\rho}}\left(a_{i\bar{\rho}}{}^0\right) < \Pi_{i\rho}\left(a_{i\rho}{}^0\right)$$

Q.E.D.

If β_i or $\tau_j(\rho)$ or both are sufficiently high, there is no incentive to send FDIs or outsource in another location.

IV. Moral Hazard

We relax the assumption of perfect information in the case of outsourcing. Incomplete contracts arise in outsourcing activities because the action of the intermediate supplier is not observable to the firm. Because the supplier has private information about his action, his action cannot be specified as a part of the contract. In the organizational mode literature described earlier, the supplier and final producer will enter a bargaining process because of incomplete contracts. The literature uses a generalized Nash bargaining to represent the bargaining process, wherein the final producers and intermediate suppliers having an outside option and a share of the total profits obtained from the partnership. Another significant contribution was that of Riordan and Sappington (1987), who investigated the relationship between private information and a firm's organizational mode. Almazan et al. (2007) meanwhile presented a location theory choice that derived insights from incomplete contracts literature. This section delves into the contribution to the literature this paper makes, namely focusing on how locational advantages and risk appetites of the contracting parties determine the contractual structure in the case of outsourcing.

We begin the analysis by setting up a benchmark principal-agent problem without moral hazard. We allow profits to be random, hence the revenue function becomes a random variable with the density function $g(R_i, a_j)$, the latter also being a function of the quality of the intermediate input. The unintegrated final producer will maximize

$$\left(\int \{B_i[R_i - \beta_i T_i(R_i)]\} g(R_i, a_j) dR_i \right) - c_i$$

subject to

$$\left\{\int R_j[T_i(R_i)] g(R_i, a_j) dR_i - \tau_j(\rho) v_j a_j \right\} - c_j$$
$$\geq 0 \qquad (17)$$

where (17) is the PC. The final producer maximizes a Lagrangian where λ is the Lagrangian multiplier for constraint (17). Differentiating the Lagrangian with respect to $T_i(R_i)$ yields:

$$\beta_i B_i' g(R_i, a_j) = \lambda R_j' g(R_i, a_j)$$
$$\Rightarrow \beta_i \frac{B_i'}{R_j'}$$
$$= \lambda \qquad (18)$$

Here, $\frac{g_{a_j}(R_i, a_j)}{g(R_i, a_j)}$ tells the likelihood that quality affects the distribution of all levels of output; it describes how the quality of the intermediate input affects revenues of the final producer. If $g_{a_j}(R_i, a_j) > 0$, then higher revenues realized for the final producer mean better quality for the intermediate input. This implies that the supplier must be incentivized for it to produce inputs of better quality, which means that the transfer must rise with its random revenues, hence $T_i'(R_i) > 0$. $T_i'(R_i)$ is the power of the contract, or the responsiveness of the transfer to the realized random revenues, which we now solve. From (18) we get

$$\Rightarrow \beta_i B_i'$$
$$= \lambda R_j' \qquad (19)$$

Differentiating (19) with respect to R_i yields:

$$\beta_i B_i''[1 - \beta_i T_i'(R_i)]$$
$$= \lambda R_j'' T_i'(R_i) \qquad (20)$$

Plugging in (18) to (20), we obtain

$$\beta_i B_i''[1 - \beta_i T_i'(R_i)] = \left(\beta_i \frac{B_i'}{R_j'}\right) R_j'' T_i'(R_i)$$

Solving for $T_i'(R_i)$,

$$T_i'(R_i)$$
$$= \frac{-\dfrac{B_i''}{B_i'}}{-\beta_i \dfrac{B_i''}{B_i'} - \dfrac{R_j''}{R_j'}} \qquad (21)$$

where $-\dfrac{B_i''}{B_i'}$ and $-\dfrac{R_j''}{R_j'}$ are the Arrow-Pratt measures of absolute risk aversion for the final producer and the intermediate supplier, respectively. This means that $T_i'(R_i)$ is a function of risk attitude.

$T_i'(R_i) = 0$ i.e. the transfer does not vary with revenues, if $B_i'' = 0$, i.e. the final producer is risk-neutral, and $R_j'' > 0$, i.e. the intermediate supplier is risk-averse. The intermediate supplier bears all the risk associated with the randomness of R_i. The contract then specifies that the transfer to the intermediate supplier is fixed, the final producer being the residual claimant. A different type of contract arises if $R_j'' = 0$, i.e. the intermediate supplier is risk-neutral, and if $B_i'' > 0$, i.e. the final producer is risk-averse. (21) then collapses to

$$T_i'(R_i)$$
$$= \frac{1}{\beta_i} \qquad (22)$$

which means that $0 < T_i'(R_i) < 1$: hence, a "risk-sharing" contract. The power of the contract then is a function of the parametric purchasing cost; location then can determine how the contract is to be defined. β_i being strictly greater than unity makes the final producer bear some of the risk even if risk-averse; the purchasing cost, hence location, shifts some of the risk born by the

intermediate supplier to its partner, instead of it bearing all the risk. However, as $\beta_i \to \infty$, $T_i'(R_i) \to 0$. Hence, the greater β_i is, the greater is the risk the intermediate supplier absorbs.

We now add the moral hazard component to the analysis. The partners negotiate over the terms of trade, most likely to be governed by incomplete contracts because the quality and other attributes of the intermediate input cannot be observed by the final producer and by a third party. It is always attractive for the intermediate supplier to choose $a_{i\rho}{}^0 = 0$. So, even in the presence of location advantages, outsourcing may not happen. The presence of asymmetric information renders location useless in motivating outsourcing activities.

Under moral hazard, the final producer cannot observe the quality of the intermediate input produced by the supplier. This implies that R_i is random only from the perspective of the final producer. Profits then become a random variable, and the final producer earns an expected payoff over random profits $B_i[R_i - T_i(R_i)]$, $B_i'(\cdot) > 0, B_i''(\cdot) < 0$. We assume that the final producer is risk-averse. Taking into account the randomness of this revenues, the final producer adds another constraint:

$$\left\{ \iint R_j[T_i(R_i)] g_{a_j}(R_i, a_j) dR_i - \tau_j(\rho) v_j \right\} = 0 \ (23)$$

(23) is the incentive compatibility constraint, the necessary condition for an interior maximum of the supplier's expected profits with respect to a_j ($g_{a_j}(R_i, a_j)$ is the derivative of $g(R_i, a_j)$ with respect to a_j). The final producer only has to determine the $T_i(R_i)$ it will provide for the supplier when he purchases the intermediate input in writing the contract because the optimal level of quality a_j will always be given by (23). The intermediate supplier, knowing the quality of the intermediate input to be supplied, does not see the final producer's revenues as random; hence, it does not see its own revenues as random. The final producer maximizes a Lagrangian where λ

and μ are the corresponding Lagrangian multipliers for constraints (17) and (23).

Differentiating the Lagrangian with respect to $T_i(R_i)$ yields:

$$\beta_i B_i' g(R_i, a_j) = \lambda R_j' g(R_i, a_j) + \mu R_j' g_{a_j}(R_i, a_j)$$

$$\Rightarrow \beta_i \frac{B_i'}{R_j'}$$

$$= \lambda + \mu \frac{g_{a_j}(R_i, a_j)}{g(R_i, a_j)} \qquad (24)$$

We are now ready to state the results. To do this, we begin with a lemma:

Lemma: *At optimal contract, $\lambda > 0$ and $\mu > 0$.*

Proof:

If $\lambda > 0$ but $\mu = 0$, then (24) reduces to

$$\beta_i \frac{B_i'}{R_j'} = \lambda$$

$$\Rightarrow \beta_i B_i' = \lambda R_j'$$

as in (19). Therefore, if $\lambda > 0$ but $\mu = 0$, then $T_i'(R_i)$ does not reflect the quality level of the intermediate input produced by the supplier. Since quality is costly for the intermediate supplier and is unobservable to the final producer, the quality level that will maximize the intermediate supplier's profits is $a_j^O = 0$. It then will be optimal for the final producer to set $T_i^O(R_i) = 0$. Thus, the partnership will not prosper. If $\lambda = 0$ and $\mu > 0$, by the Kuhn-Tucker conditions, (17) is strictly positive. This means that the final producer can reduce $T_i^O(R_i)$ to obtain higher profits, which in turn means that $T_i^O(R_i)$ is not optimal to begin with. If $\lambda = 0$ and $\mu = 0$, again (18) holds. This implies that $\beta_i \frac{B_i'}{R_j'} = 0$, a contradiction since $\beta_i \frac{B_i'}{R_j'} > 0$ by assumption.

Q.E.D.

Now the power of the contract under moral hazard is given by Proposition 3:

Proposition 3:

The power of the contract under moral hazard is

$$T_i'(R_i) = \frac{-\frac{B_i''}{B_i'} + \frac{d\left[\frac{g_{a_j}(R_i, a_j)}{g(R_i, a_j)}\right]}{dR_i}}{\frac{\lambda}{\mu} + \frac{g_{a_j}(R_i, a_j)}{g(R_i, a_j)}}}{-\beta_i \frac{B_i''}{B_i'} - \frac{R_j''}{R_j'}}$$

Proof: See Appendix.

If the rise in $T_i(R_i)$ makes it more likely that the intermediate input is of high quality, then $\frac{d\left[\frac{g_{a_j}(R_i, a_j)}{g(R_i, a_j)}\right]}{dR_i} > 0$. In contract literature, this is known as the monotone likelihood ratio property (MLRP). From the Lemma, we know that $\lambda, \mu > 0$. Therefore, in a moral hazard scenario, if the MLRP holds, an increase in R_i leads to an increase in $T_i'(R_i)$.

V. Conclusion and Recommendations

This paper discussed the role of location in the choice of a firm's mode of organization, presenting the issue under moral hazard. This was done by constructing a model dealing with outsourcing behavior, extending this model to include location, and further extending this to include moral hazard in the analysis. Particularly, the paper showed that location parameters would determine the structure of the contract, in that location affects the power of the contract. The paper thus showed that location and asymmetric information affects the decision of a firm regarding its organizational form.

The model just presented can be used to analyze the patterns of outsourcing throughout its history. For instance, in the 1980s, innovations in information and communications technology significantly lowered coordination and communication costs, paving the way for different tasks previously done in proximity to be decentralized across separate geographic locations and making it possible to utilize wage differentials between developed and developing nations (Baldwin, 2006).

These events led to the outsourcing phenomenon, identified by Hätönen and Eriksson (2009) to have three main, overlapping phases. In the first phase, lasting until the end of the 1980s and called the "Big Bang" era, firms outsourced to cut operational costs. Outsourcing mainly occurred domestically and the relationships were managed in an arms-length manner, relying on contracts. The second phase took place in the 1990s, when more firms resorted to outsourcing, hence the "Bandwagon" era. By the beginning of the 21st century, the global resource pool became more available for firms across industries, geographical locations, or sizes, leading to the last and current phase, the "Barrierless Organizations" era.

The model presented, for instance, can be used to explain how outsourcing made the transition from one phase to another, as discussions of the historical progress of outsourcing generally involve location and contracts, as in what was previously described. To do this, historical data relating to trade and FDIs can then be used, as data relating to the literature, e.g. wage differentials, technology indices, etc. albeit on a much disaggregated level. Obtaining data for risk appetite would be a challenge. Also, the MLRP can be used to predict the organizational form of a firm. A higher $T_i'(R_i)$ means a higher rate of increase of transfer to an intermediate supplier given an increase in realized revenues. This may be costly for some firms, and may just resort to vertical integration instead of outsourcing.

As a final note, trade policy is an implication of the model presented. Specifically, an intended preferential trade agreement (PTA) can be used to mitigate the moral hazard problem, for instance, in each stage of a GVC. To arrive at the optimal contract posited by Proposition 3, the economies participating in a GVC can engage in trade policy intervention by writing a PTA. PTAs are in essence contracts, and therefore can be used to solve a potential moral hazard problem, and hence facilitate the formation of GVCs, taking into account the complications mentioned in the relevant strand of literature.

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Appendix

Proof of Proposition 4

From (24),

$$\beta_i B_i' g(R_i, a_j) = \lambda R_j' g(R_i, a_j) + \mu R_j' g_{a_j}(R_i, a_j)$$

Differentiating with respect to R_i:

$$\beta_i \{ B_i''[1 - \beta_i T_i'(R_i)]g(R_i, a_j) + B_i' g_{R_i}(R_i, a_j) \}$$
$$= \beta_i B_i'' g(R_i, a_j)$$
$$- \beta_i^2 B_i'' T_i'(R_i) g(R_i, a_j)$$
$$+ \beta_i B_i' g_{R_i}(R_i, a_j)$$
$$= \lambda [R_j'' T_i'(R_i) g(R_i, a_j)$$
$$+ R_j' g_{R_i}(R_i, a_j)]$$
$$+ \mu [R_j'' T_i'(R_i) g_{a_j}(R_i, a_j)$$
$$+ R_j' g_{a_j R_i}(R_i, a_j)]$$

where $g_{R_i}(R_i, a_j)$ is the derivative of $g(R_i, a_j)$ with respect to R_i. Solving for $T_i'(R_i)$:

$$T_i'(R_i)$$
$$= \frac{\beta_i B_i'' g(R_i, a_j) + \beta_i B_i' g_{R_i}(R_i, a_j) - \lambda R_j' g_{R_i}(R_i, a_j) - \mu R_j' g_{a_j R_i}(R_i, a_j)}{\beta_i^2 B_i'' g(R_i, a_j) + \lambda R_j'' g(R_i, a_j) + \mu R_j'' g_{a_j}(R_i, a_j)}$$

$$\Rightarrow T_i'(R_i)$$
$$= \frac{\beta_i B_i'' + R_j' \left[\lambda + \mu R_j' \frac{g_{a_j}(R_i, a_j)}{g(R_i, a_j)} \right] \frac{g_{R_i}(R_i, a_j)}{g(R_i, a_j)} - \lambda R_j' \frac{g_{R_i}(R_i, a_j)}{g(R_i, a_j)} - \mu R_j' \frac{g_{a_j R_i}(R_i, a_j)}{g(R_i, a_j)}}{\beta_i^2 B_i'' + \lambda R_j'' \frac{g(R_i, a_j)}{g(R_i, a_j)} + \mu R_j'' \frac{g_{a_j}(R_i, a_j)}{g(R_i, a_j)}}$$

$$\Rightarrow T_i'(R_i)$$
$$= \frac{\beta_i B_i'' + \mu R_j' \frac{g_{a_j}(R_i, a_j) g_{R_i}(R_i, a_j)}{g(R_i, a_j)^2} - \mu R_j' \frac{g_{a_j R_i}(R_i, a_j)}{g(R_i, a_j)}}{\beta_i^2 B_i'' + R_j'' \left[\lambda + \mu \frac{g_{a_j}(R_i, a_j)}{g(R_i, a_j)} \right]}$$

$$\Rightarrow T_i'(R_i) = \frac{\beta_i B_i'' - \mu R_j' \frac{d \left[\frac{g_{a_j}(R_i, a_j)}{g(R_i, a_j)} \right]}{dR_i}}{\beta_i^2 B_i'' + \beta_i \frac{B_i'}{R_j'} R_j''}$$

since $\frac{g_{a_j}(R_i, a_j) g_{R_i}(R_i, a_j)}{g(R_i, a_j)^2} - \frac{g_{a_j R_i}(R_i, a_j)}{g(R_i, a_j)} = \frac{g_{a_j}(R_i, a_j) g_{R_i}(R_i, a_j) - g_{a_j R_i}(R_i, a_j) g(R_i, a_j)}{g(R_i, a_j)^2}$. Factoring out $\beta_i B_i'$ yields

$$T_i'(R_i) = \frac{\frac{B_i''}{B_i'} - \mu \frac{R_j'}{\beta_i B_i'} \frac{d \left[\frac{g_{a_j}(R_i, a_j)}{g(R_i, a_j)} \right]}{dR_i}}{\beta_i \frac{B_i''}{B_i'} + \frac{R_j''}{R_j'}}$$

$$\Rightarrow T_i'(R_i) = \frac{\frac{B_i''}{B_i'} - \frac{\mu}{\lambda + \mu \frac{g_{a_j}(R_i, a_j)}{g(R_i, a_j)}} \frac{d \left[\frac{g_{a_j}(R_i, a_j)}{g(R_i, a_j)} \right]}{dR_i}}{\beta_i \frac{B_i''}{B_i'} + \frac{R_j''}{R_j'}}$$

$$\Rightarrow T_i'(R_i) = \frac{-\frac{B_i''}{B_i'} + \frac{\frac{d \left[\frac{g_{a_j}(R_i, a_j)}{g(R_i, a_j)} \right]}{dR_i}}{\frac{\lambda}{\mu} + \frac{g_{a_j}(R_i, a_j)}{g(R_i, a_j)}}}{-\beta_i \frac{B_i''}{B_i'} - \frac{R_j''}{R_j'}}$$

Q.E.D.

Analysis on Efficiency of Hub Ports in Northeastern Asia Based on DEA Model

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ABSTRACT

Twenty-two hub ports in Northeast Asia were analyzed in an empirical way based on the Technology Efficiency Model, Pure Technology Efficiency Model and Scale Efficiency Model in Data Envelopment Analysis (DEA). Five input indicators and 1 output indicator were selected in this study and the average value in 4 years in the CCR model was 0.55, 0.65 the in BCC model, and 0.84 in the SE model. Analysis data revealed that irrespective of the strategic differences of each port, the scale efficiency of each port is reasonable on the whole, though non-efficient application in terms of technology still exists. Therefore, efficient ports and non-efficient ports were compared in the analysis and indicators of non-efficient ports needing improving and corresponding improvement were put forward.

Keywords: data envelopment analysis (DEA), port efficiency, ports in northeastern Asia
JEL Classifications: C67, N75

I. Introduction

With the rapid development of economic globalization and expansion of foreign trade, the position and function of a Port Economy in a national economy is improving and competition between ports becomes more and more fierce. In recent years, shipping has been on an increasing trend. Thus, as the hub of water and land transport, ports have to be developed with large-scale orientation. Since the 20th century, ports in Northeastern Asia have been developing especially vigorously: container throughput

is increasing and the position of ports in Northeastern Asia among the global container ports is becoming more and more dominant. For example, in 2006, there were 5 northeastern Asian ports among the top 6 higher handing capacity container ports and there were 9 northeastern Asian ports among the top 20 higher handing capacity container ports. The total handing capacity of ports in China (mainland), South Korea, Japan, Taiwan and Hong Kong exceeded 150 million TEU in 2006 and the proportion of their handling capacity of the global total increased to 31.1% in 2006 from 19.5% in 1990. All of this shows that a new pattern of global ports dominated by northeastern Asian ports has taken shape. The throughput of ports in Northeastern Asia is increasing rapidly, especially in

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China, which is the known world factory and a large consumption country; the increase of its cargo throughput imported and exported has reached over 20%. Consequently, new requirements have been presented for the future development of ports. Meanwhile, competition and cooperation between ports should be boosted. Further, ports in Northeastern Asia are supposed to be optimized and improved so as to raise their competitiveness.

Reasonable planning of future development, more investment in infrastructure and improvement in operating efficiency are important steps to enhance the competitiveness of ports. Ports efficiency is one of the important indicators of port competitiveness because it not only reflects the competitiveness but improves the international competitiveness of the import and export trade. Currently, studies don't evaluate the efficiency of ports in Northeastern Asia utilizing a focus on operating efficiency. Therefore, the operating efficiency of Northeastern Asia ports was analyzed and evaluated in this paper.

The feasibility of the DEA model used in this paper was firstly proved and then the efficiency of Northeastern Asian ports was analyzed in a DEA-CCR model and a DEA-BCC model by measuring efficiency in terms of technology efficiency, pure technology efficiency and scale efficiency for more accurate efficiency levels. Based on the analysis results in the DEA model, each efficiency indicator of efficient ports and non-efficient ports was measured so as to find causes of low efficiency and target values for improving efficiency of non-efficient ports, aiming to provide references for improving the overall competitiveness of non-efficient ports.

II. Theoretical Studies

Scholars and experts have proposed DEA models and applied these models to analyzing port efficiency. For example, Roll and Hayuth (1933) have initiated the application of DEA models in a valid measurement of port efficiency. Tongzon (2001) has analyzed the efficiency of 4 Australian ports and 16 global ports

applying a DEA-CCR Additive Analysis Model. Cullinane et al. (2002) have expounded how to apply DEA and Stochastic Frontier Models in the analysis of the productivity of ports and studied the effectiveness of ports using this model. In the study, they have found that a scale economy exists in port industry, so Cullinane et al. (2002) suggested that BCC and Additive Models be used to evaluate the efficiency of ports in DEA models. Park and De (2004) have divided their studies on port efficiency into 4 stages before analyzing input factors and output factors at each stage. Barros and Athanassiou (2004) have analyzed the efficiency of seaports in Portugal and Greece. Ji Abing and Zhu Lidao (2005) have assessed the performance of container ports with a super-efficiency DEA model. Yang Hualong et al. (2005) have measured the relative efficiency of the top 8 container ports in China through a DEA model.

Besides studies on port efficiency, a DEA model can be applied in analyzing the efficiency of schools (Beasley, 1990), banks (Schaffnit et al., 1997), hospitals (Chang, 1998), airports (Bazargan et al., 2003), mansions (Chen, 2009), Supply Chain Management efficiency evaluation (Liang, 2006) and Third-Party Logistics Operating System (Hamdan, 2008) and in performance appraisal. Efficiency of ports was evaluated in the DEA model in this paper and the findings will provide references for government sectors and operating units.

III. Construction of the DEA Model

Efficiency is defined to optimize resource allocation by economizing and allocating all social resources in order to meet human demand and obtain maximum benefit from minimum resources. Port efficiency in this paper refers to the ratio of investment in port facilities and equipment to the output (throughput) in the process of production. The efficiency is exposed to the influence of internal factors such as port management strategies, personnel allocation, work efficiency, production equipment, and resource utilization as well as the influence of external

factors like the effective utilization of a transport system and its supporting facilities. As a result, there is no fixed indicator or system according to which the port efficiency can be evaluated in studies. The investment and output of ports were analyzed in DEA models to evaluate port efficiency; the efficiency of ports was measured in the DEA-CCR model, the pure technical efficiency of ports was measured in the DEA-BCC model and the scale efficiency was worked out in the two models.

Data Envelopment Analysis (DEA) is a method of evaluating the relative efficiency of a comparable Decision Making Unit (EMU) using Linear Programming according to various input and output indicators. On the basis of the concept of efficiency proposed by Farrell (1957), wellknown operations researchers Charnes et al. (1978) have proposed a CCR model based on the effectiveness of more outputs with more inputs. On the precondition of unchanged returns to scale, the CCR model is used to measure technology efficiency by measuring the relative efficiency of each DMU before estimating the production frontier in linear programming. Assume that there are j DMU, (j=1，2，3…,n) and there are m input Xij (i=1,2,3…,m) and i output Yrj （r=1，2，3…,l） in each DMU; the efficiency of DMUk—hk can be calculated in Formula (1):

$$\text{Max hk} = \frac{\sum\limits_{r=1}^{\ell} \text{UrYrk}}{\sum\limits_{i=1}^{m} \text{ViXik}} \tag{1}$$

$$\text{Subject to: } \frac{\sum\limits_{r=1}^{\ell} \text{UrYrj}}{\sum\limits_{i=1}^{m} \text{ViXij}} \le 1 \text{ , j=1,…,n.}$$

$$(\text{Ur, Vi} \ge \varepsilon \ge 0 \text{ , j=1,2,…,n)}$$

The CCR model is used to evaluate the effectiveness with constant returns to scale. Considering a DMU may be at the stage of increasing or decreasing returns to scale, inefficiency of a DMU can be caused by the inefficiency of input-output resulting from its own scale. Since the CCR model can't be used to distinguish scale and pure technology efficiency, a BCC model proposed by Banker, Charnes

and Cooper (1984) was used to measure pure technology efficiency in this paper. In the BCC model, returns to scale were firstly derived before removing the returns from overall efficiency; the remainder is the pure technology efficiency. In this way, the pure technology efficiency in a DMU can be measured. The difference between a BCC model (2) and a CCR model (1) lies in the existence of factor of returns to scale— $U_O^\star$. A BCC model can be expressed by Equation (2).

$$\text{Max hk} = \sum\limits_{r=1}^{\ell} \text{UrYrk} - \text{U}_0 \tag{2}$$

$$\text{Subject to: } \sum\limits_{r=1}^{\ell} \text{UrYrk} - \sum\limits_{i=1}^{m} \text{V}_i \text{X}_{ik} \le 1$$

$$(\text{Ur, Vi} \ge \varepsilon \ge 0 \text{ , j=1,2,…,n)}$$

Uo unrestricted (free) variable

Generally speaking, thanks to the existence of scale efficiency, the value of CCR efficiency is smaller than that of BCC efficiency. According to the model proposed by Cooper et al. (2000) to study Scale Efficiency (SE), SE=CCR efficiency/BCC efficiency. As the value of a CCR efficiency is not more than that of BCC efficiency, SE≤1. Without considering SE, Technology Efficiency can be measured in a CCR model, and on the contrary, if changeable SE is considered, Pure Technology Efficiency can be measured in the BCC model. Consequently, TE=PTE×SE, which reveals the cause of non-efficiency: unreasonable scale or inefficient operating mode.

IV. Empirical Analysis of Northeastern Asian Hub Ports Based on a DEA Model

4.1. Study Model Design

Twenty-two ports in Northeastern Asia were selected as the object of study and input indicators with highest relevancy were selected after correlation analysis. Based on the measurement and computation of DEA-Solver Learning v1.0, the integrated TE value,

PTE value and SE value were computed to find the mean value in each year. Then, non-efficient ports in 2006 were analyzed through a BCC model, aiming to find optimal method of improving these ports.

Main ports in Northeastern Asia were selected. The average growth rate of their throughput reached 14.3% from 2003 to 2006, hitting a historic high. Twenty-two Northeast Asian ports out of the top 100 ports worldwide in 2006 were selected to be evaluated. With the exception of Zhongshan port and Yingkou port, for which data were unavailable, 11 ports are in mainland China: Hong Kong, Shanghai, Shenzhen, Qingdao, Ningbo, Guangzhou, Tianjin, Xiamen, Dalian, Lianyungang and Fuzhou. Three are in Taiwan: Gaoxiong, Taichung and Keelung. Three are in South Korea: Busan, Gwangyang and Inchon. Finally, there are five in Japan: Tokyo, YOK, Nagoya, Kobe and Osaka. Data from the Containerization International Yearbook 2003~2006 (CIY in short) which is authoritative worldwide, were used in analyzing the input and output indicators in the principle of equity and fairness.

According to Cooper et al. (2000), in a DEA model, the number of DMU-n should at least satisfy formula (3):

$$n \geq \max \left\{ m \times s, 3(m + s) \right\} \qquad (3)$$

s and n refer to the number of input indicators, output indicators and DMU respectively.

Formula (3) is applicable when there are at least 18 DMUs, so 22 DMUs were selected in this study.

4.2. Selecting Indicators

The selection of input and output indicators is of vital importance for the validity of study results in the study on port efficiency through a DEA model. Thanassoulis (2001) has pointed out that different targets result from different selections of valid indicators, thus selecting the right indicator is the key to the study. In previous studies, infrastructure of ports has been selected as the input, and throughput as the output in most cases. Dowd and Leschine (1990) have pointed out that the production efficiency of a

container terminal changes with the change in utilization efficiency of labor force, facilities and equipment as well as land, and that the production efficiency of a container terminal can be measured only by analyzing the 3 factors. Therefore, they proposed that the store of facilities and equipment, productivity of the container terminal, competitive edge of price and customer satisfaction improvement be used as the output indicators of the competitiveness of a container terminal. In the selection of input indicators, the amount of equipment such as drawbridges and transtainers, storage space, berth length, wharf area, CFS area, manpower resources, fixed assets, the number of tugboats and average waiting times are direct and indirect influencing factors. Output indicators include throughput of the containers, work efficiency of the vessels, customer satisfaction and so on.

Customer service capacity is one of the primary reflections of a port's international competitiveness. A shipping company is more competitive than a goods enterprise. Therefore, it is vital for ports to provide services for a shipping company, such as a large wharf, long berth and rapid loading and unloading operations.

In this study, data from CIY (2004-2007) were used and important factors in measuring ports efficiency include:

Input indicators: wharf area, number of wharfs, length of berth, number of suspension bridges, and number of transtainers. The number of suspension bridges is the sum number of container cranes along the seacoast, wharf travelling cranes and floating container cranes. The number of transtainers is the sum number of yard cranes, container straddle carriers, container reach stackers, container fork trucks and top cranes. Output indicators include the total throughput capacity.

Results of correlation analysis between indicators are shown in Table 1. All correlation coefficients between the number of suspension bridges and that of transtainers, between the number of transtainers and the number of wharfs, between the number of suspension bridges and that of wharfs, between the

number of wharfs and the length of berth reached above 0.9, implying that the correlation between those

indicators are significantly higher, so they are suitable input indicators.

Table 1. Results of Correlation Analysis (2006 data)

DMU	Wharf Area	Number of Wharf	Length of Berth	Number of Suspension Bridges	Number of Transtainer	Total Throughput
Wharf Area	1					
Number of Wharf	0.597	1				
Length of Berth	0.707	0.903	1			
Number of Suspension Bridges	0.721	0.927	0.885	1		
Number of Transtainer	0.648	0.943	0.847	0.953	1	
Total Throughput	0.761	0.788	0.794	0.877	0.859	1

4.3. Empirical Analysis on Efficiency

In this paper, TE (Technical Efficiency), PTE (Pure Technical Efficiency) and SE (Scale Efficiency) were analyzed to measure the efficiency of ports. This is because the measured value of efficiency may vary

due to of changes in technological level and scale. Thus, in this study, a CCR model was used to measure the value of TE, a BCC model for the value of PRE and a CCR/BCC model for the value of SE. Results are displayed in Table 2.

Table 2. Results of Analysis on Port Efficiency

DMU	CCR (TE)				BCC (PTE)				SE (SE)			
	03	04	05	06	03	04	05	06	03	04	05	06
Hong Kong	0.82	1.00	1.00	0.73	1.00	1.00	1.00	1.00	0.82	1.00	1.00	0.73
Shanghai	1.00	1.00	0.89	0.69	1.00	1.00	1.00	1.00	1.00	1.00	0.89	0.69
Shenzhen	0.86	1.00	1.00	0.61	0.92	1.00	1.00	1.00	0.94	1.00	1.00	0.61
Busan	0.46	0.75	0.58	0.43	0.73	0.78	0.67	0.71	0.63	0.96	0.86	0.61
Gaoxiong	0.74	1.00	1.00	1.00	0.77	1.00	1.00	1.00	0.96	1.00	1.00	1.00
Qingdao	0.47	0.49	0.71	0.73	0.48	0.52	0.72	0.83	0.97	0.95	0.99	0.88
Ningbo	0.88	1.00	1.00	1.00	0.89	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Guagnzhou	0.97	1.00	0.52	0.42	1.00	1.00	0.61	0.71	0.97	1.00	0.86	0.58
Tianjin	0.34	0.73	0.88	0.89	0.35	0.85	0.89	0.92	0.96	0.86	0.99	0.97
Xiamen	0.69	0.97	1.00	1.00	0.95	1.00	1.00	1.00	0.72	0.97	1.00	1.00
Tokyo	0.33	0.39	0.47	0.42	0.33	0.45	0.47	0.46	1.00	0.88	1.00	0.91
Dalian	0.37	0.30	0.33	0.27	0.62	0.31	0.40	0.35	0.59	0.98	0.82	0.76
Yokohama	0.17	0.21	0.20	0.19	0.21	0.23	0.21	0.27	0.82	0.91	0.94	0.70
Nagoya	0.25	0.30	0.31	0.22	0.25	0.33	0.32	0.31	1.00	0.89	0.99	0.71
Kobe	0.13	0.16	0.16	0.15	0.16	0.19	0.19	0.21	0.78	0.81	0.85	0.71
Osaka	0.15	0.21	0.20	0.19	0.15	0.21	0.20	0.24	1.00	1.00	1.00	0.82
Keelung	0.70	0.62	0.85	0.67	0.72	0.63	1.00	1.00	0.98	0.98	0.85	0.67
Gwangyang	0.97	0.29	0.27	0.25	1.00	0.29	0.28	0.25	0.97	0.99	0.95	0.99
Taichung	0.26	0.28	0.33	0.31	0.36	0.39	0.38	0.38	0.72	0.73	0.88	0.81
Inchon	0.14	0.33	0.77	0.86	1.00	1.00	1.00	1.00	0.14	0.33	0.77	0.86
Lianyungang	0.19	0.29	0.27	0.15	0.20	0.36	0.27	0.18	0.96	0.80	1.00	0.81
Fuzhou	0.28	0.32	0.33	0.25	0.29	1.00	1.00	1.00	0.97	0.32	0.33	0.25
Average	0.51	0.57	0.59	0.52	0.61	0.66	0.66	0.67	0.83	0.87	0.90	0.77

It can be seen that the average value of TE is 0.51 in 2003, 0.57 in 2004, 0.59 in 2005 and 0.52 in 2006, continually increasing year by year until peaking in 2005 and abruptly dropping in 2006. As for individual ports, Shanghai in 2003; Hong Kong, Shanghai, Shenzhen, Gaoxiong, Ningbo and Guangzhou in 2004; Hong Kong, Guangzhou, Ningbo and Xiamen in 2005; and Gaoxiong, Ningbo and Xiamen in 2006 can be seen as efficient ports. During this period, the efficiency of most ports in China such as Qingdao, Tianjin and Xiamen grew rapidly, which is synchronous with the growth of China's economy. This is the cause of a rapid increase in port handing capacity in China.

Although ports in other regions of Northeastern Asia had the same development, comparative analysis revealed that the growth in efficiency of China's ports was much more rapid than that of ports in other countries. That is because the operating efficiency had been greatly improved by proprietors through unceasingly improving operating systems and changing strategic modes.

Results in Table 2 were produced in a BCC model and the hypothesis that the efficiency value from returns to change scale is smaller than that from returns to fixed scale can be seen. Evaluation of the PTE reveals that the number of efficient ports per year is: 5 in 2003, 9 in 2004, 9 in 2005 and 9 in 2006. The average value of the PTE is 0.61 in 2003, 0.66 in 2004, 0.66 in 2005 and 0.67 in 2006. Results in the BCC model are similar to results in the CCR model: some of China's ports, including Hong Kong, Shanghai, Shenzhen, Gaoxiong, Ningbo, Xiamen, Lianyungang and so on are on the list of efficient ports for 3 consecutive years while the efficiency of Japan's ports is comparatively lower.

The average value of SE was worked out through a CCR/BCC model, which was found to be 0.83 in 2003, 0.87 in 004, 0.90 in 2005 and 0.77 in 2006. It is clear that the value declines rapidly in 2006. Analysis on SE determines the number of efficient ports: 4 in 2003, 7 in 2004, 8 in 2005 and 3 in 2006.

It can thus be known that Hong Kong, Shanghai, Shenzhen, Gaoxiong and Ningbo can be regarded as the efficient ports in the TE analysis, PTE analysis and SE analysis, which means that their utilization efficiency is reasonable and their scales are proper. PTE and TE of Inchon and of Fuzhou rise each year while their SE is lower. The TE and PTE values of Lianyungang and Japan's ports are below 0.5, while their SE values are above 0.9, which shows that the efficiency of Japan's ports is not so high in terms of technology and pure technology, though their scale is suitable.

4.4. Improving Efficiency of Non-efficient Ports

Causes of non-efficient ports can be traced through the analysis data in 2006 in the BCC model. Results are displayed in Table 3.

This table is composed of Name of Port, Efficient Score of Port, Reference Ports and the proportion. The ports whose efficiency value is 1 include Hong Kong, Shanghai, Shenzhen, Gaoxiong, Ningbo, Xiamen, Keelung, Lianyungang and Port of Fuzhou, all of which are efficient ports. Ports whose efficiency value is below 1 are seen as non-efficient ports, which can be improved with the reference of efficient ports. It can be seen that the efficient ports are used as reference for non-efficient ports and their proportions. A higher value of reference means higher validity. Busan port, for example, has an efficiency score of 0.706, which is regarded as non-efficient with the proportion references of Shanghai (0.329), Shenzhen (0.453) and Ningbo (0.218). Consequently, it can be improved as a most efficient virtual port through linear analysis of input and output.

Table 3. Analysis of Efficiency Score of Ports and References for Non-efficient Ports (2006)

Ports	Efficiency score	Reference Objects
Hong Kong	1.000	Hong Kong(1)
Shanghai	1.000	Shanghai(1)
Shenzhen	1.000	Shenzhen(1)
Busan	0.706	Shanghai(0.329)Shenzhen(0.453)Ningbo(0.218)
Gaoxiong	1.000	Gaoxiong(1)
Qingdao	0.827	Hong Kong(0.123) Shenzhen(0.019)Ningbo(0.858)
Ningbo	1.000	Ningbo(1)
Guangzhou	0.711	Shenzhen(0.194)Ningbo(0.806)
Tianjin	0.917	Ningbo(0.900) Lianyungang(0.100)
Xiamen	1.000	Xiamen(1)
Tokyo	0.457	Hong Kong(0.098) Ningbo(0.902)
Dalian	0.351	Shanghai(0.176) Ningbo(0.659) Xiamen(0.165)
Yokohama	0.273	Shanghai(0.041) Shenzhen (0.285) Gaoxiong(0.294) Ningbo(0.381)
Nagoya	0.307	Shenzhen(0.167) Ningbo(0.833)
Kobe	0.205	Hong Kong(0.078) Shenzhen (0.160)Gaoxiong(0.580) Ningbo(0.182)
Osaka	0.236	Hong Kong(0.007) Shenzhen(0.120) Gaoxiong(0.329) Ningbo(0.544)
Keelung	1.000	Keelung(1)
Gwangyang	0.248	Ningbo(1)
Taichung	0.381	Ningbo(0.400) Lianyungang(0.600)
Inchon	1.000	Lianyungang(1)
Lianyungang	0.181	Shanghai(0.054)Ningbo(0.532) Xiamen(0.414)
Fuzhou	1.000	Fuzhou (1)

DEA analysis divides the efficient and non-efficient ports and determines the improvement in non-efficient ports. Indicators of non-efficient ports need improving and the improvement is specific. Table 4 presents target values of input indicators through the BCC model, which can not only cut down inputs but can raise the total throughput capacity. For example, 36,900 sq.m wharf area, 4 wharfs, 472m-long berth and 75 transtainers need reducing, and 6,491-TEU throughput capacity need improving to increase the efficiency of Tianjin Port to the leading edge (negative refers to the inputs needing reduction while a positive number refers to the throughput needing increased). Analysis in Table 4 implies that it is more feasible to maximize the throughput than to change the existing fixed input.

Table 4. Improvement for Non-efficient Ports (2006)

Ports (DMU)	Efficiency Score	Total Area Wharf	Number of Wharf	Length of Berth	Number of Suspension Bridge	Number of Transtainer	Total Throughput
Busan	0.7056			-860	-1		17,048
Qingdao	0.8270			-1,755	-4	−56	9,313
Guangzhou	0.7108	-3,390,439	-7	-1,477	-8		9,285
Tianjin	0.9166	-306,900	-4	-472		-75	6,491
Tokyo	0.4568		-3	-1,006	-8	-17	8,689
Dalian	0.3515		-5		-4	-52	9,139
Yokohama	0.2732		-3			-4	11,712
Nagoya	0.3068	-180,473	-5	-602	-12		8,968
Kobe	0.2053			-525		-38	11,754
Osaka	0.2364		-1			-13	9,439
Gwangyang	0.2484	-616,000	-8	-1,562		-7	7,068
Inchon	0.3807	-100,000	-2	-856		-10	3,609
Taichung	0.1811		-2		-4	-9	6,598

V. Conclusion

This method of measuring the SE of ports was put forward based on DEA and production situations of 22 ports in Northeastern Asia during 2003~2006, and they were analyzed through a CCR model, a BCC model and a CCR/BCC model. This empirical analysis revealed that the average value is 0.55 in the CCR model, 0.65 in the BCC model and the average value of SE is 0.84, implying that taking no account of strategic difference between ports, non-efficiency in terms of technology applications still exists even though the SE scores of the ports were reasonable on the whole.

Conclusions in this study are; firstly, ports with reasonable TE and SE measures include large ports in China (Hong Kong, Shanghai and so on). The PTE of these ports have reached the optimal state. It is worth noting that the SE of these ports suffered a sharp decrease on the whole because of a construction extension in 2006, which led to a sharp extension of scale and sharp growth of throughput capacity. However, with the rise of utilization efficiency, it is certain that SE will increase remarkably. Secondly, ports with reasonable PTE but lower SE include Inchon Port and Fuzhou Port. Although the PTE of these two ports has reached the peak value, the SE is quite low because of unreasonable resource allocation. Thirdly, ports with proper SE but lower TE are in Japan. All 22 ports were divided into efficient ports and non-efficient ones, whose efficiency indicators and corresponding improvement in these indicators were proposed as well.

Based on the evaluation of port efficiency, several suggestions have been proposed. To begin with, port authorities should lay more emphasis on each indicator of port efficiency, allocate port resources in a reasonable way and formulate plans for improving port efficiency. In addition, the operating modes of the non-efficient ports mentioned can be analyzed to provide references for their own construction. Third, a National Harbors Board should develop a measurement system for port performance as this system will help support the policies of port authorities and ensure a reasonable utilization of limited resources. Fourth, port operating systems need improving; the concept of efficiency of container ports should be established. Statistical management of data on these container ports should be nationally controlled and the information processing must be in scientific management. Moreover, to break the contradiction between the requirements of customers for the service level of ports and demands for cost savings, ports should be built which can be well connected so as to improve supply chain management. Only in this way can the various demands of important clients (large shipping companies) be met and optimal throughput capacity of ports achieved. Thus, new value of port enterprises will be created and competitiveness of ports will be raised.

In a word, input-output efficiency of ports was evaluated through quantitative analysis. Variables of business strategy, enterprise culture, and operational capacity of proprietors can be added in further studies to analyze port efficiency qualitatively. What's more, influence of indicator movement during research on total factors applying the Malmquist index of production period is a possible orientation in future studies.

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A Study on the Mediating Effects of International Marketing Activities in the Relationship between R&D Capability, Network Capability and Management Performance in Korean Ventures

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ABSTRACT

The purpose of this study was to explore the relationship between R&D capability, network capability, international marketing activity and the effects on management performance in globalizing Korean ventures. Although previous studies have found that R&D capability, network capability, and international marketing activities affect management performance directly, there have been only a few studies which focus on the specific causal relationships among these potential variables in Korean ventures. Recently, with the global environment of competition becoming more complex and consumer needs becoming more diversified, even a corporation that develops an excellent product cannot achieve a high level of performance if the product is not combined with international marketing efforts, or the corporation does not make use of developed networking in its international marketing activities. This study, through the use of covariance structural analysis, showed that while R&D capability and marketing activities directly affect management performance, network capability does not. In addition, R&D capability and network capability were shown to have a positive effect on management performance with international marketing activities working as a mediator. This result theoretically and practically implies that network capability has an effect on management performance when used in international marketing activities.

I. Introduction

Management studies on the internationalization of corporations have traditionally focused on the phenomenon of international expansion of mature corporations or multinational corporations. For example, eclectic theory among foreign direct investment theory considers that firm-specific resources, a locational characteristic which is a nation-specific factor, and the superiority of internationalization based on market imperfection are at the core of international expansion in corporations.

In addition, stage theories of corporate internationalization maintain that international expansion of corporations undergo certain stages from export to direct foreign investment. These theories have theoretically systemized the phenomenon relatively persuasively that corporations which have accumulated sufficient resources in the domestic market advance into overseas markets. The emergence of studies on Born Globals (BGs) or International New Ventures (INVs) have attracted attention since the mid-1990s. However, fundamental problems in internationalization theories began to be pointed out. Unlike mature corporations or multinational corporations, BGs and INVs are corporations which pursue internationalization quickly from an early period in their establishment, even with insufficient accumulated resources in the domestic market.

Internationalization of these corporations has distinct characteristics which are different from that of multinational corporations. First, they have a strong will to expand into the international market from an early period of establishment (1 to 6 years after establishment).

Second, even without sufficiently accumulated physical resources, they build a competitive edge in overseas market by utilizing unique intangible resources.

A vast majority of the studies on these corporations explore the effect of the internal capacity of new medium- and small-sized corporations, such as CEO experience, entrepreneurship, technological capacity, international marketing activities, quantitative and qualitative characteristics of overseas network and strategic characteristics of management performance through overseas expansion, and, on the other hand, the effect of external factors such as industrial characteristics, the management environment of overseas market and governmental support policies on management performance of these companies through overseas expansion. This study aims to explore the direct and indirect effect of R&D capability, network capability, and international marketing activity on management performance of Korean Ventures (which

are technology-intensive or technologically innovative small- and medium-sized corporations) in their efforts for internationalization by utilizing Structural Equation Modeling (SEM).

More specific goals of the study are as follows. First, while many studies applied resources, such as R&D capability, network capability and international marketing activities in management and internationalization performances of Born Globals (BGs) or International New Ventures (INVs), this study applies these resources to Korean Ventures with the same resource-based view and confirms if consistent results are drawn from Korean Ventures as well. Second, this study aims to elucidate the causal relationship among these variables, especially the mediating role of international marketing activities between R&D capability and management performance as well as between network capability and management performance since studies are emerging which emphasize a convergence of R&D capability and international marketing activities and the importance of cooperative marketing efforts among corporations. These two aspects are the vital goals of this study and the major difference from previous studies.

II. Theoretical Background and Establishment of Hypotheses

2.1. Theoretical Background

Resource Based View (RBV) stresses that management performance of a corporation depends on the kinds, quantitative and qualitative, of differences in firm-specific resources rather than on structural characteristics of the industry it belongs to (Wernerfelt, 1985; Barney, 1991; Rumelt, 1991). RBV defines a corporation as an aggregate of resources, which is a view away from industrial organization theory (in product-market position) that the competitive position of a corporation is decided by the aggregate of its unique assets and relationships (Penrose, 1959; Roth, 1995; Wernerfelt, 1985; Rumelt, 1991). Thus, when

assets, capabilities, corporate processes, task processes and knowledge that a corporation possesses are valuable, inimitable, irreplaceable and relatively scarce to customers, they works as a source of competitive advantage (Barney, 1986/1991; Dierickx & Cool, 1989).

Companies which possess these resources have a stronger desire and tendency to expand into international markets and hence, they can work as a vital motivation for the internationalization of corporations (Peng, 2001; Westhead et al., 2001).

Oviatt and McDougall (1994) claimed that although INVs have inherent limitations, they relatively lack resources compared with large corporations and multinational corporations, so they create competitive advantages by putting their unique and valuable resources in international markets. These corporations enhance management performance by strategically realizing innovations and differentiations of products which competitors cannot imitate in niche markets as they pursue internationalization from an early period in their establishment (Kobrin, 1991; Tyebjee, 1994; Shrader, 2001; Bloodgood et al, 1996; Autio et al, 2000; Zahra et al, 2000; Burgel & Murray, 2000). Relation-specific nature among corporations can also be a resource for a competitive edge because the core resources of a partner corporation can be transferred to a counterpart corporation through the learning process while establishing and maintaining the relationship. Thus, since resources can be exchanged beyond the bounds of companies when corporations build relationships with partner companies through networking, this can be an important channel to acquire intangible resources such as knowledge and technologies, which are hard to acquire by corporations themselves.

Oviatt and McDougall (1994) emphasized the network structure as a resource of INVs' differentiation advantage or cost advantage in addition to strategic means such as patents, copyrights, inimitable firm-specific assets and low-price policy. Network becomes leverage for corporate internationalization as it works as a pathway for INVs to find out international

business opportunities and can help INVs expand into international markets with psychological distances without passing through gradational processes (Crick & Jones, 2000; Madsen & Servais, 1997; Johanson & Mattson, 1989). From this relational perspective, Leenders and Gabby (1999) also asserted that cooperative partnerships with external organizations can play a positive role in creating value and contributing to enhanced corporate management performance. RBV, which stresses the internal resources of a corporation, sees resources as a concept of stock, which is pointed out as a weakness when considering the complexity and dynamic nature of the management environment (Foss, 1998). Moreover, criticisms are raised that RBV alone cannot sufficiently explain survival, growth and internationalization of small- and medium-sized venture corporations with inherently deficient resources.

With this weakness, the importance of the capability to create a competitive advantage by utilizing these resources by expanding RBV has been raised. The capability of a corporation is a kind of specific resource which is inherent and immovable in the organization and can enhance effectiveness and efficiency of other resources possessed by a corporation (Eisenhardt & Martin, 2000; Makadok, 2001; Teece et al., 1997). The recent global management environment can be summarized as uncertainty and discontinuity, and Teece et al. (1997) maintained that, in order to confront a fast-changing management environment, a corporate capability to consolidate, construct and reorganize internal and external resources is required since it is impossible to acquire and sustain a competitive advantage by simply positioning in highly-profitable industry or accumulating superior resources. That is, in order to adapt to a rapidly changing market environment, it is important for corporations to construct a competitive capability as strategic management activity to integrate internal resources in the organization with external resources and re-coordinate them to meet the needs of the market. Hence, internal capability of a corporation is a qualitative concept to achieve the goals of a

corporation and enhance its competitive edge by utilizing retained resources rather than the simple quantitative concept of retained resources.

Furthermore, Grant (2008) argues that, in order for a corporation to create value, scarcity and market-relatedness of resources in stock should be the premise, and it should have the capability to establish and sustain a competitive advantage. In terms of establishment and sustainability of this capability, globalization of a corporation is a process of combining firm-specific knowledge with the market and optimizing the information structure of a corporation to fit this process (Knudsen & Madsen, 2002).

2.2. Establishment of Hypotheses

Day and Wensley (1988) observed that the distinctive competence of a corporation starts from possessing superior and more skilled technologies or resources than competing corporations. The competitive advantage of a corporation from a capability-based view is an expansion of the resource-based view that requires not only specific resources but efforts to expand retaining resources into a distinct capability. Specifically, the R&D capability among the other capabilities of a corporation becomes a firm-specific superiority in terms of theory of industrial organizations (Hymer, 1976), and the higher the technological intensity, the better the competitive advantage a corporation can create by using core technologies (Dunning, 1995). RBV also stresses that unique intangible resources, such as superior technology and knowledge, of competing corporations become important factors in their internalization of a corporation as they work as a driving force in overcoming the limitations of physical resources when expanding into international markets (Cavusgil & Knight, 1997; Zahara et al., 2000; Autio et al., 2000).

In a study on resources that enhance the performance of new venture corporations and the role of their use, McGrath et al. (1994) claimed that technology development capability becomes the very basis of core capabilities of a corporation while

stressing that resources construct capability and enhance a competitive edge superior to competitors. Therefore, as intangible resources, such as complexity and implicitly of production techniques, are recognized as exclusive resources to help a corporation build a competitive advantage and create a continuous competitive advantage in international market, a corporation with excellent R&D capabilities can enhance management performance even when physical resources are deficient. Thus, the R&D capability of small- and medium-sized corporations such as venture corporations promotes internationalization and a high level of R&D capability enables a corporation to enjoy exclusive superiority, enhancing management performance (Amin & Thrift, 1994). In the same context, Bloodgood et al. (1996) emphasized that many venture businesses possess state-of-the-art technologies and knowledge that grant them firm-specific superiority and elucidated a significant relationship between the level of technological innovation and market share in the international market. Based on these preceding studies, this study established the following hypothesis:

H1: The R&D capability of Korean Ventures pursuing internationalization has a positive effect on management performance.

In order to respond to change in the global environment and establish a leading position by producing advanced products with the technology possessed, corporations with excellent technologies and deficient resources such as ventures tend to seek out partners that can complement their competitive weaknesses (Johanson & Mattsson, 1989; Oviatt & McDougall, 1944). When these corporations utilize networks effectively and strategically, they can reduce risk and uncertainty in the discovery of opportunities, idea experimentation and the supplementation of deficient resources and networks can be used as a major channel through which knowledge can be acquired on markets overseas (Aldrich & Auster, 1986; Nerkar & Paruchuri, 2005). Networks also facilitate

the development of offers to provide for customers by understanding the needs of local customers and promoting technology transfer based on trust among corporations. A corporation can build such network capabilities by combining its resources with those of partner corporation(s). Thus, the network is recognized as an important factor in forming a mutual business relationship or entering into strategic cooperation and a management strategy through a joint venture.

These studies maintain that diversity and the number (quantity) of networks are very critical as they have a positive effect on and play a mediating role in management performance. A network is especially emphasized in technology-intensive small- and medium-sized corporations as they, with short corporate histories, make decisions in a short time rather than investing enough time; they tend to fail in decision making because they absolutely lack time to collect information (Buckley, 1999). Hence, in order to overcome this limitation, they need to establish networks such as horizontal or vertical cooperative partnerships with other corporations. However, Anand and Khanna (2000) claims that since building a network with heterogeneous corporations may accidently cause negative results due to differences in individuals or organizational and cultural attributes, it is necessary to secure methods or build the capacity to manage partners to prevent undesirable results.

Liesch et al. (2002) also asserted that the capability to establish, manage and utilize networks must be dealt with more significantly than the simple scale of the network, and this capability becomes a vital source of competitive edge against other corporations. In addition, Kale et al. (2002) considered network capability or alliance capability constituting factors of an alliance experience that can contribute to the structural formation of a corporation. Such alliance capability means a capability to absorb, combine and consolidate knowledge through interaction with other corporations (Lorenzo & Lipparini, 1999). Therefore, this study established the following research hypothesis focusing on capability to establish and manage networks and utilize the other resources of a

corporation rather than simple number and diversity of networks.

H2: The network capabilities of Korean ventures pursuing internationalization have a positive effect on management performance.

Unique products, excellent customer service and brand reputation are important resources which distinguish a corporation from competitors (Miles & Snow, 1978) and they work as catalysts for corporations that lack resources, such as Korean ventures, in their management performances and to expand into global markets. Barney (1991) emphasized the specific marketing role of market-based resources such as corporate brand, customers and distribution channels in securing resources for a competitive advantage. Marketing activities superior to competitors can be established through customization of products and conformity to customer requests (Cavusgil & Zou, 1994), which corresponds with the emphasis of traditional marketing in that promotion, price, distribution and product should orient toward customers in overseas markets. Therefore, this study also established the following hypothesis to verify the importance of international marketing activities that Korean ventures undertake.

H3: International marketing activities of Korean ventures pursuing internationalization have a positive effect on management performance.

As seen above, preceding studies have maintained that R&D capability and network capability have a positive effect on management performance from RBV. Additionally, active international marketing activities of a corporation also have a positive effect on management performance. Yet, with the global competition environment becoming more complex and the diversity of consumers increasing, it is becoming more difficult for a corporation to reach a maximum performance with only its own resources and capabilities (Park et al., 2008). Although a corporation

must possess sufficient tangible and intangible resources and the capability to use then strategically as RBV stresses, small and medium-sized corporations like ventures lack sufficient resources to establish a competitive edge in the global market. Still, if R&D capability and network capability are not thoroughly market-oriented, the corporations might fail.

The connection between marketing, R&D and the operational system of the new product development team decides the performance of a corporation, and they emphasized the importance of interaction between these sections as the marketing and R&D departments are highly interdependent. Performance can be enhanced when the direction of technological development leads to product development which can satisfy the needs of consumers. In addition, since the position of a small- or medium-sized corporation in the global market must be smaller than global companies, products made by utilizing differentiated technologies require active marketing. Thus, however great the capability a corporation has to satisfy the needs of consumers and to develop products with a high level of technologies, it can be limited in its ability to enhance management performance if it cannot let the fact known to consumers through international marketing activities. Recognizing this, numerous corporations attempt to enhance their management performances through cooperative marketing activities by building inter-corporate networks.

Moreover, though corporations pursue competitive advantages and aim to enhance management performances by advancing into new markets for sustained growth based on economy of scale and differentiated technologies, various environmental differences incur foreign costs (Hymer, 1976; Zaheer & Mosakowski, 1997) when corporations try to build networks with other corporations. The effort and wills of these corporations mean not only complementing deficient resources but earning management performances superior to competition in an existing market or utilizing networks as a strategic marketing tool.

Exchange of resources takes place among corporations through cooperation and marketing activities can be increased though the bonds of partner corporations. That is, trust established through an inter-corporate network ultimately contributes to the enhancement of management performance by increasing marketing achievements (Hunt & Morgan, 1997).

In sum, the formation of a network with partner corporations and the capability to utilize a formed network not only increases the overall performance of a corporation but also the interaction with active marketing activities in the network, further enhancing performance.

Like this, not only do international marketing activities as well as resources and capabilities of a corporation have a direct and positive effect on corporate management but also the technological capability and network capability a corporation possesses can have an effect on management performance through international marketing activities. Therefore, focusing on the mediating role of international marketing activities between network and management performance, this study established the following hypotheses:

H4: The R&D capability of Korean ventures pursuing internationalization has a positive effect on international marketing activities.

H5: The network capability of Korean ventures pursuing internationalization has a positive effect on international marketing activities.

III. Research Model and Measurement of Variables

3.1. Research Model

This study aims to explore the relationship between R&D capability, network capability and international marketing activities and management performance of Korean ventures (specifically the mediating role of international marketing activities) by utilizing SEM.

Specifically, as seen in the theoretical background and establishment of study hypotheses, while preceding studies focus on the fact that R&D capability, network capability and international marketing activities have a direct and positive effect on management performances, this study further expands the focus and looks into the mediating role of international marketing activities between corporate capabilities and management performances through effect analysis.

3.2. Measurement of Variables

For the measurement of latent variables of R&D capability, network capability and international marketing activities of ventures, this study selected 3~4 observed variables with high suitability from advanced research or quantitatively observed variables which were measured by converting them into a 7-point Likert scale.

First, for R&D capability, this study quantitatively measured the amount of R&D, utility models, patents and quality certifications acquired in and out of country from the study of Lee et al. (2001) and used in empirical analysis through standardization. As the result of a verification on reliability and validity by measuring these variables with the Likert scale in Yoon's study (2009), an exploratory factor loading shows over 0.6 and Cronbach's α is over 0.8, demonstrating high reliability and validity. Thus, this study also constituted 4 items and measured them using the Likert scale.

Second, for network capability, this study used measuring items suggested by Walter et al. (2006) and constituted 4 items: level of understanding needs and strategies of corporations, quality of relationships with cooperating partner corporations, level of knowledge sharing, information on cooperating corporations across a corporation and the level of communication with cooperating corporations in solving problems.

Table 1. Independent, Dependent and Mediate Variables Used in the Study

Variables	Measured items	Researchers
R&D Capability	● Technological advantage against competition ● Technological diversity against competition ● Number of international patents compared with competition ● Scale of R&D expenditure compared with competition	Lee et al. (2001) Jolly et al. (1992)
Network Capability	● Level of understanding needs and strategies of corporations ● Quality of relationship with cooperating partner corporations ● Level of knowledge sharing and information of cooperating corporations across a corporation Level of communication with cooperating corporations in solving problems	Walter et al. (2006)
International Marketing Activities	● Advertising activities in overseas markets ● Speed of new product release ● Price competitiveness of products ● Customer service activities	Atuahene-Gima (1995) Weerawardena (2003) Guan &Ma (2003) Richard et al. (2004) Namen & Slevin (1993)
Management Performance	● Satisfaction with market share ● Satisfaction with increase in sales ● Customer satisfaction	Carlsson et al. (2005) Glaister & Buckley (1998) Pangarkar (2008) Lee (2005)

Third, for marketing activities, this study selected suitable and non-repeated items from the indices developed by Atuahene-Gima (1995), Weerawardena

(2003), Guan and Ma (2003), Richard et al. (2004), and Namen and Slevin (1993) constituted and measured with 4 items: advertising activities, speed of

new product release, price competitiveness of products and customer service activities.

Fourth, when comparing the management performance of corporations with different scales, industry, management goal and strategic view, using non-financial performance indices is more beneficial and non-financial indices are in a statistically very significantly positive relationship with quantitative financial indices (Lee, 2005; Jaworski & Kohli, 1993; Geringer & Hebert, 1991). This study also measured the level of satisfaction such as market share, increase in sales and increase in customer satisfaction with items of high suitability among the variables used in the studies of Carlsson et al.(2005), Glaister and Buckley (1998), Pangarkar (2008), and Lee (2005) used them as management performance variables.

IV. Results and Discussion

4.1. Method of Sampling and Analysis

This study collected data for empirical analysis using a structural questionnaire from certified technologically innovative small- and medium-sized corporations (ventures) earning sales revenue from overseas markets. This study set Korean ventures as its objects of study considering existing studies which claim that inherent global corporations and international venture corporations frequently appear in technology-intensive industries (Jolly, 1992; Jones, 1999; Zahra et al., 2000). In Korea, technology-intensive industry is largely classified into venture corporations and technologically innovative small- and medium-sized corporations.

Another reason for selecting ventures as the study object was to reflect the opinions of experts and scholars in that it is easier to secure the reliability and credibility of the study from ventures than in venture corporations, which are more frequently created and extinguished as certification for Korean ventures requires over 3 years of operation after establishment.

As of end of April, 2014, 16, 168 Inno-Biz corporations are registered at http://www.innobiz.net,

operated by the Korean Small and Medium Business Administration. For sample the corporations of this study, 500 corporations were randomly selected out of 1,536 Inno-Biz corporations with sales revenue from overseas, and questionnaires were sent by email and fax after which a survey was conducted for one month in December 2014. In particular, sample corporations were required to retain at least 5 years of history and have operated normally up until December 2014.

Questionnaires were requested to be completed by CEOs or executives if possible, but, if not possible, they were restricted to be completed by personnel with more than 3 years of experience in overall corporate work. Finally, 187 questionnaires that fit the purpose of this study were selected for analysis among the 274 collected.

As analysis tools, IBM SPSS Statistics 22 and IBM Amos 22 were utilized. For empirical analysis, first, in order to analyze the reliability and validity of the construct concept, confirmatory factor analysis, correlation analysis and reliability analysis were conducted.

Second, in order to verify the hypotheses that established causal relationships among variables, covariance structure analysis was conducted. Third, in order to precisely identify the mediating role of international marketing activities in causal relationship among variables, a statistical significance test was conducted on direct and indirect effects through the decomposition of covariance structure analysis.

4.2. Validity Analysis of the Construct (Concept)

Validity of construct (concept) is an index which indicates how precisely developed measuring tools measure concepts or attributes (desired to measure), and they need to have a high level of convergent validity and discriminant validity. That is, resultant values of the same concepts measured by different measuring methods should have a high level of correlation and different concepts measured by the same measuring method must have a low level of

correlation to secure the validity of the construct concept.

In order to verify convergent validity, this study reviewed factor loading (λ), average variance extracted (AVE) and construct reliability (CR) by conducting confirmatory factor analysis. Table 2 presents the results of confirmatory factor analysis. Standardized estimate coefficients (λ: Std. estimate) that approach or are over 0.7 and values of CR on CR λ range from a minimum 7.012 through a maximum of 10.717, showing they are bigger than threshold 1.965 at a significance level of 0.05, demonstrating factor loading of measured items are very significant. In addition,

AVE of latent variables measured with multiple items (observed variables) range from a minimum of 0.804 to a maximum of 0.904, satisfying the condition that minimum AVE should be over 0.5.

Furthermore, reliability means the degree of consistency in observed variables and the variance of observed values appearing when same concepts are measured. Construct reliability (CR) is calculated by using errors of standardized estimate coefficients and observed variables, which turned out to be over 0.942. As the result of confirmatory factor analysis (CFA), the reliability of observed variables is judged to be excellent.

Table 2. The Result of CFA

Path			Std. Estimate	SE	t-value	CR	AVE
International Marketing Activities	→	ma1	.637	-	-	.943	.806
	→	ma2	.724	.160	7.053		
	→	ma3	.782	.167	7.411		
	→	ma4	.742	.177	7.157		
R&D Capability	→	rnd1	.709	-	-	.947	.820
	→	rnd2	.872	.157	8.873		
	→	rnd3	.626	.174	6.757		
	→	rnd4	.731	.148	7.778		
Network Capability	→	nc1	.819	-	-	.974	.904
	→	nc2	.832	.091	11.315		
	→	nc3	.819	.104	10.722		
	→	nc4	.866	.102	11.487		
Management Performance	→	per1	.704	-	-	.951	.867
	→	per2	.810	.144	8.544		
	→	per3	.893	.155	8.957		

Meanwhile, latent variables must show a distinct difference in discriminant validity in observed variables comprising latent variables. When a correlation coefficient is large between latent variables, the validity of construct concept is feeble as there are problems in discriminate validity. In discriminate validity between latent variables, it is judged that discriminant validity is secured between two factors if AVE earned from the two factors is bigger than the squared correlation coefficient ($\varphi2$) of each factor. Table 3 shows the correlation coefficient (φ) between each factor and presents AVE instead of a correlation coefficient of 1 between the same factors. The maximum correlation coefficient between international

marketing activities and R&D capability and network capability and management performance is 0.813, and their $\varphi2$ does not exceed the AVE value of international marketing activities (0.806). Squared values of correlation coefficients between R&D capability and network capability and management performance do not exceed AVE value of R&D capability, and squared value of correlation coefficients between network capability and management performance does not exceed the AVE value of network capability either, demonstrating that the overall discriminant validity of construct (concept) is secured. Therefore, it proved that the overall variables

measured in this study satisfy both convergent validity and discriminant validity.

Table 3. The Correlation Coefficients and AVE of Variables

	International Marketing Activities	R&D Capability	Network Capability	Management Performance
International Marketing Activities	.806 [a]			
R&D Capability	.702	.820 [a]		
Network Capability	.813	.576	.904 [a]	
Management Performance	.655	.624	.484	.867 [a]

Note: [a] Average Variance Extracted (AVE).

Lastly, quotients to judge the goodness-of-fit of the model for which CFA is conducted were χ^2=108.230 (p=0.000, df=81), GFI=0.900, NFI=0.912, CFI=0.976 and RMSEA=0.05, showing that the overall goodness-of-fit of the model is satisfactory. Considering these results of confirmatory factor analysis, validity (convergent validity and discriminant validity) and reliability of construct reliability of the variables measured in this study can be viewed as secure.

4.3. Verification of Hypotheses and Results

Hypotheses established in this study were tested by SEM using IBM AMOS 22. For Covariance Structure Analysis, Maximum Likelihood Estimation was used and ML produces the optimum solution when the sample is small and kurtosis is excessively big (Moradi & Subich, 2002). In addition, it is used in social science as it enables precise estimation of an unknown quantity when measured variables follow multi-variate normal distribution, and it can still estimate an unknown quantity without difficulty on proper samples even when they are in part assumptions of multi-variate normal distribution.

For the goodness-of-fit of the research model before the verification of hypotheses, it turned out that χ^2=115.669 (p=0.000, df=82), GFI=0.897, NFI=0.906, CFI=0.970 and RMSEA=0.05.

Among these quotients, although GFI does not exceed 0.9, non-strict interpretation may be allowed since the difference from the standard value is 0.003.

Study hypotheses were verified by comparing t-values with a threshold of 1.96 at a significance level (α) of 0.05, comparing the significance probability value (p) with significance level value (α) to see whether the regression coefficient is statistically significant and by confirming whether expected signs and test signs correspond with each other. The results of structural analysis of covariance are presented in Table 4.

Table 4. The Result of Hypotheses

Hypothesis	Path	Std. Estimate	SE	t-value (p)	Adoption of Hypothesis
H1	R&D capability → Management performance	.311	.144	2.266 (.023)	Adopted
H2	R&D capability → International marketing activities	.362	.103	3.592 (.000)	Adopted
H3	Network capability → Management performance	-.146	.176	-.832 (.406)	Rejected
H4	Network capability → International marketing activities	.604	.111	5.339 (.000)	Adopted
H5	International marketing activities → Management Performance	.555	.240	2.366 (.018)	Adopted

It was confirmed that a standardized regression coefficient of 0.362 between R&D capability and international marketing activities is a statistically significant relationship (t=3.592>1.96, p=0.000<0.05).

It was confirmed that a standardized regression coefficient of 0.311 between R&D capability and management performance is a statistically significant relationship (t=2.266>1.96, p=0.023<0.05).

It was confirmed that a standardized regression coefficient of 0.604 between network capability and international marketing activities is a statistically significant relationship (t=5.339>1.96, p=0.000<0.05).

It was confirmed that a standardized regression coefficient of -0.146 between network capability and management performance is a statistically significant relationship (t=-0.146>-1.96, p=0.406>0.05).

It was confirmed that a standardized regression coefficient of 0.555 between international marketing activities and management performance is a statistically significant relationship (t=2.366>1.96, p=0.018<0.05).

The focus of this study was to find out whether international marketing activities play a mediating role between R&D capability and management performance and between network capability and management performance. Path analysis for this purpose can elucidate a direct and indirect effect on the variables with a causal relationship. As discussed in the literature review, advance studies have empirically demonstrated that R&D capability, international marketing activities and network capability have a direct effect on management performance.

This study, however, aimed to empirically elucidate that even excellent R&D capability and network capability have a minor effect on management performance if they are not supported by reasonable international marketing activities. For this purpose, it is necessary to compare the direct effect that R&D capability, international marketing activities and network capability have on management performance with the indirect effect that R&D capability and network capability have on management performance with international marketing activities as a mediator.

This study conducted empirical analysis on the assumption that the international marketing activities of Korean ventures play a mediating role between exogenous variable, R&D capability and network capability, endogenous variable, and management performance. This relationship among variables can be verified by direct and indirect effects through a covariance structural model. The direct effect is the degree to which exogenous variables (R&D capability, network capability and international marketing activities) have an effect on the endogenous variable (management performance) directly. On the other hand, the indirect effect is the degree of effect of exogenous variables (R&D capability, network capability) on the endogenous variable (management performance) exerted through a mediating variable (international marketing activities), which is expressed as a squared value of effect between exogenous variables and the mediating variable and between the mediating variable and the endogenous variable. Covariance structural analysis has the advantage of showing effects between variables in each path and whether a mediating role is statistically significant at the same time. Table 5 shows the effects and statistical significance in this analysis of effects.

Total effect is composed of the sum of direct and indirect effects and the greatest effect on management performance was exhibited by international marketing activities (0.555) followed by R&D capability (0.512) and network capability (0.189) Table 5 was verified between the significance levels 0.05 and 0.10.

As the result of disassembling total effect into direct and indirect effects, it turned out there were both direct and indirect effects on R&D capability and management performance.

While network capability has a statistically significant indirect effect on management performance, it has no statistically significant direct effect on management performance, which corresponds with the assertion of the studies by Gulati et al. (2000) and Inkpen and Ross (2001) in that a corporation's creation of value through organizational bonds is not simple at all because if a relationship lasts longer than necessary, it can waste resources and hamper strategic interests of the partner. Nonetheless, the fact that network capability has an indirect effect on management performance through international marketing activities

implies that a corporation should overcome the limitation of resources and enhance management performance with efforts to discover and acquire

international marketing opportunities through partner corporations.

Table 5. The Result of Direct Effects, Indirect Effects, and Total Effect among Variables

		R&D capability	Network capability	International marketing activities
Total effect	International marketing activities	.362**	.604**	-
	Management performance	.512**	.189*	.555**
Direct effect	International marketing activities	.362**	.604**	-
	Management performance	.311*	-.146	.555**
Indirect effect	International marketing activities	-	-	-
	Management performance	.201**	.335**	-

Note: ** $p<0.05$, * $p<0.10$.

V. Conclusion

5.1. Summary and Implications of the Study

The purpose of this study was to explore the relationship among R&D capability, network capability, international marketing activities and management performance of technology-intensive corporations pursuing internationalization (technologically innovative small- and medium-sized corporations, specifically Korean ventures). While recent studies on management performance of Born Globals (BGs) or International New Ventures (INVs) suggest results that R&D capability, network capability, international marketing activities have a direct and positive effect on management performance, this study tried specific effect analysis through SEM while focusing on the mediating role of international marketing activities. This study purpose started from the idea that the creation of synergy is absolutely essential in a global environment where it is difficult for corporations to produce excellent management performance with only capabilities of individual corporations from a resource-based view. Specifically, this study empirically analyzed both a direct effect of independent variables (R&D capability, network capability, international marketing activities) on the dependent variable (management performance) and the indirect effect of exogenous variables (R&D capability, network capability) on an endogenous

variable (management performance) through a mediating variable (international marketing activities). Although studies on the direct effect of the former have been abundantly conducted on Born Globals (BGs) or International New Ventures (INVs), it is true that studies on indirect effect of the latter have been relatively deficient.

For this purpose, this study established 5 hypotheses (3 hypotheses on direct effect, 2 hypotheses on indirect effect) and the results of empirical verifications using IBM AMOS 22 are as follows. First, R&D capability had a statistically positive (+) effect on the management performance of Korean Ventures pursuing internationalization, which corresponds with the assertion of Knight and Cavusgil's study on international new ventures (2004) and empirically confirms that R&D capability for technology-intensive corporations is an important competition tool in the global market. Second, international marketing activities had a statistically positive (+) effect on management performance of Korean ventures pursuing internationalization, which reaffirms the results abundantly verified in management studies that international marketing activities are important for all corporations in global market competition regardless of category of industry and scale of the corporation.

In addition, the effect of international marketing activities was bigger than that of R&D capability (effect of R&D capability =0.512, effect of

international marketing activities =0.555), which implies that even technology-intensive corporations can achieve maximum performance in the global market through active international marketing activities as well as unique technological resources. Third, network capability does not have a significant effect on the management performance of Korean ventures pursuing internationalization, which is a conflicting result among many studies. While Aldrich and Auster (1986), Nerkar and Paruchuri (2005), and Buckley's studies (1999) maintain that type and scale of network have a positive effect on management performance, Gulati et al. (2000) and Inkpen and Ross's studies (2001) claim that a corporation's creation of value through bond or partnership among corporations is not simple at all. That is, since transfer of knowhow between network partners includes ambiguity and interactions between corporations rarely take place through contracts, there are cases in which networks can create unproductive processes and sometimes incidentally include negative aspects of wasting resources (Gulati et al., 2000), or networks may last longer than necessary or can hamper strategic interests of partners (Inkpen & Ross, 2001). In this study, the direct effect of network on management performance was denied. Fourth, it was confirmed to be statistically significant that R&D capability has a positive (+) effect on management performance through the mediation of international marketing activities, which shows that sustained growth can be secured when a corporation can satisfy the needs of the consumers in the market through the cooperation between an R&D department and an international marketing department. The direct effect of R&D capability on management performance (0.311) was bigger than the indirect effect (0.201), which is the result reflecting the Korean ventures' technology-intensive characteristics that place more importance in R&D organization than international marketing organization. Fifth, network capability has a statistically significant positive (+) effect on management performance through the mediation of international marketing activities, which is a very

meaningful result when combined with the result that network capability has no direct effect on management performance. That is, as mentioned before, although attempts to enhance management performance through network capability have various negative aspects, network capability may have an indirect effect on management performance when partnerships with other corporations are used for international marketing activities. In other words, the result implies that though a network may be a means to acquire resources through a technology transfer with partner corporations, it can also work as an important means to enhance management performance of a corporation when used in international marketing activities.

5.2. Study Limitations

Even though this study suggested theoretical and practical implications by empirically analyzing the relationship between R&D capability, network capability and international marketing activities and management performance of Korean technologically innovative small- and medium-sized corporations, several limitations need to be settled.

First, as most studies on Born Globals (BGs) or International New Ventures (INVs) focus on technology-intensive corporations (especially in the field of studies on International New Ventures) this study followed this trend as well. Expansion of the analysis range into general corporations, however, will secure universality through comparison analysis. Second, as a problem frequently appeared in observed variables, this study constructed variables with the ones sufficiently verified in advance studies. Still, literature reviews of preceding studies mostly refer to studies of foreign researchers and so do variables used in empirical analyses.

While this kind of attitude has an advantage in minimizing risk or ambiguity of the study results, it may have a certain limitation in discovering new variables or establishing a new academic area. Therefore, a perspective is deemed to be necessary which can exert a balanced insight. Third, this study simply limited its objects to technologically innovative

small- and medium-sized corporations with revenues from overseas markets without classifying strategic types of internationalization, the reason for which was that it is very difficult to select necessary samples sufficient enough for empirical analysis and that individual corporations are frequently too ambiguous to be classified into a specific type. For example, there may be corporations which are engaged both in export and in foreign direct investment at the same time, and cases with uncertain classifications like joint ventures, international M&As and direct foreign investments need to be minimized. Yet comparison analysis based on strategic types after the expansion of range in corporations and setting up distinct standards of classifying strategic types for internationalization might have a greater meaning.

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An Application of Hofstede's Cultural Dimensions for International Marketing: A Focus on the Distance between Korea and Mongolia

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ABSTRACT

The purpose of this paper is to examine a comparison of culture distance between South Korea and Mongolia with the Hofstede Model. Hofstede's cultural dimensions include power distance, individualism, masculinity, uncertainty avoidance, long-term orientation and indulgence. Although cultural distance has been analyzed using the model among many countries, the Mongolian culture dimension has not been studied yet. Mongolia is an East Asian country; however its culture is nomadic and it is different from the other East Asian countries. Thus, we will introduce a new dimension score for Mongolian culture and examine cultural distance. We focus on only PDI, IDV and IVR. Our study intends to show how Mongolian culture is different from South Korean as well as other East Asian several countries. We hope that our research results will have important implications for those who want to easily understand the dimension of Mongolian cultural distance.

Keywords: cultural distance, Hofstede model, Mongolia and Korean distance
JEL Classifications: M10, M31

I. Introduction

Culture is both stable and changeable (Minkov, 2011). Culture can be one of the most influential behaviors of International Business (IB), especially for market customers and consumers. Furthermore, researching the culture of a nation is very important in understanding the economics of that country. Thus, culture-focused research is gaining greater interest (Mooij & Hofstede, 2010; Shi & Wang, 2011). Several studies have examined and compared cultural distance among over 100 nations (Hofstede, 1984; Bond et al.,

1990; Leung & Bond, 1989; Shi & Wang, 2011). However, there are still nations to be measured against the Hofstede Model. A neighbor to both of China and Russia, Mongolia is a prime example. International companies have a lot to gain with knowledge of Mongolian culture as they expand into Asia. Having knowledge of the target country's culture is vital in having successful business in that country. However, there is no data and no score for Mongolia in Hofstede's culture score matrix. A majority of people assume Mongolian culture is similar to several other East Asian countries, such as South Korea, China and Japan. However, even though Mongolia is a part of Eastern Asia, its culture is nomadic and the lifestyle is different from other East Asian countries. Therefore,

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we try to demonstrate the differences and cultural distances between East Asian countries, especially the differences between South Korea and Mongolia.

Thus, we have attempted to evaluate Mongolia with the Hofstede Model using his original cultural dimensions. As Mongolia's emerging trading partner with ancient cultural ties, we have included South Korea in the analysis to give it further depth. We hope the result of this paper has important implications for those who want to understand the dimensions of Mongolian culture.

Our paper consists of the following sections. First, we will give brief introduction on Hofstede's Model (cultural dimensions). Second, we will use Hofstede's formulas for index calculation through information derived from the Values Survey Module 2013. Third,

we will present the results of the derived score matrix and calculate cultural distances for PDI, IDV and IVR between South Korea and Mongolia by using the CD (Cultural Distance) formula. Thus, we have compared South Korea, Mongolia, China and Japan in PDI, IDV an IVR. At the end, there will be a short conclusion on the findings.

II. Brief Introduction to the Hofstede Model

Researcher and Professor Geert Hofstede introduced one of the most important and comprehensive studies of how values in the workplace are influenced by culture. He compared the answers of

Table 1. Six Dimensions of Culture Measurement in Hofstede Model

The First Four Public Dimensions	
Power Distance Index (PDI) The extent to which the less powerful members of organizations and institutions (like in a family) accept and expect that power is distributed unequally.	**Masculinity (MAS) (masculinity vs femininity)** Masculinity: the dominant values in society are achievement and success. Femininity: the dominant values in society are caring for others and quality of life.
Individualism (IDV) (individualism vs collectivism) Collectivism: people belong to groups who look after them in exchange for loyalty Individualism: people only look after themselves and their immediate family.	**Uncertainty Avoidance Index (UAI)** The extent to which people feel threatened by uncertainty and ambiguity and try to avoid such situations.
The Fifth Dimension	*The Sixth Dimension*
Long Term Orientation (LTO)(long versus short term orientation) Long- term oriented societies foster pragmatic virtues oriented towards future rewards, in particular saving, persistence, and adapting to changing circumstances. Short-term orientation is respect for tradition, fulfilling social obligations and protecting one's face.	**Indulgence (IVR) (indulgence versus restraint)** Indulgence: for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. Restraint: for a society that suppresses gratification of needs and regulates it by means of strict social norms.

Source: www.geerthofstede.eu and Smith (2014).

117,000 IBM [1] matched employee samples on the same attitude survey in different countries between 1967 and 1973. The data covered more than 70 countries, from which Hofstede first used the 40 countries with the largest groups of respondents and

afterwards extended the analysis to 50 additional countries and 3 regions. Hofstede's six cultural dimensions are Power Distance, Individualism vs Collectivism, Masculinity vs Femininity, Uncertainty Avoidance, Long- and Short-Term Orientation and Indulgence vs Restraint (see Table 1). The first public version was issued in 1982 (VSM 82) and contained four dimensions, which were widely used for twelve years. The next version, published in 1994 (VSM 94), contained an additional dimension (see Table 1). It was

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[1] The International Business Machines Corporation (IBM) is an American multinational technology and consulting corporation with headquarters in Armonk, New York, United States. IBM was founded in 1911. IBM manufactures and markets computer hardware and software, and offers infrastructure, hosting and consulting services in areas ranging from mainframe computers to nanotechnology.

developed as a result of the findings in a comparison of students in 23 countries using a questionnaire mainly designed by Chinese scholars. The sixth dimension was derived from Minkov's analysis of 81 countries in 2007. Further, the Value Survey Module (VSM) was updated in 2008 and 2013.

III. Formulas for Index Calculation and Derived Score Matrix of Mongolia

First, this study used the Values Survey Module 2013 (VSM 2013) for the calculations of comparing national samples. VSM 2013 is a 30-item paper questionnaire developed for comparing culturally-influenced values and sentiments of similar respondents from two or more countries. This case focuses on the comparing South Korean and Mongolian cultures of PDI, IDV and IVR. The index of South Korea already exists in Hofstede's cultural dimension score matrix. Therefore, we only needed to derive cultural dimension scores for Mongolia. VSM 2013 allows scores to be computed for six dimensions of national culture on the basis of four questions per dimension; thus, it counts 6 * 4, equaling 24 content questions. The other six questions ask for demographic information: the respondent's gender, age, education level, kind of job, present nationality and nationality at birth. First, we gathered 241 respondents from Mongolia from June 1, 2015 to June 15, 2015, including company workers and university faculty and staff. We selected just 23 respondents because we needed data for respondents with the same age, gender, division, education level and occupation (see Table 2). Second, we searched for additional respondents with the selected age, gender division, education level and occupation and found 39 respondents from June 22, 2015 to July 06, 2015. However, this number was reduced to 31 because nine respondents gave at least one invalid answer (i.e. did not answer one or more question or erred in demographic information). In total, 54 respondent questionnaires were found to be valid.

Table 2. Demographic Information of Respondents

Gender	Female
Age	30-39
Education year	14-17
Occupation level	Academically trained professional or equivalent (but not a manager of people)
Present nationality	Mongolia
Nationality of birth	Mongolia

Index formulas use to calculate each dimensions are:

Power Distance Index (PDI)

PDI=35(m07-m02) + 25(m20-m23) + C (pd)

m= mean score, in which m07 is the mean score for question 07, m02 is the mean score for question 02, and m20 and m23 are the mean scores for question 20 and 23. C (pd) is a constant; it does not affect the comparison.

Individualism Index (IDV)

IDV=35(m04-m01) + 35(m09-m06) + C (ic)

m= mean score, in which m04 is the mean score for question 04, m01 is the mean score for question 01, and m09 and m06 are the mean scores for question 09 and 06. C (ic) is a constant; it does not affect the comparison.

Indulgence vs Restraint Index (IVR)

IVR=35(m12-m11) + 40(m17-m16) + C (ir)

m= mean score, in which m12 is the mean score for question 12, m11 is the mean score for question 11, m17 is the mean score for question 17 and m16 is the mean score for question 16. C (ir) is a constant; it does not affect the comparison.

IV. Result of Cultural Distance between South Korea and Mongolia

Table 3 presents the score of the six dimensions of cultural distance between South Korea and Mongolia.

Table 3. South Korea and Mongolia Cultural Dimensions

|	PDI	IDV	IVR
South Korea	60	18	29
Mongolia	8	6	56

Source: www.geerthofstede.eu and data of derived from
VSM 2013 in Mongolian sample.
Note: PDI: Power Distance, IDV: Individualism vs
Collectivism, IVR: Indulgence vs Restraint.

According to the data in Table 3, the first line index of South Korea exists in Hofstede's cultural dimension score matrix. The second line index of Mongolia is what we derived from the data of the Value Survey Model 2013 in the Mongolian sample and calculated with the above formulas. However, we found only three dimension scores in Mongolia. Due to errors, the other three scores are yet not available yet to present.

South Korea has a 60 whereas Mongolia has a 9 in PDI; South Korea has an 18 whereas Mongolia has a 6 in IDV and South Korea has a 29 in IVR whereas Mongolia has a 57. South Korea ranks higher than Mongolia in PDI and IDV; however, in terms of IVR, Mongolia ranks higher.

We can see differences of South Korea and Mongolia when compared with the mean. Fig. 1 presents a vivid illustration.

Fig. 1. South Korea and Mongolia according to Hofstede's Cultural Dimensions
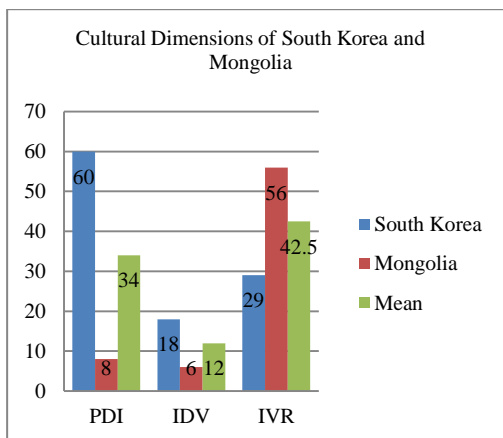
Source: www.geerthofstede.eu and data derived from
VSM 2013 in the Mongolian sample.

Finally, we needed to find Cultural Distance (CD) through Table 3. In this case we used the data of PDI, IDV and IVR between South Korea and Mongolia.

$$CD = \sqrt{\sum_{i=1}^{3} (TCSV_i - BCSV_i)^2} = \sqrt{3577} \approx 59.8 \approx 60$$

Where CD shows cultural distance, TCSV shows target country value score on dimension i, BCSV shows baseline country value score on dimension i.

The results show that South Korean and Mongolian Cultural Distance is 59.8 points of approximately 60 points.

If CD points are higher, it means culture distance is high; if the points have lower mean, culture distance is low (CD between 0-100 points). The results show a high difference in South Korean and Mongolian cultural distance.

Additionally, we show a comparison of Cultural Distance and Cultural Dimensions between Mongolia, South Korea, China and Japan (see Table 4 and 5; Fig. 2 and 3).

Table 4. Cultural Distance of Compare

Countries	Cultural Distance (CD)
Mongolia vs S. Korea	60
Mongolia vs Japan	63
Mongolia vs China	80
S. Korea vs Japan	31
S. Korea vs China	21
Japan vs China	41

Source: Hofstede's cultural dimension score matrix and
derived from VSM 2013 in Mongolian sample.

Fig. 2. Cultural Distance Comparison
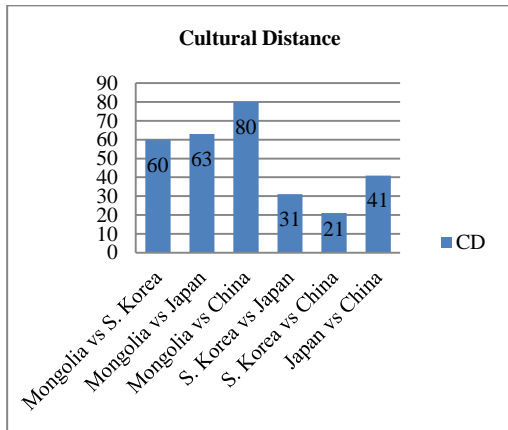
Source: Hofstede's cultural dimension score matrix and derived from VSM 2013 in Mongolian sample.

Table 5. Cultural Dimensions of East Asian Countries

	PDI	IDV	IVR
South Korea	60	18	29
Mongolia	8	6	56
China	80	20	24
Japan	54	46	42

Note: PDI: Power Distance, IDV: Individualism vs Collectivism, IVR: Indulgence vs Restraint.

Fig. 3. Cultural Dimensions of East Asia
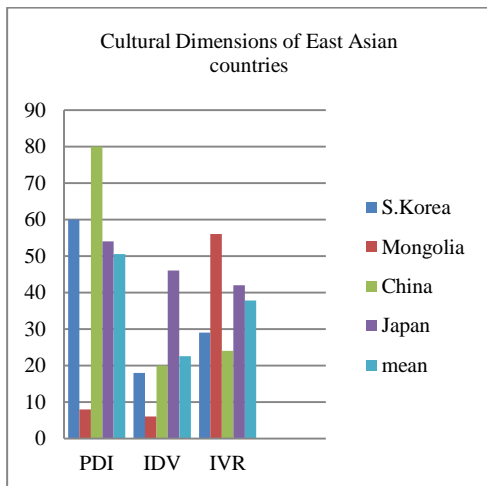
Source: www.geerthofstede.eu and data derived from VSM 2013 in the Mongolian sample.

We can see differences of Mongolian culture compared with the South Korea, China and Japan.

However, South Korea, China and Japan are similar culture.

V. Conclusion

The previous analyzed data from the Hofstede culture score matrix (see Table 3) has shown clear difference between South Korea and Mongolia. It is evident in three areas. 1) South Korea has a higher score than Mongolia in PDI (60:8). This means South Koreans are more accepting of powerful members of organizations and institutions than Mongolians. For example, Korean employees cannot express their opinions freely towards their superiors when they are not at fault. On the other hand, Mongolian employees are free to express their views in the work place and their views are valued. 2) South Korea has a slightly higher IDV score than Mongolia (18:6). Both South Korea and Mongolia lean heavily toward collectivism; however, Mongolia tends to be more collective than South Korea. For example, one of the main factors in Mongolian nomadic life is the traditional accommodation the ger. Several generations of the same family still live together in the ger. This is this juxtaposition of the old and new, combined with the unfailing hospitality of all Mongolians. 3) However, in the IVR dimension, Mongolia scored higher than South Korea (56:29). It can be seen that Mongolia is relatively free and has a more enjoyable life than in South Korea. An example of this cultural difference between South Korea and Mongolia is the typical philosophy the people of each culture follow. South Koreans tend to believe that the lifestyle that they should have focused on earning money, getting married and raising children; there are not many options apart from that. However, Mongolians are more interested in enjoying their time and being free in their decisions.

According to my experience, most Korean people have thought there are similar cultures in East Asian several countries such as Japan, China and Mongolia. In this study we found evidence that Mongolian culture is different (see Table 5). Also, according to the

calculation results of the CD (Cultural Distance) formula, approximately 60 points are shown to be the difference between South Korea and Mongolia. The conclusion of this study can be shown to demonstrate the difference of South Korean and Mongolian cultural distance.

Going forward, we recommend different research about the culture and the culture of business, such as investment, marketing and management as necessary to find out whether these affect the economy in South Korea, Mongolia and other countries. We will derive other culture dimensions such as MAS, UAI and LTO between South Korea and Mongolia.

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Antecedents and Consequences of Export Intermediaries' Customer Orientation: Conceptualization and Propositional Development

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ABSTRACT

Export Intermediaries involve transactions with exporters and importers, both of which are these intermediaries' customers. Therefore, dyadic perspectives implicit in conventional theories of customer orientation should be revised to apply to a triadic relationship framework in indirect export contexts. The present manuscript proposes that an export intermediary's customer orientation consists of summated customer orientation (customer orientation toward both the exporter and importer sides) and asymmetrical customer orientation (customer orientation in favor of the exporter relative to the importer side), and examines the antecedents and outcomes of these orientations. It is posited that importer- (exporter-) side concentration increases summated customer orientation and asymmetrical customer orientation toward exporters (importers). It is also posited that these positive effects are weaker when importers and exporters interact directly versus indirectly and are stronger when the offering prices vary versus remaining stable during negotiations. Finally, it is posited that summated customer orientation increases export intermediaries' performance by itself and in conjunction with customer concentration, but asymmetrical orientation enhances their performance only interaction with customer concentration.

I. Introduction

Export intermediaries attract two or more groups of customers that occupy distinct functional roles (e.g., exporters and importers). Therefore, indirect exporting is distinct from typical inter-firm relationships (e.g., direct exporting), in which the interaction between an exporter and an importer is not a condition for value generation.

A fundamental marketing challenge for conventional inter-firm relationships stems from the complexity associated with managing different customer sides with distinct, even conflicting, demands. Because customers are the "lifeblood" (Gupta & Lehmann, 2005, p.2) of any organization, customer orientation is the rudimentary mechanism for attracting customers (Kirca, Jayachadran, & Bearden, 2005; Kumar et al., 2011; Narver & Slater, 1990).

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Nonetheless, extant research has little systematically addressed how export- intermediaries manage their customers. Thus, drawing on the theory of customer orientation, the present study attempts to explicate the nature, antecedents, and consequences of export intermediaries' customer orientation.

Customer management on conventional inter-firm relationships typically differs from that in dyadic relationships. In a dyadic exchange, an importer is the only customer of an exporter. A triadic exchange system, however, involves an exporter side, an importer side, and the intermediary (Hagiu & Wright, 2014). The export-intermediary plays the roles of attracting and retaining quality participants on both sides, thereby facing an intricate customer management task. The export-intermediary should establish its customer orientation toward both sides because its success relies heavily on continued patronage by both (Evans, 2008). In addition, just as is true of any inter-firm structure (Geyskens, Steenkamp, & Kumar, 2006; Shervani, Frazier, & Challagalla, 2007), so the export-intermediary and its customers are interdependent, thereby influencing the export-intermediary's customer orientation. For example, confronted by forceful players on one side of the market, an export-intermediary may tend to reveal differential degrees of customer orientation toward the two sides of its market. Based on these two complexities, the current study presents a two dimensional conceptualization of customer orientation comprised of summated customer orientation and asymmetrical customer orientation. On one hand, summated customer orientation is the degree to which an export-intermediary engages in endeavors to understand, serve, and satisfy its customers, regardless of their affiliation with importer- or exporter- sides. It thus reflects the premise that an export-intermediary should satisfy the needs of both importers and exporters, which are both customers of the export-intermediary (Hagiu, 2007; Rochet & Tirole, 2006). On the other hand, asymmetrical customer orientation is the degree to which the export-intermediary understands, serves, and satisfies one customer side

more than the other. This notion represents the likelihood that some export-intermediaries focus their customer-endeavors more on one side of the export marketplace than on the other.

To develop a model that explains the antecedents and outcomes of this proposed customer orientation structure, the present study builds on power dependence theories pertaining to inter-firm relationships (Frazier, 1983; Kumar, Scheer, & Steenkamp, 1995). The current study depicts how export-intermediaries manage their dependence on powerful importers (and exporters) both by appeasing the powerful partners and by balancing their reliance on the forceful partners (Emerson, 1962). For antecedents, the present study posits that export-intermediaries nurture their summated customer orientation and asymmetrical customer orientation according to their perceived dependence on both sides of the export-market. In accordance with inter-firm relationship research (e.g., Ghosh, Dutta, & Stremersch, 2006; Kashyap, Antia, & Frazier, 2012), the current study also posits that certain attributes of intermediary-based exchange process, such as uncertainty and switching costs, moderate the impact of an export-intermediary's dependence on its customer orientation. In terms of consequences, the present study posits that both components of export-intermediaries' customer orientation support intermediary performance, contingent on the dependence considerations at hand.

Inter-firm relationships are proliferating. Nevertheless, research in marketing on this theme has only just begun to emerge (Grewal, Chakravarty, & Saini, 2010; Kaplan & Sawhney, 2000; Sridhar et al., 2011). The current study may contribute to the literature of marketing by depicting export-intermediaries' customer practices. Even though customer orientation is often essential to any exchange and represents "a central doctrine" (Lusch & Laczniak, 1987, p.1) in marketing, it is little explored for export-intermediaries (Gawer & Cusumano, 2008; Rochet & Tirole, 2006). In addition, the present study adds to the inter-firm relationship literature by underscoring the relevance of power-dependence theories to customer

orientation in intermediary-based exchange. Unlike extant studies (e.g., Chakravorti & Roson, 2006; Rochet & Tirole, 2006), the present study explains the complicated interplay of an export intermediary's customer management endeavors and theoretically prominent attributes of the intermediary-based exchange process. For export intermediaries, the current study also describes how and when customer orientation creates value in intermediary-based exchange (Kirca, Jayachandran, & Bearden, 2005; Kumar et al., 2011).

II. The Nature of Export Relationships

Export relationships are more likely to involve interimistic relational exchange than an enduring relational one. Interimistic relational exchange refers to a close, collaborative, fast-developing, and short-lived exchange relationship wherein firms pool their resources to address a transient business opportunity and/or threat (Lambe, Spekman, & Hunt, 2000). Export relationships feature distinct characteristics. First, exporters often develop close relationships with export intermediaries for their long-term success. Export intermediaries represent an additional layer of communication between exporters and overseas importers. If the relationship between an exporter and an export-intermediary is characterized by poor communication, the exporter's learning in regard to crucial export-market factors might be hindered (Cavusgil, Yeoh, & Mitri, 1995; Shipley, Cook, & Barnett, 1989). Second, export intermediary-based relationships can be collaborative relationships because they require relatively high degrees of cooperation, adaptation, and joint planning (Lambe, Spekman, & Hunt, 2000). If an exporter and an importer view their relationship as an arms-length transaction, rather than a cooperative relationship, the exporter would have little control in the export market (Bello, Chelariu, & Zhang, 2003; Rosson & Ford, 1982). Third, export relationships are often fast-developing. They do not engage in shared equity and may be easier to revise, reorganize, or terminate (Varadarajan & Cuningham,

1995). Fourth, export relationships are typically short-lived. They often last only as long as the time it takes a firm to enter a new export market and become familiar with it (Day, 1995). Fears of a short-lived export relationship might lead parties to make fewer idiosyncratic investments in that the relationship may not last long enough to provide a payback on these investments (Bucklin & Sengupta, 1993; Heide & John, 1990; Stump & Heide, 1996). Accordingly, partners in an export relationship may aim to keep idiosyncratic investments at the minimum essential to functional exchange (Lambe, Spekman, & Hunt, 2000).

III. Conceptualization

3.1. Customer Orientation of Export Intermediaries

In line with prior studies (e.g., Jaworski & Kohli, 1993), the present study defines customer orientation as the extent to which an export-intermediary attempts to understand, serve, and satisfy customers' (exporters' and importers') needs. In the context of an exporter-export intermediary relationship, customer orientation involves tailoring trading interfaces, technical help lines, and work-flow support systems to meet the certain needs of importers and exporters (Archer & Gebauer, 1999). To delineate export-intermediaries' customer orientation, the current study builds on relationship marketing constructs such as inter-firm dependence (Kumar, Scheer, & Steenkamp, 1995) to present two separate elements of customer orientation: summated customer orientation and asymmetrical customer orientation.

Summated customer orientation refers the degree to which the behavior of an export-intermediary is geared toward understanding, serving, and satisfying the needs of both importers and exporters. This perspective evaluates the export-intermediary's orientation toward both importers and exporters collectively and reflects a view of export relationships as an "interdependent" (Kumar, Scheer, & Steenkamp, 1995, p.348) exchange. Interdependence occurs

because the export-intermediary counts on both importers and exporters for revenues, thus maintaining customer orientations toward and offering transaction efficiencies to both sides (Bakos, 1991; Wang & Benaroch, 2004). Because the appeal of an export-intermediary to a prospective participant on each side relies partly on the quality of the trading partners on the other (Evans & Schmalensee, 2010), export-intermediaries should foster customer orientations toward both exporters and importers.

Asymmetrical customer orientation represents the degree to which an export-intermediary understands, serves, and satisfies one side more than the other. In effect, inter-firm dependence encourages firms to engage with customers primarily and can involve asymmetrical positions on the part of the firms involved. Gupta and Lehmann (2005) contend that various customers provide different "performance value" to a firm, which would be factored into the firm's decisions of customer orientation. In particular, different sides of an export-intermediary reveal distinct attributes, which might dictate different degrees of the export-intermediary's customer endeavors (Pavlou & El-Sawy, 2002). Previous studies (e.g., Anderson et al., 2001; Anderson & Jap, 2005; Chatterjee & Ravichandran, 2004; Dagenais & Gautschi, 2002) have suggested that a firm's intent to invest resources in an inter-firm relationship enhances as the focal partner becomes more dependent on it and, therefore, becomes easier to manage. Accordingly, an export-intermediary might align itself more toward the side of the market on which it is less dependent.

3.2. Antecedents of Customer Orientation

Because export-relationships represent a system of dependence relationships, the current study depends crucially on power-dependence theories (Emerson, 1962) to identify the export-intermediary's dependence on participants as a critical antecedent of its customer orientation. A measure of dependence in inter-firm contexts can be market concentration: unlike less-concentrated markets, more concentrated markets are dominated by larger players (Pfeffer & Salancik, 1978).

In an export-intermediary context, exporter (importer) concentration is the degree to which the export-intermediary's business disperses across either exporters or importers; as the number of either exporters or importers decreases, or their sizes increase, market concentration increases. When the concentration of either importers or exporters increases, the export-intermediary becomes more dependent on them. In this respect, the current study that draws on extant studies that recognize the relevance of market concentration to market orientation (e.g., Jaworski & Kohli, 1993; Ramani & Kumar, 2008) expects dependence considerations to lead to an export-intermediary's customer orientation decisions.

Beyond the direct dependence-based effect of exporter- (importer-) side concentration on an export-intermediary's customer orientation, the present study refers to contingency frameworks in the inter-firm literature (Kim et al., 2011; Rindfleisch & Moorman, 2003) in order to predict that export intermediary-distinctive contextual attributes − which are also regarded as critical descriptors of an export-intermediary's business model in literature (Bakos, 1991; Pavlou & El-Sawy, 2002) − moderate the effect of exporter (or importer) concentration. These contextual attributes are one- and two-sided matching processes, dynamic and static pricing, and export-intermediary transaction fee structure. Specifically, research on the inter-firm relationship has highlighted the importance of incorporating these attributes in an export-intermediary system. Transaction cost analysis (Williamson, 1996), agency theory (Alchian & Demsetz, 1972), and marketing literature (Heide, 1994) elaborate three typical exchange conditions − performance ambiguity, export market uncertainty, and switching costs − that are predicted to affect an export-intermediary's customer management endeavors. The present study posits that these three conditions are disclosed as one- and two-sided matching, dynamic and static pricing, and transaction fee structures, respectively, on export-intermediaries.

Performance ambiguity is defined as an export-intermediary's inability to measure the quality of an

exchange partner's abilities, motivations, and offerings (Geyskens, Steenkamp, & Kumar, 2006; Ouchi, 1980). In the context of export relationships, a specific sort of performance ambiguity problem occurs in the form of one- and two-sided customer matching processes. On one respect, one-sided matching allows importers and exporters to negotiate indirectly or anonymously through the export-intermediary interface without disclosing their identities to each other. On the other respect, two-sided matching encourages importers and exporters to interplay directly and know each other's identities. Therefore, ambiguity is higher for one-sided than for two-sided matching processes.

Export market uncertainty represents turbulence in the decision environment that makes it difficult to predict future status or performances of a given exchange (Anderson, 1985). The current study defines uncertainty as dynamic and static pricing arrangements. Static pricing entails offerings sold at fixed prices, while dynamic pricing involves changing prices. Price changes are typcially a visible form of uncertainty to parties and indeed compose a key factor of any intermediary's business model (Haruvy & Jap, 2012). Dynamic pricing generates uncertainty about actual prices and participants' individual outcomes. Whereas importers perceive a greater risk of overpaying, exporters fear not getting the desired magnitude for their offerings. The likelihood that some parties collude to manipulate prices also cannot be ruled out with dynamic pricing (Kauffman & Wood, 2005).

Switching costs is defined as the costs incurred to replace a focal offering, brand, or exchange partner (Dubé, Hitsch, & Rossi, 2010; Monteverde & Teece, 1982). Prior research (e.g., Day, Fein, & Ruppersberger, 2003) has identified a key manifestation of switching costs in an export-intermediary setting—the proportion of transaction-driven fees. The amount of fixed fees can be a metric for switching costs. Nonetheless, scaling fixed fees by the whole of fees offers a comparable metric of switching costs for firms of distinctively different sizes in various industries in the reason that firms vary in their operations, size, and resources (Adebanjo, 2010).

Fees charged by export-intermediaries can entail transaction-based fees that vary with the degree of activity of the importer or exporter and fixed fees, such as for subscriptions or licenses that importers and exporters pay for the right to participate as the export-intermediary. As the proportion of fixed elements increases, participants face gradually greater switching costs in the reason that if they changed export-intermediaries, they would sacrifice the subscription fee. Nevertheless, as the proportion of transaction-based fees increases, switching costs decreases (Kambil & Van Heck, 2002).

IV. Propositions

Because of increasing importer concentration, each individual importer embodies a more considerable share of the transactions on the export-intermediary, which then becomes gradually more dependent on fewer importers. In effect, the export-intermediary is vulnerable to concentrated importers that are in a position to wrest specific concessions from it (Kumar, Heide, & Wathne, 2011; Palmatier, Dant, & Grewal, 2007). One approach to manage powerful partners is to appease them through further inducements or exchange benefits (Cook et al., 2013). These benefits lower a focal firm's relative dependence on a forceful partner in the fact that partners that abuse their power stand to lose these benefits in the event that the focal party terminates the relationship (Emerson, 1962). Therefore, an export-intermediary might manage its dependence on concentrated importers by increasing its summated customer orientation (McIvor & Humphreys, 2004). For instance, the export-intermediary may construct a superior returns system particularly for the forceful importers by keeping customer orientation constant on the exporter side. Otherwise, it might invest in market-wide infrastructure, which can simultaneously benefit both sides. By fostering favorable market perceptions of its customer orientation, the export-intermediary not only appeases importers but also attracts and retains quality exporters, which is a crucial benefit importers seek.

Therefore, increasing importer concentration should improve an export-intermediary's reliance on summated customer orientation as a dependence management strategy. Therefore, it is posited that:

P1a: As importer (exporter) concentration increases, the export-intermediary's summated customer orientation increases.

The matching process should moderate the effect of exporter (importer) concentration on summated customer orientation. In other words, importers profit from lower degrees of ambiguity regarding exporters in a two-sided matching process than they do in a one-sided matching. In this regard, the present study predicts that two-sided matching leads to more predictable transaction experiences for importers than a one-sided matching process (Haruvy & Jap, 2012; Niederle, Roth, & Sonmez, 2008). To the extent that importers value such predictability in transactions (Anderson, 1985; Ouchi, 1980), even with increasing importer concentration, importers are less likely to exploit the export-intermediary's dependence for a two-sided rather than for a one-sided matching process. Therefore, the export-intermediary's need to engage in dependence management actions, by fostering greater summated customer orientation in response to heightening importer concentration, should be lower for two-sided than for one-sided matching processes. Thus, it is posited that:

P1b: The positive effect of importer (exporter) concentration on summated customer orientation is smaller for a two-sided matching than for a one-sided matching process.

A dynamic price discovery process involves greater export market uncertainty for importers than a static process (Choudhury, Hartzel, & Konsynski, 1998; Lee, 1998). Therefore, importers should be more reluctant to participate in export markets with dynamic pricing than in those with static pricing. From the export-intermediary's perspective, such reluctance is more consequential with increasing importer concentration. In particular, given an export-intermediary's increasing dependence on importers as importer concentration increases, the reluctance of these importers to participate in the export-intermediary can severely hinder the export-intermediary's performance. Extant research (e.g., Buvik & John, 2000; Foss & Laursen, 2005; Gatignon & Anderson, 1988) has presented how uncertainty can aggravate the detrimental impacts of dependence on performance. For a dependence management strategy, an export-intermediary should increase its summated customer orientation to a greater degree with increasing importer concentration when price discovery is not static but dynamic. Therefore it is posited that:

P1c: The positive effect of exporter (importer) concentration on summated customer orientation is larger for a dynamic than a static price discovery process.

Transaction-driven fees catch the level of lock-in faced by the export-intermediary's customers. As their proportion increases and the share of fixed fees diminishes, an importer's cost of switching to another intermediary decreases (Day, Fein, & Ruppersberger, 2003; Wang & Benaroch, 2004). With increasing importer concentration, the export-intermediary's reliance on importers increases. Such importers are all the more in a position to exploit the export-intermediary's dependence without fearing significant consequences as the switching costs they face decrease (Bakos, 1991; Ganesan et al., 2010). Accordingly, both increasing importer concentration and decreasing switching costs could heighten the export-intermediary's dependence on importers. In this regard, the joint effect of increasing importer concentration and decreasing switching costs should be to heighten the export-intermediary's reliance on summated customer orientation as a dependence management strategy. Thus, it is posited that:

P1d: The positive effect of importer (exporter) concentration on summated customer orientation increases with the proportion of transaction-driven fees.

Export-intermediaries invest in customer orientation toward both importer and exporter sides. Nevertheless, investments made on each side of the marketplace involve "localized" and "tacit" content (Citrin, Wuyts, & Rindfleisch, 2007, p.9) tailored to each specific side. Export intermediaries make separate customer orientation investments on importer and exporter sides. The substantial amount of these investments is specialized to the side in question. Nonetheless, it is unclear whether greater investments should focus on the importer side or the exporter side when importer concentration increases. The present study discusses this issue of asymmetrical orientation. First, as importer concentration increases, the export intermediary's dependence on importers increases as well, which, in turn, increases the possibility that importers will extract undue concessions from the export-intermediary. In effect, increasing customer orientation efforts toward the importer side could appease importers. Nevertheless, it generates a risk of unintentionally deepening the export-intermediary's dependence on the importers even further because of the idiosyncratic customer orientation investments toward the importer side, which locks in the export-intermediary with the importers (Hart & Saunders, 1997; Williamson, 1996). Although such investments can produce favorable relationship outcomes, they could also be exploited, specifically when the partner in question is forceful to begin with (Anderson & Weitz, 1992; Heide & John, 1988; Rokkan, Heide, & Wathne, 2003). Accordingly, as importer concentration increases, increasing customer orientation − though beneficial in terms of appeasing the powerful importers − might by itself be little sufficient for managing dependence.

Emerson (1962) proposes that a constitutional strategy to manage forceful partners is balanced dependence, which entails the "diffusion of dependency into new relations" (p.37) by reinforcing relationships with other parties in the inter-firm network. Bacharach and Lawler (1981) explain experimentally that power-disadvantaged actors tend more to involve balanced dependence over appeasement actions toward a powerful partner (Lawler & Yoon, 1993). Skinner and Guiltinan (1986) present similar results in a marketing channels context. Furthermore, Bae and Gargiulo (2004) indicate that instead of appeasing powerful allies, firms actively invest in third-party relationships to gain "indirect leverage" (p.843) on the forceful partners and are better off following such balanced dependence initiatives. Anderson and Coughlan (2002) suggest that salespersons accomplish leverage over forceful principals by fostering "strong ties with the principal's customers" (p.238), viewed as a "key element" (p.240) of any strategy of dependence management.

In line with these views, the current study proposes that an export-intermediary can effectively manage its dependence, even with increasing importer concentration, by purposely investing more on the exporter side than on the importer side. To the degree that the exporter-side customer orientation efforts are tailored to exporters, these investments are likely to be viewed by exporters as valuable benefits and credible signals of the export-intermediary's seriousness toward exporters (Anderson & Weitz, 1992; Rokkan, Heide, & Wathne, 2003). Thus, exporter-side customer investments should bond exporters with the export-intermediary and limit importers' access to these exporters through alternative avenues (Kaplan & Sawhney, 2000). In this regard, even as importers' concentration increases, to the degree that the importers desire continued access to the exporters, importers tend less to exploit the export-intermediary's dependence. In accordance with this argument, Heide and John (1988) indicate that manufacturer agents balance dependence on forceful suppliers by bonding with downstream importers. Bensaou and Anderson (1999) discuss the role of importer-idiosyncratic investments in counteracting forceful exporters in

export markets. In an export-intermediary context, export-intermediaries pay more attention to one side of the export marketplace with the willingness of managing the marketplace effectively (Manchanda & Chu, 2013; Wang & Benaroch, 2004). Therefore, it is posited that:

P2a: As importer concentration increases, the export-intermediary firm's asymmetrical customer orientation toward exporters relative to importers also increases.

The matching process entails performance ambiguity (Ouchi, 1980) and should moderate the impact of importer concentration on asymmetrical customer orientation in that the dependence-balancing strategy of bonding exporters to the export-intermediary can be more effective for one-sided than for two-sided matching processes. Without the direct importer-exporter interplays that are available in a two-sided matching process, exporters typically experience greater ambiguity on importer credentials and motivations with one-sided than with two-sided matching (Gebauer & Mahoney, 2014; Pavlou & El-Sawy, 2002). Accordingly, exporters should value the export-intermediary's customer orientation endeavors more for a one-sided than for a two-sided matching process. In addition, export-intermediaries' customer orientation ones likely prove more effective at attracting and retaining exporters with one-sided than with two-sided matching. In effect, export-intermediaries tend less to engage in asymmetric orientation in favor of exporters for balanced dependence purposes with two-sided matching than with one-sided matching. Thus it is posited that:

P2b: The positive effect of importer concentration on asymmetrical customer orientation toward exporters relative to importers is weaker when the matching process is two-sided versus one-sided.

Compared with a static price discovery process, exporters face greater uncertainty in an exchange with a dynamic price discovery process (Anand & Aaron, 2003; Wang & Benaroch, 2004) and thus tend more to suspect opportunistic importer behavior (Carter & Stevens, 2007). This is especially true as importer concentration increases and importers become progressively more dominant relative to exporters (Jap, 2003/2007). Thus, compared with a static price discovery process, exporters should value the export-intermediary's customer orientation endeavors more under dynamic price discovery because such endeavors point out the export-intermediary's readiness to protect exporters' interests. The export-intermediary's motivation to balance its dependence on concentrated importers by bonding with exporters through asymmetrical customer orientation favoring exporters then should be greater with dynamic than with static price discovery. Therefore, it is posited that:

P2c: The positive effect of importer concentration on asymmetrical customer orientation toward exporters relative to importers is larger when the price discovery is a dynamic process in contrast to static one.

As the proportion of transaction-driven fees decreases and the share of fixed fees increases, switching costs for participants would increase. In this respect, given increasing importer concentration, the need for the export-intermediary to balance its dependence on importers by cultivating greater asymmetrical customer orientation toward exporters decreases because importers are increasingly locked in with the export-intermediary due to their rising switching costs. If such importers were to exploit the export-intermediary's reliance in the face of increasing switching costs, the export-intermediary could retaliate in consequent interactions and impose consequences (Antia & Frazier, 2001; Axelrod, 1984). Nonetheless, as the proportion of transaction-driven fees increase and the share of fixed fees reduces, switching costs for participants decline. In this situation, given increasing

importer concentration, importers are increasingly in a position to exploit the export-intermediary's dependence, thereby heightening the export-intermediary's need for dependence balancing through increased customer orientation efforts toward exporters. Thus, it is posited that:

P2d: The positive effect of importer concentration on asymmetrical customer orientation toward exporters relative to importers increases as the proportion of transaction-driven fees increases.

To explore the performance implications, the current study links export-intermediaries' customer orientation to intermediary performance, or the extent to which the export-intermediary meets its financial and strategic objectives. Specifically, the present study explores whether export-intermediaries that craft their customer orientation structure in a manner of the hypotheses experience superior performance.

In terms of summated customer orientation, previous studies have argued and empirically assessed a positive relationship between customer orientation and firm performance (e.g., Homburg, Muller, & Klarmann, 2011; Narver & Slater, 1990; Voss & Voss, 2000). In accordance with these studies, the current study contend that an export-intermediary's customer orientation involves a variety of resource-investments that are tailored to a specific side of the export-intermediary. These customer-oriented efforts offer important transaction utilities to parties while also signaling the export-intermediary's supportive intentions toward participants. Accordingly, a greater summated customer orientation of the export-intermediary should reduce its customer retention costs and increase the value, such as sales, profits, it derives from customers (Gupta & Lehmann, 2005; Kumar & Reinartz, 2012), leading to enhanced export-intermediary performance. Therefore it is posited that:

P3: An increase in an export-intermediary firm's summated customer orientation enhances its performance.

Export-intermediaries can manage their dependence on powerful importers by offering incremental transaction efficiencies through increased summated customer orientation. If increasing summated customer orientation in conjunction with increasing importer concentration truly facilitates an export-intermediary's ability to manage dependence, the export-intermediary should have superior performance. Resource dependence theory (Pfeffer & Salancik, 1978) proposes that unilateral dependence leads a firm to vulnerability to exploitation (Gilliland, Bello, & Gundlach, 2010), whereas bilateral dependence enhances exchange performance (Palmatier, Dant, & Grewal, 2007). Kumar, Scheer, and Steenkamp (1995, p.349) maintain that proportionate dependence "discourages conflict" and thereby the interests of the parties become convergent. Accordingly, to the level that the joint effect of an increase in summated customer orientation and importer concentration promotes dependence management, it should enhance export-intermediary performance. Thus, it is posited that:

P4: The joint effect of export-intermediary summated customer orientation and importer concentration is to enhance export-intermediary performance.

If increasing importer concentration heightens asymmetrical customer orientation toward exporters, export-intermediaries that are increasingly asymmetrically oriented toward exporters given increased importer concentration should have superior performance because successful dependence balancing is predicted to increase performance. Therefore, it is posited that:

P5: The joint effect of export-intermediary asymmetrical customer orientation toward

exporters and importer concentration is to enhance export-intermediary firm performance.

V. Discussion

In spite of the ubiquity of inter-firm relationships and the importance of gaining customers' hearts and minds (Chesbrough, 2011), research on how export intermediaries should manage their customers has only just triggered to emerge (Sawhney, Verona, & Prandelli, 2005). The current study conceptualized two aspects of export-intermediaries' orientations and developed a framework that features both antecedents and outcomes of export intermediaries' customer orientation.

The present study can contribute to research on export intermediaries. Intermediaries have been paid a critical attention from international marketing managers and scholars (Chesbrough, 2011). They, however, remain virtually unexplored in marketing research. Rochet and Tirole (2006) investigate intermediaries although their focus remains confined mainly to pricing. To move beyond this position, the current study emphasizes the role of other marketing variables, such as customer characteristics and customer orientation of marketing thought and action (Kohli & Jaworski, 1990). In line with Evans and Schmalensee's call (2010) for investigations of export-intermediaries' non-pricing strategy, the present study proposes the need to examine a wide variety of marketing variables in export-intermediary contexts.

The current study focuses specifically on how export-intermediaries manage multiple sides of a marketplace whose joint interactions enable the export-intermediary to create value, but whose priorities differ. Export-intermediaries can operate efficiently in multisided markets by nurturing summated customer orientation toward the whole market and implanting differential orientations toward different sides of the export-marketplace. This conceptualization not only reveals the complexities innate in customer management by export-intermediaries but also contributes to marketing theory belonging to customer

orientations. Although extant literature (e.g., Narver & Slater, 1990) provides key insights into firms' customer management, little research has addressed multi-sided markets. In fact, researchers have highlighted summated orientation but ignored the asymmetrical aspect, manifested only in multisided markets. Nonetheless, the presence of export-intermediaries in dyadic exchange relationships challenges conventional views of customer orientation. In this respect, those views of customer orientation should be reformulated to represent the ongoing nature of export-intermediaries, from actor in dyadic exchange to orchestrators of complex, multisided importer–exporter value-chains.

Based on inter-firm relationship research, the current study shows that exchange characteristics such as dependence and uncertainty can determine the orientation structure both individually and in complementary relationships with each other. Thus, both summated and asymmetrical orientations are strategic decision variables, chosen in response to focal antecedent conditions. Emerging research (Rochet & Tirole, 2006) has noted that some, but not all, export-intermediaries focus on different sides of their export-marketplace. Nonetheless, the reasons for why export-intermediaries might do so remains undocumented. The present study takes an initial approach by providing a certain rationale for the orientation system, rooted in well-established theories of inter-firm exchange (e.g., Kumar, Scheer, & Steenkamp, 1995/1998). The current study thus functions as a theoretical link between nascent research on intermediary organizations and established theories of inter-firm relationships. In presenting antecedents of orientation system, the study integrates the emerging research on export-intermediaries with established thought belonging to customer orientation.

Even though the current study examines a critical and novel theme in the area of marketing, it also suffers from certain limitations. The study focused on certain antecedents of customer orientation, such as dependence and exchange uncertainty, which have a strong precedent in marketing as descriptors of inter-

firm relationships (Kumar, Scheer, & Steenkamp, 1995; Palmatier, Dant, & Grewal, 2007). Nevertheless, industry-level factors, power of importers relative to exporters, and offering complexity could play the roles. The perspective of network effects, whereby the value of an export-intermediary on one side of the market increases with the number of participants on the other side, should be examined. In addition, a deeper comparison of the appeasement and balanced dependence views would be invaluable. Furthermore, the view of summated and asymmetric orientation is adapted from the inter-firm literature stream. Nonetheless, research is essential to verify whether they are the only components. At issue is whether the one-sidedness of the matching process is differentially consequential for the two sides.

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