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Self-Expansion or Internalization as the Two Processes of Vertical Integration: What Informs the Decision?

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Abstract: In vertical integration literature, the two processes leading to vertical integration, namely, (1) self-expansion of the scope of activities based on internal capabilities and (2) internalization of activities with external capabilities have not been distinguished. However, using internal capabilities or incorporating external capabilities is an alternative decision for managers and distinguishing them is crucial in practice. The purpose of this study is to distinguish self-expansion separated from internalization and to explain systematically when they likely occur. This study develops a unique vertical integration model by integrating transaction cost economics and the capability approach. With the model, we systematically analyzed the occurrence of (1) self-expansion and (2) internalization. Results reveal that the firm prefers self-expansion to internalization if it is easy to build the capabilities internally or difficult to procure them from outside the firm and if the costs of acquiring a firm or business with the required capabilities or the governance costs of the activities with external capabilities are high and vice versa. Our model leads to more understanding of vertical integration.

Keywords: vertical integration; self-expansion; internalization; transaction cost economics; capability approach

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1. Introduction

Vertical integration, under which the control rights of sequential production activities are integrated in the firm (Perry 1989; Lafontaine and Slade 2007), has attracted a great deal of academic and practical interest. Mainly, the literature on industrial organization, strategic management, and organizational economics has accumulated for decades (Perry 1989; Lafontaine and Slade 2007). Meanwhile, managers have long been plagued by strategic decisions regarding whether to integrate vertically. One reason may be the gap between academic research and management practice, which is the focus of this study. The vertical integration literature has not distinguished the two processes leading to vertical integration, namely, (1) self-expansion of the scope of activities based on internal capabilities and (2) internalization of activities with external capabilities. However, these differences are crucial in practice. Here, self-expansion is defined as expanding the scope of activities mainly by using the capabilities built internally, regardless of utilizing internal resources (such as human resources) or external ones. On the other hand, internalization is to undertake a new activity mainly by using the external capabilities incorporated, regardless of the ways of incorporation (such as the acquisition of a firm or business or a merger).

This study fills this gap by distinguishing self-expansion from internalization and systematically explaining when they likely occur. For this purpose, this study constructed a unique model of vertical integration by integrating the transaction cost economics (TCE) approach (Williamson 1971, 1975, 1985, 1996) with the capability approach (Barney 1999; Teece 2010, 2014) based on a review of previous research and its reconstruction. This vertical integration model is developed based on these approaches because TCE has generally been

considered as the most established theory of vertical integration to date. Moreover, the capability approach is the only approach that considers the distribution of capabilities in the market. Based on the model, this study assumes that a firm's decision between self-expansion and internalization depends on the costs of establishing the required capabilities and the governance costs of the related activities. This study reveals that the firm prefers self-expansion if the costs of establishing capabilities internally are lower than those of establishing external capabilities because of the ease of building the capabilities internally or the difficulty of procuring them from outside the firm, while the firm internalizes outside activities if the establishing costs of internal capabilities are higher than external capabilities; for example, it is easy to search for or acquire a firm or business with the required capabilities. It is also found that when a large number of governance costs of the activities with external capabilities are involved, the firm prefers self-expansion, and conversely, internalization is preferable if it does not happen. Our model leads to more understanding of vertical integration.

This study proceeds as follows. Section 2 reviews vertical integration literature and clarifies that in the literature, the self-expansion of the activities' scope and the internalization of outside activities are not distinguished. Section 3 describes the methodology in this study. Section 4 develops a new vertical integration decision model that integrates the TCE approach and the capability approach and shows the distinction of self-expansion and internalization as two processes to vertical integration systematically. Section 5 provides the conditions under which the two processes of vertical integration likely occur and some refutable hypotheses with simple examples. Section 6 discusses the results of analyzing the occurrence of self-expansion and internalization. Finally, Section 7 presents the limitations of this study and future research.

2. Self-Expansion as a Blind Spot in Vertical Integration Literature

2.1. Production Efficiency Approach

The vertical integration research began based on neoclassical economics or industrial organization literature. Neoclassical economics has focused on the relationship between production costs and vertical integration and argued that the larger the market is, the less likely it is that vertical integration would occur (Stigler 1951). According to Stigler (1951), when a firm that supplies a good and a firm that demands it integrate vertically, demands for the supplier are limited within the firm which integrates vertically. Consequently, the supply sector within the firm which integrates vertically is less likely to enjoy economies of scale and is less productive than the outside suppliers with many buyers. The larger the market size of the intermediate goods is, the greater is the differentiation in the economies of scale that can be enjoyed by the outside supplier and the supply sector within the firm which integrates vertically. Therefore, vertical integration becomes more disadvantageous in terms of production costs. Bain (1968) also argued that high technical relevance promotes vertical integration, from the perspective of industrial organization. This is because thermal efficiency is improved by, for example, performing pig iron in the blast furnace and subsequent steelmaking and rolling in the same factory in the steel manufacturing process. Hence, the production process that improves production efficiency by making it continuous in time and space should be integrated into one firm and be operated within.

However, contrary to what Stigler (1951) envisioned, the supply sector within the firm which integrates vertically is able to supply its goods outside. It can supply them to enjoy economies of scale. As such, market size alone cannot explain vertical integration. Additionally, the improvement in physical production efficiency necessitates putting those technically dependent production processes in the same factory according to Bain (1968), but this should not be a reason for owning and controlling the sequential processes within the one firm (Williamson 1971; Perry 1989).

2.2. Market Power Approach

The second major stream of vertical integration literature is related to the monopoly power and market power brought by vertical integration. One of these studies highlighted that vertical integration eliminates the double margins brought about by monopolies in successive production stages (Spengler 1950; Greenhut and Ohta 1979). This reduces the negative impact of monopoly on end consumers. Another effect of vertical integration is increasing the market power and profits of the firm which integrates vertically, which can negatively affect end consumers. For example, vertical integration restricts upstream and downstream access of rivals, increasing the costs borne by them (Krattenmaker and Salop 1986; Salop and Scheffman 1987; Salinger 1988). Additionally, downstream vertical integration can curb arbitrage in the downstream market and can maintain price discrimination (Gould 1977).

This approach has been one of the main approaches to vertical integration (Perry 1989). However, Lafontaine and Slade (2007) found that such benefits in market power could often be equated with contractual arrangements other than vertical integration, which is not a sufficient reason to integrate vertically. Moreover, most empirical studies do not strongly support this approach.

2.3. Transaction Cost Economics Approach

Since the 1970s, vertical integration research based on organizational economics has been conducted in contrast to conventional economics and industrial organization theories. These studies include agency theory-based (Lafontaine and Slade 2007; Cadot 2015) or property rights-based studies (Grossman and Hart 1986; Hart and Moore 1990). The TCE approach developed by Williamson (1971, 1975, 1985, 1996) assumes that vertical integration is one of the governance structures established to economize transaction costs incurred when trading goods through the market. According to Williamson (1975, 1985), firms integrate vertically (as hierarchical governance) rather than use market governance or governance by contracts because of the large hazards and high transaction costs of opportunism in highly asset-specific and uncertain transactions.

The TCE approach is now considered the most important theory for explaining vertical integration (Perry 1989; Teece 2010). It has the following advantages that are not found in market power approaches and others. One advantage is that the approach shows the reason for firms to integrate vertically compared to arrange transactions by contracts as a governance system called an intermediary organization or hybrid (Williamson 1991). Another advantage is that many empirical studies (Monteverde and Teece 1982; Masten 1984; Díez-Vial 2007; Fernández-Olmos et al. 2016) and the reviews or meta-analyses on multiple empirical results (David and Han 2004; Lafontaine and Slade 2007) support the hypotheses based on the TCE approach.

2.4. Capability Approach

Recent studies include the development of capability approaches and empirical studies using more diverse settings and data related to the above approaches. The capability approach has a critical aspect, primarily to the TCE approach. For example, Teece (2010, 2014) mentioned that TCE assumed a thick market and the existence of trading partners. He also argued that when the market was thin and the potential trading partners were few, firms vertically integrated regardless of transaction costs because there were no external capabilities in this market. Barney (1999) also stated that even if the hazard posed by opportunism was large and transaction costs were high, firms did not integrate vertically but trade through markets or contracts when building internal capabilities or acquiring external ones was costly. He suggested that not only the transaction costs but also the costs of the building and acquiring capabilities could affect vertical integration.

Empirical studies based on the capability approach have been often conducted along with other approaches such as market power or TCE approach rather than alone. Díez-Vial

(2007) and Fernández-Olmos et al. (2016) showed that factors related to capabilities, in addition to factors related to market power or TCE approach, influence vertical integration.

Apart from the capability approach, the research is also underway to clarify more details in a limited context based on one of the above approaches or a combination of them: for example, the impact of the vertical integration of production in the semiconductor industry on technical performance (Leiblein et al. 2002), the impact of national financial market development on vertical integration (Acemoglu et al. 2009), improved coordination brought about by vertical integration at one stage of the value chain competing for product diversity and another stage competing for scale (Zhou and Wan 2017), and reduced vertical integration brought about by intensifying competition due to globalization (Loertscher and Riordan 2019).

2.5. Self-Expansion as a Blind Spot in Vertical Integration Literature

A blind spot in vertical integration literature, except for some of the capability approaches (Teece 2010, 2014), is that they overlook self-expansion as one of the processes leading to vertical integration. For theoretical research, TCE (Williamson 1971, 1975, 1985, 1996) or property rights (Grossman and Hart 1986; Hart and Moore 1990) approach implicitly assumes the existence of outside firms with the required capabilities (Teece 2010, 2014) and trade through the market instead of integrating internally. Additionally, the cause of vertical integration and its effects are recognized by comparing the cases where this firm is integrated internally and traded through the internal organization or not. In these models and their analyses, self-expansion has been entirely ignored. The research based on market power approach (Spengler 1950; Gould 1977; Greenhut and Ohta 1979; Krattenmaker and Salop 1986; Salop and Scheffman 1987; Salinger 1988) also have been focused on market power and its impact resulting from vertical integration; whether that is due to self-expansion or internalization has not received interest. Recently, the capability approach (Barney 1999; Teece 2010, 2014) has finally mentioned the distribution of capabilities in the market, the cost of building capabilities inside the firm or incorporating capabilities from outside; however, self-expansion and internalization are not clearly distinguished systematically, and the conditions under which they likely occur are not sufficiently shown.

Additionally, many empirical studies have been conducted on the basis of those approaches (see Lafontaine and Slade 2007), but to our knowledge, no studies have distinguished the two processes of vertical integration from the perspective of capabilities. Mostly, some proxy index is used to measure the degree of vertical integration. For example, using the input–output table, the ratio of how many dollars the product of one business of a firm needs as an input to produce the product of another business of the firm can be a proxy (Fan and Lang 2000; Acemoglu et al. 2009; Fan et al. 2017). However, the proxy shows the range of vertically integrated activities at the time but does not show how these activities have been vertically integrated. Thus, in many empirical studies, self-expansion and internalization may be measured as the same. Ignoring the distinction between them can jeopardize the validity of the findings which have been demonstrated so far.

As seen above, in vertical integration literature, both theoretically and empirically, the state in which a firm "results in" conducting the sequential activities within the same vertical value chain is called "vertical integration". Attention has not been paid to the clear distinction between the two processes of vertical integration: self-expansion and internalization. The state of vertical integration indicated that the vertically sequential vertical activities are under common ownership, and the process of vertical integration is about how the state of vertical integration is achieved. However, from a practical view, whether to use internal capabilities or incorporate external capabilities is a completely different option and sometimes an alternative important decision for managers. Without focusing on this gap, we would not fully understand why a firm prefers vertical integration to other options and offer a truly useful policy of the vertical boundary setting to managers.

3. Methodology

For the purpose of this study, we build our own analytical model for vertical integration based on the literature review. To develop this model, we integrate the capability approach into the TCE approach and assume that a firm's decision between self-expansion and internalization depends on the establishing costs of the required capabilities and the governance costs of related activities. By analyzing the said model, this study provides some refutable hypotheses on the conditions that self-expansion or internalization likely occurs respectively, and some simple examples to corroborate those hypotheses to some extent.

4. Building an Analytical Model

4.1. Vertical Integration Model Based on the TCE Approach

To focus on the blind spots of vertical integration literature, this study builds an integrated model with TCE and the capability approach. The TCE approach (Williamson 1975, 1985, 1991, 1996) posits that asset specificity is the most influential factor for vertical integration. Asset specificity is defined as the extent to which the value of an asset is specific to the transaction, i.e., the extent to which an asset can be diverted to another transaction without reducing its value. Asset specificity has various types, such as local asset specificity, physical asset specificity, and human asset specificity (Williamson 1983, 1996). In transactions with high asset specificity, related assets cannot be diverted to other transactions without cost. Thus, the hazard of opportunism from a specific trading partner, such as holdup, increases, and negotiations and bargaining become fierce. Therefore, if other conditions are constant, transaction costs will be high. In such cases, firms vertically integrate to "internalize" (Williamson 1971) transactions in the market.

Figure 1 shows the relationship between asset specificity and governance costs (Williamson 1996). In Figure 1, $k(\geq 0)$ denotes the degree of asset specificity, and $I(k)$, $M(k)$, and $H(k)$, respectively, denote governance costs of transactions in the hierarchical organization (i.e., vertical integration), the market, and the intermediate form (i.e., hybrid) between the market and hierarchical organizations, such as long-term contracts. Here, the following holds:

$$0 < \frac{\partial I}{\partial k} < \frac{\partial H}{\partial k} < \frac{\partial M}{\partial k}.$$
$$0 < \frac{\partial^2 I}{\partial^2 k} < \frac{\partial^2 H}{\partial^2 k} < \frac{\partial^2 M}{\partial^2 k}.$$

Additionally, when assets are general ($k = 0$), transactions are conducted smoothly under the price mechanism in the market, whereas relatively high administrative costs are incurred in hierarchical organizations. Thus, the following relationship holds:

$$I(0) > H(0) > M(0).$$

Therefore, from the viewpoint of economizing transaction costs (governance costs: GC), firms are likely to internalize outside activities to vertical integration when asset specificity is high ($k > k_1$), as shown in Figure 1.

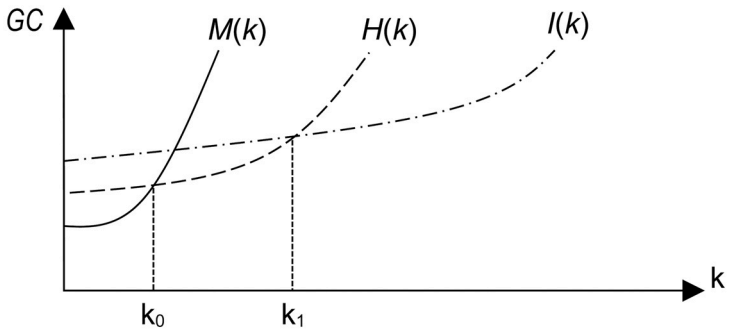

Figure 1. Relationship between asset specificity and governance costs. *Source*: Modified from Williamson (1996, p. 108).

4.2. Integration of the Capability Approach into the TCE Approach

In the above TCE approach, the issue of capabilities is not considered, and self-expansion is ignored. Barney (1999) stated that the cost of building capabilities internally and the cost of acquiring capabilities outside the firm were also factors related to vertical integration. According to Barney (1999), building internal capabilities is not easy and is costly because first, the historical context is important for building capabilities and building opportunities cannot be reproduced. Second, it must go through a long and difficult learning process and is path-dependent. Third, the capabilities may include social complexities slowly formed, such as corporate culture and trust. Fourth, it can be ambiguous how the required capabilities can be built. Let CC (≥ 0) be the creation costs of internal capabilities. Additionally, acquiring an external capability is costly because of (1) legal restrictions such as antitrust law, (2) decline in the value of the capability after the acquisition, (3) high cost of reselling the acquired firm or business, (4) acquisition of some unnecessary resources along with the required capabilities, and (5) difficulty in using capabilities due to the differences in corporate culture or systems adopted with acquired companies and businesses. The acquisition costs of external capabilities are denoted by AC (≥ 0).

Additionally, according to Teece (2010, 2014), in a thin market where a firm cannot find the outside firm with the required capabilities, the option of dealing with outside firms is unavailable; hence, it has no choice but to build the capabilities internally. For example, before the spread of iPhones and iPads, Apple opened a directly managed store (Apple Store) to sell and popularize them. However, Apple did so not because of the hazard of opportunism caused by the high-asset specificity of transactions with external distributors but because of the lack of external distributors with the ability to fully understand Apple's innovative products and convey their appeal to their customers (Teece 2010). To consider the probability that a firm cannot search outside the firm with sufficient capabilities, we incorporate it into the model as a cost SC (≥ 0) to search for and source the necessary external capabilities. Here, these cost components CC, AC and SC can be called establishing costs of capabilities (EC).

4.3. Building a Model

From the above, when a firm expands the scope of activities using internal capabilities, it bears the capability creation costs of establishing costs, CC and the governance costs of using them in a hierarchical organization, $I_s(k)$. Alternatively, when internalizing external capabilities and using them internally, the sum of establishing costs and governance costs is the costs of sourcing and acquiring external capabilities and the costs of hierarchical governance, $(SC + AC + I_i(k))$. In general, it is more difficult to manage sequential activities based on external capabilities and control the hazard of opportunism due to the differences in corporate culture or systems than based on internal capabilities. The following holds:

$$\begin{array}{c} \frac{\partial I_s}{\partial k} < \frac{\partial I_i}{\partial k}, \\ I_s(0) < I_i(0). \end{array}$$

Also, when sourcing and using the external capabilities through markets or contracts (hybrid), the total costs of establishing and governance are $(SC + M(k))$ in market governance or $(SC + H(k))$ in hybrid governance, respectively. Therefore, the following holds:

$$\begin{array}{c} EC(S) + GC(S) = CC + I_s(k) \\ EC(I) + GC(I) = SC + AC + I_i(k) \\ EC(M) + GC(M) = SC + M(k) \\ EC(H) + GC(H) = SC + H(k) \end{array}$$

Here, S, I, M and H indicate self-expansion, internalization, market governance and hybrid governance, respectively.

Therefore, the process of vertical integration is assumed to be determined by the costs of establishing capabilities and the governance costs incurred when using these capabilities. Figure 2 shows the basic form of the vertical integration model. When asset specificity is $k > k_2$, firms perform the self-expansion to economize the total costs of EC and GC. The condition for the internalization is the range of asset specificity $k_1 < k < k_2$.

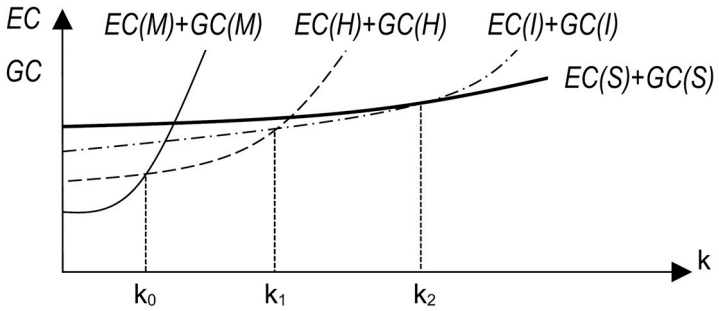

Figure 2. Basic analytical model. *Source*: Modified from Williamson (1996, p. 108).

5. Hypotheses from the Model

On the basis of the vertical integration model, we consider under what conditions the two processes of vertical integration are likely to occur and present some refutable hypotheses.

5.1. Why Self-Expand the Scope of Activities: Low EC and GC of Self-Expansion

Self-expansion of the scope of activities is preferable over a range of k where the following inequalities hold:

$$CC + I_s(k) < SC + AC + I_i(k)$$
$$CC + I_s(k) < SC + M(k)$$
$$CC + I_s(k) < SC + H(k)$$

Thus, the probability of self-expansion increases with a decrease in CC, establishing costs and $I_s(k)$ as GC of self-expansion. First, the capability building cost CC is the lowest when a firm already has the required capabilities and does not need to build new ones. For example, in the case of the abovementioned Apple Store (Teece 2010), Apple has internal knowledge of its products and shares its concept. It has the capabilities needed to sell those products in-house, hence the CC can be low. Moreover, based on Barney (1999), CC is small when a firm's history is unimportant in building the capabilities, path-dependency is small, no social complexity exists, and the building method is precise. Therefore, the following hypothesis is proposed:

Hypothesis 1 (H1). *All else being equal, the lower the internal capability creation cost is, the more likely is a firm to self-expand its scope of activities than to internalize outside activities.*

Second, the lower GC for using the internal capabilities $I_s(k)$ compared to GC of other options $I_i(k)$, $M(k)$ and $H(k)$ are, the higher the probability of self-expansion is. In the next section, this condition is considered with GC of internalization in detail.

Based on Figure 2, the situation that EC and GC of self-expansion are enough low can be shown in Figure 3. A firm always expands the scope of its activities regardless of asset specificity k.

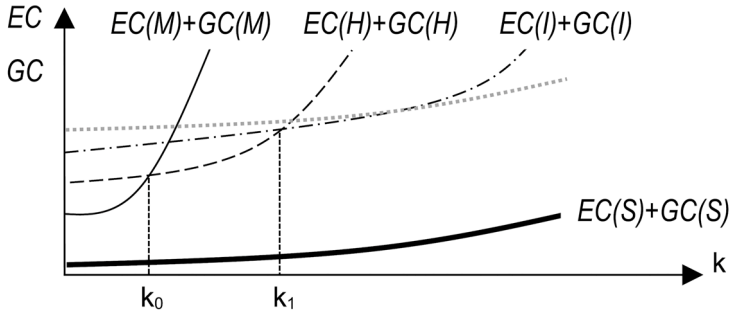

Figure 3. Low costs of creating capabilities and governance for using internal capabilities. *Source*: Modified from Williamson (1996, p. 108).

5.2. Why Self-Expand the Scope of Activities: High EC and GC of Internalization

The probability of self-expansion increases with an increase in SC and AC as establishing costs and $I_i(k)$ as governance costs of internalization. If the costs of sourcing the required capabilities from the external market SC are high, a firm is likely to rely on internal capabilities. SC is very high in a thin market with the absence of external firms with sufficient capabilities. For example, none of the external distributors other than Apple had the capabilities to properly understand the characteristics and concepts of iPhones and iPads and convey them to customers before their products became widespread. Therefore, it is costly for Apple to source the capabilities from outside (Teece 2010). SC is also high if some legal regulation does not allow the capabilities of a particular outside firm to be purchased through the market. Therefore, we proposed the following hypothesis:

Hypothesis 2 (H2). *All else being equal, the higher the external capability sourcing cost is, the more likely a firm is to self-expand its scope of activities than internalize outside activities.*

Moreover, a firm is likely to expand the scope of activities using internal capabilities when the capability acquisition cost AC is higher. Concerning Barney (1999), AC is particularly high when acquiring an outside firm or business that holds the required capabilities is not legally permitted because of antitrust laws or regulations on foreign companies. For example, a multinational enterprise may want to acquire a local company to secure a sales channel as it enters an overseas market, but the ownership of the local company by the foreign company may be restricted. Additionally, when the value of the capabilities declines after the acquisition, market uncertainty is higher, reselling the acquired company or business is more difficult, it is unable to acquire the required capabilities without many unnecessary resources, and the corporate culture and system integration of the acquired company or business are more different from the firm's, AC is higher. Therefore, we present the following hypothesis:

Hypothesis 3 (H3). *All else being equal, the higher the acquisition costs of capabilities are, the more likely is a firm to self-expand its scope of activities than internalize outside activities.*

Additionally, if the governance costs of internalization $I_i(k)$ are high compared to the governance costs of self-expansion $I_s(k)$, it is likely that a firm gives up the internalization of outside activities and uses the internal capabilities. This relative increase in governance costs has three routes. First, the higher the asset specificity k is, the higher are the governance costs $I_i(k)$ in a hierarchical organization (Williamson 1975, 1985, 1991, 1996), compared to $I_s(k)$. Therefore, if the asset specificity is expected to be very high even before the start of trading, a firm will expand its scope of activities to avoid the higher governance cost. For example, when laying a new railroad line on a developing region and building a district or residential area centered on the station, the development around the station (usually in Japan) is mainly carried out by railroad companies or its group companies, such as railroad real estate companies, because of the high local asset specificity between the

railroad line and real estate owners and developers around the station. The second route is a significant increase in governance costs associated with an increase in asset specificity k, $\partial I_i/\partial k$, indicating a situation in which the hazard of opportunism cannot be adequately governed. For example, transaction uncertainty is said to be a factor that encourages opportunism and increases governance costs (Williamson 1975, 1985, 1996; Lafontaine and Slade 2007), but some studies (Anderson 1985; Díez-Vial 2007; Fernández-Olmos et al. 2016) have shown that uncertainty further increases governance costs when combined with asset specificity. Therefore, when uncertainty is high, the increase in governance cost of internalization ($\partial I_i/\partial k$) likely becomes large compared to that of self-expansion ($\partial I_s/\partial k$). The third route is where the governance cost $I_i(0)$, which does not change because of asset specificity k, likely increases compared to that of self-expansion $I_s(0)$. In hierarchical organizations, regardless of the degree of asset specificity, incentives for organizational members may decrease, and intraorganizational communication distortions and bureaucracy costs may appear because of the expansion of the organization and increase in the hierarchy (Williamson 1985, 1996; Mahoney 1992). Consequently, the intercept $I_i(0)$ increases, and the governance cost curve shifts upward. For example, if a firm facing fierce competition in the market is internalized, the governance costs of internalizing outside activities with the required capabilities will increase because the incentives will be significantly lower through vertical integration, so firms may give up internalization. Therefore, the following hypothesis is proposed:

Hypothesis 4a (H4a). *All else being equal, the higher the asset specificity is, the more likely a firm is to self-expand its scope of activities than internalize outside activities.*

Hypothesis 4b (H4b). *All else being equal, the greater the hazard of opportunism due to asset specificity is, the more likely a firm is to self-expand its scope of activities than internalize outside activities.*

Hypothesis 4c (H4c). *All else being equal, the higher the governance cost of vertical integration is, which does not depend on asset specificity, the more likely a firm is to self-expand its scope of activities than internalize outside activities.*

Based on Figure 2, Figure 4 demonstrates the situation that EC and GC of internalization are high enough. Then, the condition for the self-expansion of the activities is asset specificity $k > k_3$, and vertical integration is more likely to be performed by self-expansion, as compared with Figure 2 (because of $k_3 < k_2$).

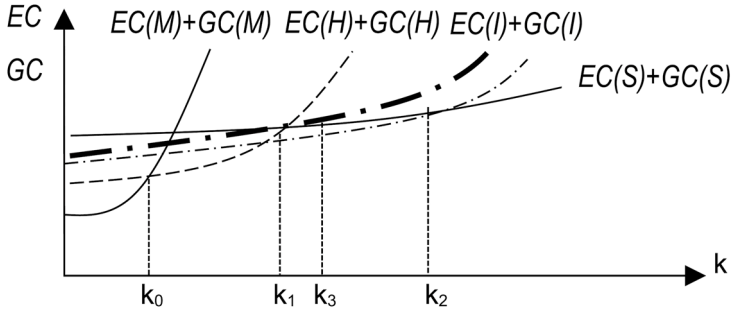

Figure 4. High costs of sourcing and acquiring external capabilities and hierarchical governance for using the capabilities. *Source*: Modified from Williamson (1996, p. 108).

5.3. Why Choose Internalization of outside Activities: High EC and GC of Self-Expansion

The internalization of outside activities is preferable over a range of k where the following inequalities hold:

$$SC + AC + I_i(k) < CC + I_s(k)$$
$$SC + AC + I_i(k) < SC + M(k)$$
$$SC + AC + I_i(k) < SC + H(k)$$

Thus, the probability of internalization increases with an increase in CC as establishing costs and $I_s(k)$ as governance costs of self-expansion. The first condition is that the capability-building cost CC is high. For example, if a firm needs capabilities that are completely different from what the firm has built before as it enters a new business, it costs much to build the capabilities from scratch in-house. Additionally, when the history of a firm is important in building capabilities and related technology is highly path-dependent, as in the biotechnology or high-tech industries, CC is higher (Barney 1999).

Hypothesis 5 (H5). *All else being equal, the higher the capability creation cost is, the more likely is a firm to internalize outside activities with the required capabilities than self-expand its scope of activities.*

Moreover, the higher the governance costs for using the internal capabilities $I_s(k)$ compared to the governance costs of other options $I_i(k)$, $M(k)$ and $H(k)$ are, the lower is the probability of self-expansion. In the next section, this condition is considered with the governance costs of internalization in detail.

Based on Figure 2, the situation that EC and GC of self-expansion are high enough can be shown in Figure 5. The condition of the range of asset specificity for the internalization of outside activities is $k_1 < k < k_4$, and a similar condition in Figure 2 is in the range of $k_1 < k < k_2$. From this, the probability of vertical integration by internalization in Figure 5 is higher than that in Figure 2.

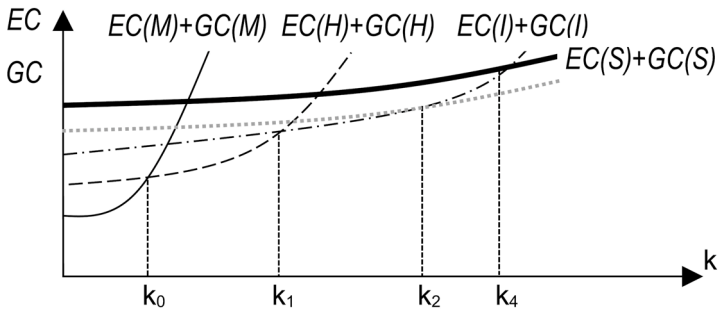

Figure 5. High costs of creating capabilities and governance for using internal capabilities. *Source*: Modified from Williamson (1996, p. 108).

5.4. Why Choose Internalization of outside Activities: Low EC and GC of Internalization

The probability of internalization increases with a decrease in SC and AC as establishing costs and $I_i(k)$ as governance costs of internalization. The costs of sourcing the required external capabilities SC are lower in thick markets where the capabilities are widely distributed. Therefore, the following hypotheses can be presented.

Hypothesis 6 (H6). *All else being equal, the lower the capability sourcing cost is, the more likely is a firm to internalize outside activities with the required capabilities than self-expand its scope of activities.*

Additionally, when the costs of acquiring the external capabilities AC are lower, firms are motivated to incorporate external capabilities rather than use internal capabilities. For example, this is the situation where no legal regulations are related to acquisition, the value of capabilities is not likely to decline after the acquisition, market uncertainty is lower, only the required capabilities can be acquired separately, or the corporate culture and system

are like those of the acquired firm or business and post-acquisition integration proceeds smoothly, based on Barney (1999). Therefore, the following hypothesis is posited:

Hypothesis 7 (H7). *All else being equal, the lower the capability acquisition costs are, the more likely a firm is to internalize outside activities with the required capabilities than self-expand its scope of activities.*

Moreover, lower governance costs of internalization $I_i(k)$, compared to that of self-expansion, work to encourage firms to prefer to incorporate external capabilities. However, whether a firm internalizes outside activities depends on $M(k)$ and $H(k)$ eventually. For example, it is known that pre-entrants in the incubation stage use alliances as hybrid, compared to acquisition, to obtain technical capabilities because of the flexibility (Moeen and Mitchell 2020). As mentioned above, the issue of governance costs should be considered from three perspectives. First, the lower the asset specificity k is, the lower is $I_i(k)$. Meanwhile, if asset specificity k is below a certain level (the level at which the governance costs of hybrid and vertical integration are equal), then $k < k_1$, $I_i(k)$ is higher than $M(k)$ or $H(k)$, and it is advantageous for firms to deal with outside firms through markets or hybrids. Therefore, the following hypothesis, which corresponds to the factors of vertical integration in the TCE approach, is proposed.

Hypothesis H8a (H8a). *All else being equal, the lower the asset specificity is, the more likely is a firm to internalize outside activities with the required capabilities than self-expand its scope of activities only if the governance costs of vertical integration are lower than in the market or hybrid.*

Second, if the increase in governance costs due to an increase in asset specificity k, $\partial I_i/\partial k$ is more gradual, for example, because of lower uncertainty, $I_i(k)$ is likely to lower compared to $I_s(k)$. Therefore, a firm is likely to incorporate external capabilities. However, simultaneously, if the increase in governance costs in the market or hybrid ($\partial M/\partial k$ or $\partial H/\partial k$, respectively) becomes moderate, the superiority of vertical integration from the viewpoint of governance costs will decline, and external capabilities will be used through the market or the hybrid form. Therefore, assuming that the other governance cost increments do not change, the gradual increase in governance costs ($\partial I_i/\partial k$) in vertical integration positively affects the internalization of outside activities. For example, if a firm has a good organizational structure to manage the hierarchical organization and a devised incentive system, the increase in governance costs in vertical integration will be smaller than in the market or hybrid. Meanwhile, the small increases in governance costs in the market or hybrid have the opposite effect. Therefore, the following hypothesis can be presented:

Hypothesis H8b (H8b). *All else being equal, the larger the difference between the increase in governance costs in vertical integration and that in the market or hybrid is, the more likely a firm is to internalize outside activities with the required capabilities than self-expand its scope of activities.*

Third, if the governance cost $I_i(0)$ is likely to be lower compared to $I_s(k)$ because the outside firm or business with the required capabilities belongs to a less competitive industry, the probability of internalization increases. However, simultaneously, if the governance costs $M(0)$ or $H(0)$, which do not fluctuate depending on asset specificity k, are also lower, the relative superiority of vertical integration from the viewpoint of governance costs decreases. Therefore, the condition which promotes the internalization of the outside activities is that $I_i(0)$ is lower and $M(0)$ or $H(0)$ is higher as possible. For example, if a firm can overcome the problem of bureaucracy that is prominent in a hierarchical organization, $I_i(0)$ approaches $M(0)$ or $H(0)$, and so, the firms will actively internalize outside activities. Therefore, the following hypothesis is proposed:

Hypothesis H8c (H8c). *All else being equal, the smaller the difference in governance costs independent of asset specificity between vertical integration and market or hybrid is, the more likely a firm is to internalize outside activities with the required capabilities than self-expand its scope of activities.*

Based on Figure 2, Figure 6 shows a situation that *EC* and *GC* of internalization are low enough and that *GC* in the market or hybrid shift in the direction in which vertical integration is relatively advantageous. The condition of the range of asset specificity k for the internalization of outside activities with the required capabilities is $k_5 < k < k_6$, and the same condition in Figure 2 is $k_1 < k < k_2$. From this, the probability of vertical integration by internalization is higher than that in Figure 2.

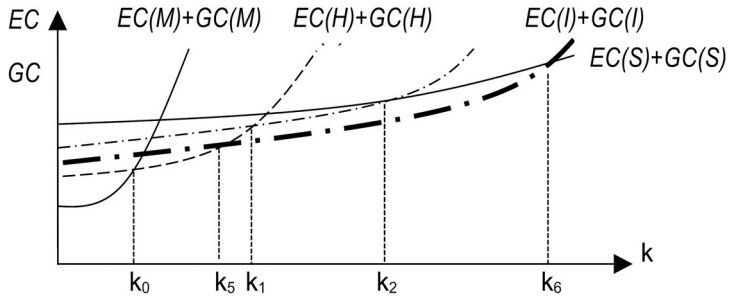

Figure 6. Low costs of sourcing and acquiring external capabilities and hierarchical governance for using the capabilities. *Source*: Modified from Williamson (1996, p. 108).

6. Discussion

In this section, we discuss the results of our analysis of when self-expansion or internalization likely occurs, respectively, based on the integrated model of the TCE and capability approaches. A firm's decision on whether to choose self-expansion or internalization depends on (1) the establishing costs of the required capabilities, such as creation costs, sourcing costs and acquisition costs, and (2) the governance costs of related activities with the required capabilities. If the establishing costs of internal capabilities are low, the firm prefers self-expansion of activities' scope by using internal capabilities, while if the establishing costs of external capabilities are low, the firm internalizes external firms with the required capabilities. Our detailed analysis also revealed that these establishing costs of internal capabilities are significant when the required capabilities can be easily built internally (Barney 1999) and when it is difficult to procure or acquire the capabilities from outside the firm (Barney 1999; Teece 2010, 2014).

When the governance costs of the activities with the external capabilities as the second determinant are higher compared to those of the activities with internal capabilities, it leads to self-expansion, and conversely, when the governance costs of the activities with the external capabilities are lower, it leads to internalization. Moreover, our analysis clarified that the costs are generally higher when asset specificity or uncertainty in a transaction are high (Williamson 1985, 1996). However, it should be noted that even if using external capabilities is preferable for the firm than using internal capabilities, the firm internalizes outside activities only if the governance costs in vertical integration are lower than in the market or hybrid (Williamson 1991, 1996). Those results are consistent with the findings of some empirical studies that both transaction costs and capabilities affect vertical integration (Díez-Vial 2007; Fernández-Olmos et al. 2016).

7. Conclusions

This study focused on the vertical integration process and clarified the distinction between two processes of vertical integration: self-expansion of the scope of activities using internal capabilities and internalization of outside activities with the requisite capabilities. We developed the integrated model of TCE (Williamson 1975, 1985, 1991, 1996), which is a typical approach of vertical integration research, and the capability approach (Barney 1999;

Teece 2010, 2014), which has been attracting attention recently. Both the existing theoretical and empirical studies have focused only on the state or results of vertical integration. On the contrary, this study's novelty and academic contribution are remarkable as focusing on how to achieve vertical integration and clarifying the factors under which the two processes of vertical integration are likely to occur. The said analytical model and hypotheses could lead to our complete understanding of why or how firms integrate vertically.

Additionally, the processes of vertical integration, whether to use internal capabilities as self-expansion or incorporate external capabilities as internalization, is of decisive importance in management practice. This study clarified when each process of vertical integration likely occurs, and can be a steppingstone for vertical integration research to further contribute to practitioners' decisions. For example, when a firm starts some new activities, it should achieve vertical integration by self-expansion if the costs to create the capabilities required to the new activities internally are low, the sourcing costs from external capabilities are high or the costs of acquiring external capabilities are high, whereas the firm should achieve vertical integration by internalization if it is easy to govern the hazard of opportunism in related activities with external capabilities.

Despite these contributions, this study contains some limitations, which also indicate the direction of future research. First, this study developed an analytical model, presented some refutable hypotheses based on it and provided some simple examples. Further empirical research aimed at testing the hypotheses is required. Second, Riordan and Williamson (1985) and Williamson (1985) considered how production and transaction costs influence the choice of governance structures, including vertical integration. Thus, considering the influence of production costs, which have been mainly dealt with in the fields of conventional economics and industrial organization theory, leads to the building of a more complete vertical integration decision model. In particular, a difference in production costs between internal and external capabilities must be considered. Other factors such as trust, psychological biases, heuristics or attention can also affect transaction costs through opportunism (Cuypers et al. 2021). The influence of these factors on the process of vertical integration will be examined in future research. Third, a limitation common to other vertical integration literature is not to focus on the situation where the required capabilities do not exist both inside and outside a firm, such as a rapidly changing modern business environment. Therefore, the dynamic capabilities framework (Teece et al. 1997; Teece 2007, 2014) that sheds light on the setting of a firm's boundaries in a changing environment is expected to be incorporated with the vertical integration research.

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