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Accepted for publication in International Studies of Management & Organization, 2000

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Abstract

This article examines the effect of variation - in the geographical operations - of international business operations on experiential knowledge development in the internationalization of the firm. Based on learning theory, this article develops five hypotheses on the effects of variation on three interrelated components of international experiential knowledge: internationalization knowledge, business knowledge and institutional knowledge. The LISREL analysis indicates that variation has a positive effect on the accumulation of experiential knowledge in internationalizing firms. In particular, it demonstrates that internationalization knowledge is a key variable which mediates the effect of variation on the other two knowledge variables.

The last few years have seen a resurgence of research interest in the internationalization process of firms. Several models and theories have been suggested some of them based on behavioral theories which describe the internationalization of firms as a process of trial and error in an uncertain and unknown future. Learning about the opportunities and problems that exist abroad is important. This holds true for the learning-based model by Johanson and Vahlne (the Uppsala

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model, 1977, 1990), as well as the innovation models (Bilkey and Tesar, 1977; Cavusgil, 1980, 1984; Czinkota, 1982; Reid, 1983; Leonidas and Katsikeas, 1996). Based on the behavioral theory of firm and the gradual learning process, a considerable amount of literature on exporting and the internationalization process of firms has been accumulated (Wiedersheim-Paul, Olson and Welch, 1978; Reid, 1984; Root, 1987; Sharma and Johanson, 1987; Kogut and Singh, 1988; Beamish, 1990; Erramilli, 1990, 1991; Erramilli and Rao, 1990, 1993; Hirsch, 1993; Calof and Beamish, 1995; Eriksson, Johanson, Majkgård and Sharma, 1997). One stream of research is increasingly focusing on the factors that affect the accumulation of knowledge in the internationalization process of firms. Factors such as the duration of foreign operations (Erramilli, 1991), the firms' size and age, and the number of foreign countries in which they operate (Barkema and Vermeulen, 1998) seem to influence the accumulation of knowledge. The use of firm size and age to measure the knowledge accumulated by firms has been investigated and criticized (Calof, 1994).

Much of the literature, however, is speculative and in need of empirical validation. Past research has not, for example, investigated the effect of variation on the accumulation of knowledge in firms as they internationalize, *variation* being defined as the diversity of foreign environments to which the internationalizing firm is exposed. In the literature on internationalization, it is clearly assumed that there is a positive correlation between variation and the amount of knowledge accumulated in firms as they internationalize. To the best of our knowledge, there are two only exceptions which really examine the effect of variation. In the first, Erramilli (1991) investigated the effect of variation on foreign-market-entry decisions, and found that variation has such an effect. Barkema and Vermeulen (1998) studied the effects of variation on the choice taken by firms when deciding between "start-ups" or "acquisitions" abroad. They used learning theories and concluded that variation, in terms of diversity in the geographical operations and in the products, affects the choice between starting-up from scratch and making an acquisition abroad. Both these studies, however, related variation directly to firms' behavior in the

internationalization process without making an empirical examination of the role of knowledge accumulation. Moreover, neither of them investigated the dynamic aspects of this process.

This article analyzes the effect of variation on the accumulation of knowledge in firms in their internationalization process. In particular, we examine the incremental or dynamic aspect of knowledge accumulation. Our arguments are based on the literature on learning. The model by Eriksson et al. (1997) is the point of departure (see the following section) of the analysis: they identified three components of knowledge in the internationalization process of firms and analyzed their effect on the perceived cost of incremental international commitments. For this reason, we pay no specific attention to the effects of knowledge on cost in the internationalization process, and use the term experiential knowledge and knowledge interchangeably.

We begin with a discussion of learning theories, followed by Eriksson et al.'s (1997) three different components of knowledge and a review of the literature on internationalization and learning. Then, five hypotheses relating variation to knowledge in the internationalization process of the firm are developed. In the following section, the method and the data employed are presented. The hypotheses were tested on a sample of 362 firms from Sweden. The data was collected in 1993. Finally, the results are discussed and some implications examined.

VARIATION AND ORGANIZATIONAL LEARNING – SOME BASIC ASSUMPTIONS

Internationalization can be viewed as a process of learning and knowledge accumulation. For this reason, the use of learning-based theories is preferred to explain firms' international operations (Barkema and Vermeulen 1998), and we develop hypotheses based on this literature (Cyert and March, 1963; Nonaka, 1991; March and Simon, 1958; Corsini, 1987; Fiol and Lyles, 1985). Learning by firms is defined as "the process within the organization by which knowledge about action-outcome relationships and the effect of the environment on these relationships is developed" (Duncan and Weiss; 1979, p. 84 in Weick, 1991). Learning alters the manner in which the internationalizing firms see and interpret the world. Learning theories claim that variation changes the stock of knowledge (Walsh and Ungson, 1991), absorptive capacity (Cohen

and Levinthal, 1990) and theory-in-use (Argyris and Schön, 1978) in firms. Cohen and Levinthal (1990) stated that, in the process of learning, the stock of knowledge already accumulated in firms plays an important part.

Previous authors (Penrose, 1959; Fiol and Lyles, 1985; Argyris and Schön, 1978) have distinguished among different types of knowledge. We use here the distinction proposed by Argyris and Schön (1978) who identified single-loop and double-loop learning. Single-loop learning involves the use of existing theories-in-use to solve problems when only a slight modification is needed. No fundamental re-evaluation of the norms, strategies and mechanisms in the foreign market occurs. In double-loop learning, the basic assumptions of theories-in-use are reconsidered and amended, involving those sorts of organizational inquiry which resolve incompatible organizational norms by setting new priorities and weightings of norms with a evaluation and restructuring of organizational norms, strategies and assumptions being required. Double-loop learning arises when firms are exposed to variation in the shape of new issues and opportunities, clients and institutions abroad, and learn completely new things. Some of this new knowledge is stored in the firm's routines and processes, thereby transforming the firm's current stock of knowledge (Nonaka, 1991). Routines and structures associated with successes abroad are more likely to be stored than those associated with failures (Cyert and March, 1963).

INTERNATIONALIZATION AND LEARNING

Through an adaptation of the Uppsala model (Johanson and Vahlne, 1977), Eriksson et al. (1997) modeled the effect of lack of experiential knowledge on cost of incremental commitments in the internationalization process of firms. They argued that firms develop routines and structures to manage operations in their home market but such routines and processes are not ”sensitive” to stimuli originating from overseas. In contrast to technology, other skills in firms may have a limited geographical application because of differences between the host and home countries (Buckley and Casson, 1976). As firms operate abroad, failure and success are achieved, firms learn, and their routines and administrative structures are amended. The model by Johanson and

Vahlne (1977) is based on the behavioral theory of the firm (Cyert and March, 1963; Aharoni, 1966), and on the theory of firms' growth (Penrose, 1959).

The Uppsala model claims that the internationalization process is: (1) experience based; (2) local; (3) sequential, and (4) relies upon feedback. It proposes that: (1) experience-based organizational routines and procedures drive firms' internationalization; (2) the internationalization of a firm is trial and error based, and (3) firms have imperfect knowledge of the institutions and customers abroad. Knowledge of institutions and customers abroad is accumulated by conducting international operations. This accumulated knowledge drives internationalization (Simpson and Kujawa, 1974; Sunzook, 1978; Ayal and Zif, 1979; Reid, 1984; Denis and Depelteau, 1985) by way of influencing the entry-mode selection (Johanson and Wiedersheim-Paul, 1975; Davidson, 1980; Gatignon and Anderson, 1988; Franko, 1989; Goodnow and Hansz, 1972; Kogut and Singh, 1988; Stopford and Wells, 1972; Green and Cunningham, 1975; Calof and Beamish, 1995) and the country-market selection (Hörnell, Vahlne and Wiedersheim-Paul, 1972; Nordström, 1991; Kogut and Singh, 1988; Vernon, 1966; Davidson, 1983; Weinstein, 1977; Erramilli and Rao, 1993) as well as expansion in the markets (Barkema, Bell and Pennings 1996).

In the process of internationalization, the knowledge accumulated in firms concerns business knowledge, institutional knowledge and internationalization knowledge (Eriksson et al., 1997). Knowledge is required about both the market and the firm, and compatibility between a firm's existing resources and those needed abroad is crucial (Madhok, 1996). Lack of knowledge generates costs in a new assignment abroad. We propose that accumulation of the above three kinds of knowledge is affected by variation in the internationalization process of firms.

Internationalization knowledge is about a firm's capability and resources to engage in international operations (Yu, 1990). It operates as a kind of repository in which knowledge may be retained over some period of time (Loftus and Loftus 1979), and supplies decisional stimuli and responses that are preserved in the firms and have behavioral consequences when recalled (Walsh and Ungson, 1991). *Business knowledge* concerns knowledge about competitive

situations in specific markets and about clients in these markets. *Institutional knowledge* is knowledge about the governance structures in specific countries, their rules, regulations, norms and values. The internationalization process model explicitly emphasizes that the internationalization of firms entails accumulating knowledge of particular markets and clients. In international markets, a lack of knowledge about a particular client's way of making decisions and his idiosyncratic requirements regarding products and services is problematic. Thus, there is a need to cultivate relationships to acquire first-hand experience of the customers' preferences, practices and customs, and to display the available products and services to potential clients (Denis and Depelteau, 1985). Operations in the market allow the internationalizing firm to accumulate the kind of institutional and business knowledge it requires, and to interpret the information in a firm-specific context (Carlson, 1974).

Research on learning shows a positive relationship between variation and knowledge accumulation in firms. Firms that are exposed to a variety of institutional and business actors are exposed to a wider variety of events and therefore learn more (Mezias and Glynn, 1993). Such firms are better at spotting problems, errors and opportunities than those firms only exposed to a narrow range of international business and institutional actors. Firms that remain in a single industry may continue to use the same knowledge base as well as the same routines and structures and thus may perform less well than firms exposed to a variety of industries. Operations in diverse markets, however, expose the firm to different clients and competitors and to diverse sets of institutional rules, norms and regulations (Argyris and Schön, 1978). Such firms are exposed to multifaceted change, tend to be more innovative on technical and marketing issues, and their managers are usually more knowledgeable (Mezias and Glynn, 1993). Also, firms operating in a variety of international environments are likely to possess multiple product and production technologies. Such firms attain more knowledge and gain advantages through being able to select the technology and production method that suit particular institutional environments and business actors abroad. Firms operating in a variety of cultural environments

may be better placed to reduce the cultural differences between one of its existing subsidiaries abroad and the cultural environments in a new international market. This is a source of advantage as differences between nations can make international operations difficult (Kogut and Singh, 1988; Barkema, Bell and Pennings, 1996).

Thus, being exposed to variation enables internationalizing firms to accumulate knowledge from a richer variety of business and institutional actors and a double loop-learning process more easily evolves in such firms. Exposure to a richer set of business actors and institutional environments may set in motion a process whereby current assumptions regarding business and institutional actors held by the internationalizing firm are confronted with a new "reality." The feedback process from this questioning may force the firm to reconsider and amend its existing theory-in-use as well as its organizational practices and strategies, and to develop new technological solutions, products and ideas. Also, firms operating in a variety of institutional and business environments may use a wider array of foreign market-entry modes, e.g., acquisition abroad, forming strategic alliances, and starting new ventures. Operating in a variety of environments is a critical asset and a source of advantage for internationalizing firms. A richer knowledge set is positive for the future internationalization of the firm as there is a higher probability that the new knowledge required for a new situation may have some similarity with the current stock of knowledge in the firm.

The above described positive relationship between variation, on the one hand, and knowledge, on the other, seems to hold in many studies of the internationalization of firms. Dunning (1988), for example, state that one of the advantages enjoyed by multinational companies over national firms is that they can accumulate knowledge from a number of countries. He argues that foreign direct investment is also undertaken with the aim of acquiring a location-specific advantage. Implicit in this view is that, by investing in a number of countries, firms acquire a richer stock of knowledge, which is a source of advantage for international firms. In the evolutionary process model of Perlmutter (1969), accumulating knowledge on international markets is important, and he makes

an explicit consideration of variations leading to knowledge accumulation. Also, a positive relationship between variation and the amount of knowledge accumulation is evident in the product-life-cycle model (Vernon, 1966; Wells 1972) and in the strategic-options theory (Bowman and Hurry, 1993; Kogut, 1983). Strategic-options theory, characterizing sequential foreign-market entry as a process of call options and learning, argues that knowledge from past foreign markets is used for future market entries. With a similar positive correlation between variation and knowledge accumulation in mind, researchers on internationalization frequently have used variation as a proxy for the operationalization of knowledge (Calof, 1994; Caves and Mehra, 1986; Gatignon and Anderson, 1988; Davidson, 1980, 1983; Erramilli, 1991; Madsen, 1989; Naidu and Prasad, 1994; Chang, 1995).

However, the three main economic-theory-based approaches to research in international business - the eclectic paradigm (Dunning, 1977, 1980, 1988), the transaction-cost approach (Williamson, 1975; Hennart, 1982), and internalization theory (Buckley and Casson, 1976) - do not investigate the effects of variation (Anderson and Gatignon, 1986; Beamish and Banks, 1987; Gatignon and Anderson, 1988) since they are static theories in which each decision is isolated from the others.

A CAUSAL MODEL OF VARIATION AND INTERNATIONAL KNOWLEDGE ACCUMULATION

Firms exposed to limited variation (e.g., single product, single client, single technology) are exposed to a limited number of customers, competitors and other business and institutional actors. Hence these firms accumulate limited knowledge which causes more failures and hurts their performance. There is also likely to be less innovation since such firms experience only a limited set of problems and of technical and market-related solutions. This makes the questioning of current theory-in-use, product profile, marketing practices and strategies towards consumers, competitors and other institutions narrow and rare. Thus, Davidson (1980; 1983) and Erramilli (1991) state here that firms that have been exposed to limited variation abroad accumulate limited knowledge of the institutions that exist in a country and of the principles on which they operate.

The learning processes in these firms are single-looped and of a lower order. These firms may have to acquire knowledge and develop new routines and structures to be able to successfully operate in a new market. This is problematic and expensive as such firms are less aware of the sources of new knowledge.

With the possible exception of Johanson and Vahlne (1977), the literature reviewed here does not differentiate among the three components of knowledge distinguished by Eriksson et al (1997). Johanson and Vahlne's model distinguished between market-specific and general market-knowledge. It argued that knowledge is usually associated with the *particular* conditions in the market in question and thus cannot be transferred to other individuals or other markets. The longer a firm operates in a market, the more the routines and processes in the firm are embedded in the country-specific environment and networks. Thus, important knowledge is market-specific, and variation does not improve market knowledge even though "knowledge of the operation can often be transferred from one country to another country" (Johanson and Vahlne 1977, p. 28), implying that it is improved by variation.

Following the dominant view in the literature, however, we formulate these three hypotheses:

H 1: Variation in foreign environments of the internationalizing firm has a direct positive effect on its foreign institutional knowledge.

H 2: Variation in foreign environments of the internationalizing firm has a direct positive effect on its foreign business knowledge.

H 3: Variation in foreign environments of the internationalizing firm has a direct positive effect on its internationalization knowledge.

It is implicit in the above hypotheses that variation broadens firms' absorptive capacity (Cohen and Levinthal, 1990). Variation improves a firm's capability to monitor and collect information on events in different markets. The knowledge gained assimilates with the current knowledge of the firm, allowing the firm an opportunity to interpret any incoming information from various

points of view. Confrontation, questioning and reconsideration occur and double-loop learning may emerge. Double-loop learning is also likely to take place because, as argued earlier, operations abroad in diverse environments could face unexpected failures and several failures force firms to question their existing strategies and practices. Based on the new experience, the basic assumptions underlying the business and institutional knowledge are questioned and reformulated. An interplay occurs between the internationalization knowledge and the business knowledge, and between the internationalization knowledge and the institutional knowledge. Thus, we hypothesize that, through the internationalization knowledge, variation has an indirect effect on the business and the institutional knowledge:

H4: Variation in the foreign environments of the internationalizing firm has an indirect positive effect on its foreign institutional knowledge through its internationalization knowledge.

H5: Variation in the foreign environments of the internationalizing firm has an indirect positive effect on its foreign business knowledge through its internationalization knowledge.

These five hypotheses are combined together in a model (Figure 1).

PUT FIGURE 1 HERE

METHODOLOGY

Our research methodology uses perceptual measures to identify the effect of variation on knowledge development in the internationalization process of firms. The components of the basic model are based on socialization processes (Zucker, 1991), which means that the informant's perceptions also represent the perceptions of their predecessors.

On the basis of information from 70 face-to-face interviews with the CEOs of Swedish service firms, a questionnaire-based statistical survey was conducted. We systematically searched for Swedish service firms engaged in international operations. Because *Statistics Sweden* did not have data on the international operations of the Swedish service firms, we used three sources: trade registers, industry registers and business publications. During the interviews, we also asked the respondents to supply the names of other firms in their industry that were doing business abroad.

Altogether, 774 companies were included in the mail survey. Their lines of business were as follows: legal services 4.5%, engineering and architecture 32.9%, computer software and data processing 9.9%, advertising 14.9%, accounting 4.7%, education 5.2%, management consulting 21.5%, and miscellaneous services 6.4%.

The questionnaires were addressed to the presidents of these companies, as they were deemed the most likely to be involved in the internationalization-decision process of their firms. A five-point Likert scale (ranging from “not at all important” to “very important”) was used.

In all, 73 questionnaires were returned undelivered and 49 companies expressed regret at their inability to participate for various reasons - the most common being that they were no longer engaged in international business activities. Of the remaining 652 potential respondents, answers were submitted by 409. This response rate of 62.7 percent compares favorably with rates reported in other surveys involving service firms (e.g., Zeithaml, Parasuraman and Berry, 1985; Erramilli, 1991). An additional 86 of the 409 were dropped from the analysis because they gave insufficient information on a number of variables. The remaining 323 firms provided data on all the key variables.

A standard test of the non-response bias was conducted. Early respondents were compared to late respondents, with late respondents being assumed to be most similar to non-respondents (Armstrong and Overton, 1977). Accordingly, the sample was split into two categories on the basis of survey return dates: the first 65 percent were classified as early respondents and the

remaining 35 percent as late ones. We found no significant differences between the two groups on variables such as the number of employees, the total turnover and the industry distribution. Thus, we deduced that a non-response bias was unlikely to be a problem.

DATA ANALYSIS

Our empirical analysis is built on a single structural model reflecting the five hypotheses, in which variation in the international business operations influences internationalization, institutional and business knowledge. Both direct and indirect effects of variation on the different experiential knowledge components were examined. As mentioned before, all five hypotheses postulate that there is a positive relationship between the dependent construct variation and the three knowledge components in the model.

Data analysis was conducted using the LISREL method, which is a structural-equations modeling method. Structural models are generated in two steps (Anderson and Gerbing, 1988): first, a higher-order variable is formed, representing some common latent properties of a set of indicators (That is, observed variables). A latent variable of this type is at a construct level, and will hereafter be referred to as a "construct." Second, structural models are formed by defining structural relations amoong several constructs. The entire structural models analyze relations at the construct level, corresponding to an intermediate level between theory and empirical observation, while the models are confirmative and exploratory (Anderson and Gerbing, 1988). LISREL assumes that the correlation between two sets of variables is independent of their error terms, and uses both correlations and error-term covariances in structural modeling. In so doing, the technique reflects a much truer variation in the data than a regular correlation would do (Lord and Novick, 1968).

The validity of LISREL models is estimated by estimating the validity of the entire model (nomological validity), the extent of the separation between constructs (discriminant validity), and the homogeneity of the constructs (convergent validity). Nomological validity is important since the structural model should be viewed as an entity, in which causal effects reinforce and

counteract each other in a complex pattern. For example, if the relation a→b→c is investigated, then a affects b, and b affects c, but a also affects c indirectly, through b. LISREL has a method for estimating direct, indirect and total effects in complex causal patterns. The overall fit of the LISREL models is assessed by χ^2 and degrees of freedom measures and through a probability estimate (p-value) (Jöreskog and Sörbom, 1993:121). χ^2 and the degrees of freedom together measure the distance between the data and the model while the p-value is a significance test. Together, these constitute our measure of nomological validity. Discriminant and convergent validity are judged by studying the t-values and the R^2 values of each relation in the model. The R^2 value is a measure of the strength of an estimate of the linear relationship (Jöreskog and Sörbom, 1993:121). As a test of significance, the t-values are studied (Jöreskog and Sörbom 1993:108). Missing values were treated by pairwise deletion and gave more or less the same result as listwise deletion.

Construct Analysis

Table 1 shows all the constructs with their indicators, t-values, factor loadings and R^2 values. All the figures show that the construct validity is high, i.e., all the t-values are above 1.96, all factor loadings are above 0.70 and the R^2 values are above 0.20 (see Appendix for the Correlation Matrix).

The construct “variation” is meant to capture the variation in the international setting. It refers to the foreign environments in which the firm operates on a scale comprised of four different geographical areas based on a broad interpretation of cultural blocs (Ronen and Shenkar 1985): 1) Scandinavia (outside Sweden); 2) rest of Europe; 3) USA/Canada, and 4) rest of the world (see Appendix). This operationalization is different from geographical dispersion in terms of number of countries (Barkema and Vermeulen 1998, Erramilli 1991). The geographical dispersion is often assumed to be equal to the differences among nations in terms of, for instance, cultural, institutional and business practices. However, the number of countries is a crude proxy, since it does not take into account how these countries are culturally related to each other. Therefore, we

have used a four-point scale based on cultural blocs, which captures more of the difference in culture and institutional conditions and thus adds to our knowledge of variation. This operationalization has also the additional advantage of being an objective measure.

Following Eriksson et al. (1997), the knowledge constructs are formulated in terms of *lack* of knowledge. This corresponds closely to the way managers view knowledge in association with foreign assignments. The construct "internationalization knowledge" represents the accumulated internationalization experience gained by a firm in conducting its international operations. It is a general intrafirm construct, and represents a firm's theory-in-use. The construct consists of two subjective measures: (1) the respondents' evaluations of the importance of a lack of experience in doing business abroad, and (2) of a lack of perceived unique knowledge and/or competence.

PUT TABLE 1 HERE

The construct "institutional knowledge" reflects knowledge about the institutional conditions of foreign markets. The construct consists of two indicators: (1) lack of knowledge about the laws, norms and standards in foreign markets, and (2) lack of knowledge about the language.

The construct "business knowledge" captures the knowledge concerning competitors, clients and markets abroad. The construct consists of two indicators reflecting two important ways of gaining foreign business knowledge: (1) the lack of foreign subsidiaries or representative companies abroad, and (2) the lack of cooperative agreements, including agreements with agents and alliance partners.

The construct "perceived cost" consists of one indicator based on the perception of the overall cost of executing an additional order for a client abroad. In order to get a measure that did not relate to any specific internationalization decision, we use a single indicator. This single indicator is assumed to capture the overall cost judgments made by managers. Additional implies receiving an assignment either from a new or an existing local or foreign customer.

The Effect of Variation

The hypothesized effects of variation on knowledge development in internationalizing firms are tested in a structural model (Table 2). Key statistics show that the model is nomologically valid (χ^2 is 18.79 with 14 d.f. at a p-value of 0.17, error covariance between variation and language having been added).

The first column in Table 2 contains the independent "variation" construct. The second column contains all dependent constructs of the knowledge-development model: internationalization knowledge, institutional knowledge, business knowledge, and perceived cost. The numbers in Table 2 are estimates of the effects of variation on each of the dependent constructs. The direct effects are in column 3, and correspond to Hypotheses 1 to 3.

Table 2 shows that hypotheses 1 and 2 were not supported, while hypothesis 3 gained support. There is no significant direct effect of variation on institutional (-0.04, t-value -0.58) and business knowledge (0.09, t-value 1.77), while there is a strong and significant direct effect of variation on internationalization knowledge (0.26, t-value 4.39). It is worth observing, however, that the effect on business knowledge is significant at the 10-percent level so that an effect cannot be definitely discarded.

In the next column in Table 2, the indirect effects of variation through internationalization knowledge on the institutional and business knowledge are displayed. These indirect effects correspond to Hypotheses 4 and 5. The column shows that these hypotheses are supported. The indirect effect on institutional knowledge is 0.20 with a t-value of 3.70. Correspondingly, the indirect effect on business knowledge is 0.16 with a t-value of 3.91. These indirect effects indicate double-loop learning in the internationalization process. This finding is reasonable since the construct internationalization knowledge refers to the firms' learning capacity, whereas institutional and business knowledge's concern learning in specific markets.

Total effects of variation are displayed on the right in Table 2. These total effects are all positive, meaning that the more variation an internationalizing firm is exposed to, the more the managers

feel that they have institutional knowledge, business knowledge and internationalization knowledge. Specifically, the effect of variation on institutional knowledge is 0.16, with a t-value of 2.30. Variation has got an effect of 0.25, with a t-value 4.11, on business knowledge. An interpretation of these results is that a firm develops knowledge about business and institutional factors by doing business in different international settings. Internationalization knowledge which mediates all those effects is a key construct in the model.

PUT TABLE 2 HERE

Variation has a positive effect on internationalization knowledge, meaning that its knowledge about how to go international is increased by having more variation in its international business settings.

The effect of variation on knowledge is also mirrored in the result that variation has an effect of 0.11, with t-value 3.64, on perceived cost. This shows that lack of variation is costly for firms, and that firms, which are not exposed to environmental variation do not develop their knowledge of how to handle business and institutional factors when internationalizing. Conversely, this means that greater variation increases knowledge and teaches the internationalizing firm how to manage a variety of situations. This has a lower cost associated with it when expanding internationally.

There is only a small difference in the effect that variation has on institutional and business knowledge's: its total effect on institutional knowledge is 0.16, compared to 0.25 for business knowledge. This is because the direct effect of variation on institutional knowledge is negative: even though this negative effect is statistically insignificant, it reduces the positive total effect. A comparable negative effect was found in a study of the effect of the duration of internationalization on the knowledge development model (Eriksson et al., 1998 p.209). Duration had positive effects in all cases, with the exception of the negative direct effect on institutional knowledge. It is interpreted there as: ”Over time, as the firm operates abroad, it realizes that

institutions are more complex than expected. Rules and regulations are unclear, and may be implemented in different ways by different agencies in different situations." The same reasoning applies to the direct negative effect of variation on the lack of institutional knowledge. The more variation a firm is exposed to, the more the firm becomes aware that institutions are more complex than anticipated.

CONCLUSIONS AND IMPLICATIONS OF THE STUDY

Our purpose was to investigate the effect of variation on the accumulation of knowledge in the internationalization process of firms. Three different kinds of knowledge were identified. Taking our lead from the literature on learning, we developed and tested five different hypotheses. This article, thus contributes to the developing trend in international business research to explain the internationalization process of firms in terms of learning and the accumulation of knowledge (Eriksson et al., 1997). Compared with other published research, however, this study has the advantage of relating variation in the foreign environments to which firms are exposed, to knowledge accumulation in these firms. Our study shows that this is a fruitful path to pursue, and we recommend further use of learning-based theories in internationalization research.

Furthermore, the analysis of H1-H5 supports the view that variation or diversity has a positive effect on the accumulation of knowledge in internationalizing firms. These findings complement the results obtained by, for example, Barkema and Vermeulen (1998) and Erramilli (1991) who observed a positive correlation between the variation to which firms are exposed and the choice of foreign market-entry modes and of foreign markets. However, these studies did not examine knowledge development empirically. Knowledge was only used as an argument with which to explain the effects of variation on the choice of entry mode and market. Since our study demonstrates that variation, in fact, has effects on knowledge accumulation, it contributes to the theoretical underpinning of those studies. The approach taken here has enabled us to analyze the effects that variation-based differences in the institutional, business and internationalization knowledge's of firms have on their choice of international markets as well on the choice of

international market entry mode (such as export, the creation of joint ventures or wholly owned subsidiaries, and acquisitions).

Internationalization knowledge captures the firm's absorptive capacity in internationalization. It points at the fact that when firms first go abroad, they are likely to be "ethnocentric" (Perlmutter, 1969) since their absorptive capacity is domestic-market based. Therefore, firms tend to start their internationalization with countries at a small psychic distance from their home country. These results further explain findings by Johanson and Vahlne (1977) and Johanson and Weidersheim-Paul (1975) that the internationalization process of firms is a slow one. In the initial stages of internationalization, the accumulated stock of internationalization knowledge that firms possess is limited. This restricts the learning by internationalizing firms and limits the additional steps that they take in the international market. The more novel the foreign environment, the more difficult it is for the internationalizing firm to accumulate further knowledge and to apply its current stock of knowledge in foreign markets. Consequently, the internationalization process of these firms is slow. On the other hand, the closer the relation between the foreign environment and the stock of knowledge a firm possesses, the more applicable this knowledge will be abroad. In such cases, the internationalization of firms can be rapid. This supports the findings by Sharma and Johanson (1987) and is a reason to take the initial knowledge base into consideration when studying firms that are born international. How does the existing knowledge base affect their internationalization process?

Internationalization knowledge is a key mediating construct in the model. All the effects of variation are mediated by the internationalization knowledge so that it is worth taking a closer look at the indicators of such knowledge. One concerns the lack of unique knowledge and the other the lack of foreign business experience. These can be seen as two interrelated aspects of internationalization knowledge. Thus, internationalization knowledge captures a firm's ability to apply and develop its accumulated unique knowledge as it gains foreign business experience in

such a way that supports further internationalization. Hence, one should examine this construct, in greater depth, because of its key role in the dynamics of internationalization.

Additional research issues arise from this study. What are the limits to the variation that firms can manage in their internationalization process? The variation to which firms are exposed increases the amount of information that they have to process, but how much information can internationalizing firms process without facing the problem of “information overload”? Increasing the variation may increase the cost of learning in the internationalization process of firms, but where does the limit lie? How does this affect the future internationalization of firms? Can firms influence the learning process by their strategic posture?

Appendix. Correlation Matrix.

Sample size = 323								
	1	2	3	4	5	6	7	8
1. FOREXP	1.00							
2. UNIQCOM	0.65	1.00						
3. COST	0.35	0.27	1.00					
4. LANGUAGE	0.50	0.40	0.29	1.00				
5. INSTITUTE	0.53	0.37	0.30	0.59	1.00			
6. SUB	0.46	0.32	0.35	0.25	0.34	1.00		
7. COOP	0.48	0.40	0.34	0.35	0.35	0.71	1.00	
8. VARIATION	-0.24	-0.16	-0.12	-0.28	-0.12	-0.17	-0.24	1.00

The managers were asked the following questions:

1. How many wholly-owned companies, joint ventures and cooperative agreements does your campany have each in the following geographical areas?

Four different geographical areas were specified, namely, (1) Scandinavia (outside Sweden); (2) rest of Europe; (3) USA/Canada, and (4) rest of the world.

2. How important are the following factors as obstacles for the possibilities of your firm to acquire assignments from abroad?

- High costs
- Lack of language knowledge
- Lack of knowledge of foreign laws/norms/standards
- Lack of subsidiaries/branches outside Sweden
- Lack of cooperative agreements with foreign firms
- Lack of foreign experience
- Lack of unique knowledge/competence

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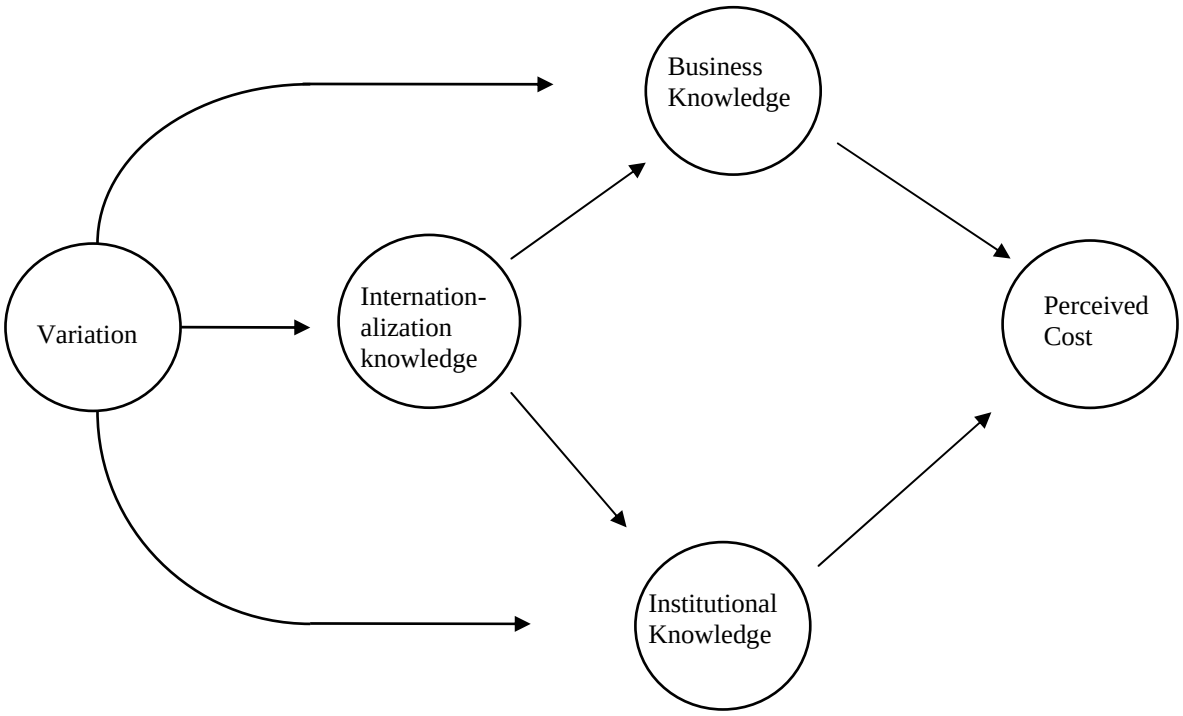

Figure 1. The Hypothesized Effect of Variation on the Accumulation of Knowledge.

Table 1
The constructs and their indicators in the structural model

Constructs	Indicators	λ	R^2	t
Variation	VAR	1.00	1.00	
Internationalization knowledge	FOREXP	0.91	0.84	15.66
	UNIQCOM	0.71	0.50	11.69
Business knowledge	COOP	0.86	0.74	12.40
	SUB	0.84	0.70	12.40
Institutional knowledge	INSTITUT	0.77	0.60	8.91
	LANGUAGE	0.76	0.58	8.92
Perceived cost	COST	1.00	1.00	

Abbreviation of indicators

VAR	Variation in number of geographical areas
COOP	Lack of cooperative agreements with foreign firms
SUB	Lack of subsidiaries/branches outside Sweden
INSTITUT	Lack of knowledge of foreign laws/norms/standards
LANGUAGE	Lack of foreign language knowledge
FOREXP	Lack of foreign experience
UNIQCOM	Lack of unique knowledge/competence
COST	Perceived high costs

Table 2
Direct, indirect and Total Effects of Variation on Knowledge

Independent Construct	Dependent Construct	Direct Effect	Indirect Effect	Total Effect
Variation	Institutional knowledge	-0.04 (-0.58)	0.20 (3.70)	0.16 (2.30)
	Business knowledge	0.09 (1.77)	0.16 (3.91)	0.25 (4.11)
	Internationalization knowledge	0.26 (4.39)		0.26 (4.39)
	Perceived cost		0.11 (3.64)	0.11 (3.64)

Note: Figures are coefficients, with t-values in brackets.