Profitability of Japanese Companies in Brazil: The Role of Firms' Local and International Experiential Knowledge and Subsequent Investment Decision

Autoria: Mario Henrique Ogasavara

This study attempts to empirically investigate how the firms' local and international experiential knowledge affect performance of its overseas subsidiaries. The accumulation of this knowledge is important because multinational companies usually face a certain level of uncertainty when investing in a culturally different market. Additionally, this paper proposes that a firm can acquire local experiential knowledge not only by operating for a long time in the local market as shown by previous studies but also by increasing the number of investments in the host country. In other words, the subsequent investment decision in the same local market helps firms to achieve a higher profitability of overseas subsidiaries. The empirical tests are performed using a random-effect model of generalized least squares regression which is applied to cross-sectional time series data. The performance information is based on profitability subsidiary-level data of Japanese companies located in Brazil.

Introduction

Foreign investors must meet some challenges in the process of firm internationalization by establishing subsidiaries abroad. Usually multinational companies face uncertainty and are subject to the "*liability of foreignness*" (Hymer, 1976), which is associated with the cost of doing business outside the firm's home country. As the multinational enterprise accumulates knowledge through experience (Barkema *et al*., 1996), building relations with local suppliers, working with governmental agencies, and recruiting local employees, its liability of foreignness should decline (Chang and Rosenzweig, 1998) and perhaps even disappear (Zaheer, 2002).

Many scholars have observed the importance of experiential knowledge in the process of firm internationalization (Johanson and Vahlne, 1977; Eriksson *et al*., 1997). The term experiential knowledge refers to all types of knowledge that firms accumulate by being active in foreign markets and implies the ability to search, analyze, and act on international business issues in local markets (Blomstermo *et al*., 2004). Johanson and Vahlne (1977) consider that experiential knowledge is also important for subsequent expansion of operation in a host country, as well as the increasing resource commitments in foreign markets. Since initial investments build network capabilities and learning process (Song, 2002), previous experience in a host country tends to increase the probability of choosing the same location for subsequent foreign direct investment (Davidson, 1980).

Although previous research found that experiential knowledge can reflect on higher performance, most studies have analyzed this approach on performance at corporate level (Delios and Beamish, 1999a; Lu and Beamish, 2001). There are some studies based on performance at subsidiary level, however, they are limited to the sample of investments in developed countries (Li, 1995) or Asian developing countries (Makino and Delios, 1996; Carlsson *et al*., 2005). Few studies have paid attention to emerging economies outside the Asian region.

Previous studies have found that accumulation of experiential knowledge led to enhanced performance while other stream of research emphasizes the importance of experiential knowledge for the decision of subsequent investments into the same location (Kogut and Singh, 1988; Chang and Rosenzweig, 1998; Song, 2002). Surprisingly, no study has attempted to investigate whether or not firms that decided to invest sequentially in the host country, in fact, achieve higher level of subsidiary profitability compared to firms that had made only one investment.

This study distinguishes itself from previous research as it examines the effect of firms' international and local experiential knowledge and subsequent investment decision on subsidiary performance by investigating Japanese foreign direct investment (FDI) in Brazil. More specifically, this paper analyzes whether or not subsidiaries of a parent firm with subsequent investment decision in the local market achieves a higher level of profitability compared to subsidiaries of a first-time investor. Attention to a single country permits the study to obtain firms' actual performance. By examining a single host country (Brazil) and a single FDI outflow country (Japan), it holds the country effects constant which allow for a greater theoretical and empirical attention to firms FDI performance (Hennart, 1991). Japanese multinational companies provide an appropriate sample for this study because Japanese firms typically tend to follow a pattern of sequential entry by incrementally increasing their commitment to foreign markets through investments over a long period of time (Chang, 1995).

Literature Review and Hypotheses

The internationalization process of the firm requires some knowledge to compete successfully with host country firms in their own markets (Cohen and Levinthal, 1990). This market knowledge is necessary to deal with culturally different employees, suppliers, and customers. In addition, firms need to adapt its production systems to local infrastructure, to deal with local governments, and other local actors. In the internationalization model, Johanson and Vahlne (1977) propose that relevant market knowledge can be divided into objective knowledge and two types of experiential knowledge: general knowledge and market-specific knowledge.

Objective knowledge is acquired through standardized methods, can be learned by studying a new market before entering it, and includes knowledge of market size, customer purchasing power, laws, and regulations. This information can be collected through secondary sources such as newspaper articles, magazines, reports, and internet as well as public and private databases. This knowledge is relatively easy to acquire and should not be of crucial importance for the performance of firms in the host country (Denis and Depelteau, 1985).

General knowledge refers to marketing methods, formalities connected with purchases, sales, payments, employees, and common characteristics of certain types of customers and suppliers, irrespective of their geographical location. General knowledge is acquired from international operations in general and can often be transferred from one to another country (Johanson and Vahlne, 1990). A longer experience of international operations allows the firm to better understand the complexity of cognitive, normative, and regulatory domains in different markets, and consequently more general knowledge the firm has acquired. Hence, internationalization is a gradual process in which firms accumulate experiential knowledge over time (Blomstermo *et al*., 2004).

Another way to acquire experiential knowledge is by operating many subsidiaries in a number of countries (Huber, 1991), building a repertoire of knowledge and skills in dealing with different requirements from the environments (Zahra *et al*., 2000). Therefore, in this study the term firms' international experiential knowledge is employed to define the general knowledge that firm has acquired in terms of length of time and scope of operating international subsidiaries.

Previous research has shown a positive relationship between general knowledge and firm performance. In an investigation of corporate performance of Japanese manufacturing companies, Delios and Beamish (1999a) found that geographic scope is positively associated

with firm profitability. Geographic scope is measured by the number of subsidiaries and the number of countries invested abroad. Using a sample of Japanese small and medium-sized enterprises, Lu and Beamish (2001) also found that greater levels of FDI are associated with higher performance. However, these studies focused on performance at the corporate level, and not at the subsidiary level. Hence, it will be interesting to use subsidiary level data to test the effect of firms' international experiential knowledge on subsidiary performance. It is expected that as firms accumulate experiential knowledge in terms of length of time and scope by operating in different environment, this portfolio of knowledge can be transferred to its subunits, and consequently it will reflect on increasing of subsidiary performance. Thus, it is hypothesized that:

Hypothesis 1: *The accumulation of firms' international experiential knowledge (length of time and scope of overseas subsidiaries) is associated with a higher subsidiary performance.*

Furthermore, firms can also learn from outside the local market, which allows organizations to transform their experience into competitive advantage (Teece *et al*., 1997). Learning outside the local market can be related to the function of the firm's prior level of related knowledge (Cohen and Levinthal, 1990). Learning is cumulative, and the ability to learn is greatest when the object of learning is related to what is already known. The more knowledge a firm has about a market, the easier and faster it can gain knowledge about a related market (Carlsson *et al*., 2005). Pan and Li (1998) suggest that join-ventures in China tend to be relatively successful if the foreign partner has been exposed to Greater China. In this sense, the experience accumulated in countries that are more similar to the local market seems to be an important factor for lowering uncertainty, and consequently enhancing subsidiary performance, thus:

Hypothesis 2: *The firms' international experiential knowledge in countries that have more similar culture to the local market is associated with a higher subsidiary performance.*

Experiential market-specific knowledge is defined as the knowledge about the specific market and its characteristics. It is critical in firms' internationalization (Penrose, 1959). This market-specific knowledge cannot be acquired as easily as objective knowledge, because information tends to be complicated and tacit (Johanson and Vahlne 1977), and such knowledge is difficult to acquire through contracts (Hennart, 1988). The experiential market-specific knowledge can be learned only through learning-by-doing (Huber, 1991). Firms need to experience the local market to establish the initial knowledge base and to understand and evaluate the context of host country (Cohen and Levinthal, 1990). In general, having a longer presence in the local market allows the firm to interact with a variety of workers, customers, suppliers, and other local actors (Zahra *et al*., 2000), it helps the firm to learn more about the host country, to develop more capabilities (Chang, 1995), and to increase know-how of doing business in the market (Luo and Peng, 1999). On the one hand, the accumulation of knowledge in a host country is time-consuming. On the other hand, it helps the firm to overcome its initial concerns about foreign operations, while reducing operational uncertainties and enhancing performance (Makino and Delios, 1996).

Furthermore, firms can acquire market-specific knowledge by operating other subsidiaries in the same host country. A firm that accumulates prior knowledge in the market can be in an advantageous position to assimilate and exploit new knowledge (Cohen and Levinthal, 1990). According to Song (2002), by establishing several subsidiaries in the same host country, a firm could benefit from greater scale economies by sharing facilities, personnel, and other resources across subsidiaries. Hence, a firm intensifies the local knowledge by increasing social networks with suppliers, business and community leaders, and government officials. In this study, the term firms' local experiential knowledge is adopted to

define the experiential market-specific knowledge that a firm has acquired in terms of length of time and scope of operating local subunits.

Carlson (1975) argues that the more different the foreign market is compared to the firm's current markets, the more difficult it is for the firm to gain experiential market-specific knowledge. Firms usually have better knowledge about opportunities and business alternatives in their immediate surroundings than about far away markets. Hence, it takes a long time to gather and interpret market information from markets that are at a long physic distance from the firm's current markets. Given the physic distance, cultural and institutional difference between Japan and Brazil (Hofstede, 1980, 1991)[1], and because both countries are classified as independent from other cluster countries (Ronen and Shenkar, 1985), the Japanese firms would have a great need to learn about local culture and business practices in Brazil. Consequently, accumulation of firms' local experiential knowledge will be crucial for Japanese subsidiaries to achieve greater profitability. Therefore, it is hypothesized that:

Hypothesis 3: *The accumulation of firms' local experiential knowledge (length of time and scope) is associated with a higher subsidiary performance.*

Kogut (1983) proposes that FDI has also been understood as a sequential process, where initial investments affect the nature and timing of subsequent investments. Multiple foreign markets entries are not random, but follow a logic process based on capability development. In accordance with this view, Johanson and Vahlne (1977) argue that subsequent expansion of operations in a host country might be based on gradual acquisition and application of experiential knowledge about operations in the local market as well as the incrementally increasing resource commitments to foreign markets.

Previous research has focused on the firm motivation (Chang, 1995) and entry decision of multinational companies (Chang and Rosenzweig, 1998) that provide subsequent investment into a local market. However, given that previous experience in a host country tends to increase the probability of choosing the same location for subsequent investments (Davidson, 1980; Kogut and Singh, 1988; Song, 2002), and based on findings that accumulated experiential knowledge achieves greater profitability (Luo and Peng, 1999; Delios and Beamish, 2001), there remains the question whether or not firms with subsequent investment decisions in the same host country will in fact enhance the profitability of its subsidiaries.

Foreign direct investment by firms engaged in subsequent investments would receive more benefit from firms' local experiential knowledge such as the network of its subsidiaries. In other words, a firm could have greater scale economies by sharing facilities, information and knowledge about local market in relation to customers, suppliers, specific regulations and laws, and other resources across subsidiaries (Song, 2002). By contrast, firms without subsequent investment in the host country realize little benefit of network information, because it is restricted to its own customers, suppliers, and government institutions. Based on these assumptions it is hypothesized that:

Hypothesis 4*: Firms that invested sequentially in the local market achieve a higher level of subsidiary profitability than firms that did not.*

Sample

For this study, subsidiary level data were collected on all Japanese investments in Brazil from 1998 to 2002, which were derived from two main data sources. First, the 2002 and 2004 editions of *Anuário: Empresas Japonesas no Brasil – Burajiru Nikkeikigyo Nenkan*

(Yearbook: Japanese companies in Brazil), a yearbook published in Brazil since 1974, and provides extensive information of investments established by Japanese firms. It is a bilingual edition published in Portuguese and Japanese. The 2002 and 2004 editions of this yearbook cover the end of fiscal year from 1998 to 2002. Second, the 1999 to 2003 issues of *Kaigai Shinshutsu Kigyou Souran: Kuni Betsu, Kaisha Betsu* (Toyo Keizai Databank: Japanese Overseas Investments: by country and by company), an annual directory of the foreign investments of Japanese firms listed on the Japan stock exchanges (Tokyo, Osaka, and Nagoya), as well as by major unlisted Japanese firms. It is published in Japanese by Toyo Keizai, Inc. since 1970. The initial dataset contains a list of 447 subsidiaries established by 286 Japanese firms in Brazil.

From each subsidiary, the major Japanese parent firm was listed and information obtained in both databases mentioned earlier. An additional parent company information was collected from 1999 to 2003 editions of *Nikkei Kaisha Nenkan: Jyoujyou Kaishaban* (Nikkei Annual Corporation Report: Listed Companies) and *Nikkei Soukan: Mijyoujyou Kaishaban* (Nikkei Annual Corporation Report: Unlisted companies).

Where required, additional subsidiary information was gathered from various editions of *Exame Melhores e Maiores* (Exame Magazine - Biggest and Best), which supplies detailed data and information of top 500 private companies in Brazil. The publication includes company balance sheets, reports, economic scenarios, and market trends. In addition, it used various issues of *Valor 1000* (Value 1000), which provide financial information of top 1,000 private companies in Brazil; and *Infoinvest Análise de Empresas* (Company Analysis), an electronic dataset available on internet which includes annual reports, balance sheets and information of 2,832 companies in Brazil.

The unit of analysis of this study is the subsidiary performance based on financial outcome measures between the periods 1998 and 2002. From the original sample of 447 subsidiaries, the sample was reduced to 119 cases. Due to incomplete data for all independent variables used in this study, it resulted in a final count of 110 subsidiaries for the analysis. Hence, based on a cross-sectional time series design, which means that each subsidiary contains information of five years (1998-2002), this study provides a total of 550 observations.

In order to investigate whether or not the reduced sample considered in this study is equals to the full sample, a standard *t*-test of non-response bias was conducted. The null hypothesis is that the averages of both samples are equals. Because the analysis of this study focused on a firm experiential knowledge, a *t*-test on a parent firm years of experience in the local market was performed. Although not reproduced in this paper (analysis is available upon request), the results revealed no significant differences (i.e. the parent firm experience in the host country) between subsidiaries in the reduced sample and subsidiaries in the full sample.

Dependent Variable

The dependent variable is subsidiary performance. Previous research on Japanese FDI had used Toyo Keizai Inc. database as the main source of subsidiary performance (Woodcock *et al*., 1994, Delios and Beamish, 2001), measured by the managerial assessment of profitability on a scale of three performance levels (loss, breakeven, and gain). However, in the Brazilian case, the number of subsidiaries that reported this subjective performance measure was decreasing year after year, and for the end of fiscal year 2002, it has listed only 28 cases. Furthermore, no study has attempted to investigate empirically the objective measure of subsidiary performance in an emerging country outside the Asian region.

Therefore, this study defines a subsidiary performance using accounting-based

measures as in prior studies (Tallman and Li, 1996; Delios and Beamish, 1999a). The accounting-based measure was obtained from financial ratio-based performance reported in *Anuário: Empresas Japonesas no Brasil*, and where required, additional performance data were gathered from *Exame Melhores e Maiores*, *Valor 1000*, and *InfoInvest Análise de Empresas* databases. The return on sales (ROS)[2], defined as *Profit before Tax* divided by *Total Sales*, is employed to measure subsidiary performance in term of profitability.

The use of objective measure subsidiary performance (i.e. profitability ratio) can provide a good contribution to the international business literature. First, it is well recognized that profitability ratio at subsidiary level is very difficult to obtain (Woodcock *et al*., 1994), which gives some constraints to the investigation on subsidiary performance. Second, most studies have used subjective measure instead of objective measure based on the assumption that subjective and objective measures of performance are highly correlated (Geringer and Hebert, 1991). However, the results obtained by Geringer and Hebert (1991) could not include actual profit ratios as one of their objective measures because the data were not available. The assumption was based on the managers' interviews, which revealed that their assessment of success and whether the profitability of the venture was better than expected were positively and significantly correlated. Thus, this study provides a great opportunity to test whether or not the data based on profitability ratio at subsidiary level can be a good measure for performance. Third, for the investigation on subsequent FDI, Li (1995) suggested the need for a future research applying different measures of performance rather than firm survival.

Independent Variables

This study adopts independent variables such as firms' international experiential knowledge, firms' local experiential knowledge, subsequent investment, and some control variables which are expected to enhance performance of Japanese subsidiaries in Brazil.

International experiential knowledge

- ***Length of time of international experiential knowledge [INT_LENGTH]*** - This variable measures the length of time of the parent firm's international experience by operating overseas subsidiaries. It is defined as the total number of years (in a logarithmic form) the parent firm had established international investment (i.e. a different country from Brazil) until the year of analysis.
- ***Scope of international experiential knowledge [INT_SCOPE]*** – This variable considers the parent firm's network of subsidiaries abroad. It is measured by the parent firm's total number of foreign subsidiaries, calculated as the number of overall subsidiaries that the parent firm established overseas minus one (focal subsidiary).
- ***International experiential knowledge of weighted average of cultural similarity with the local market [INT_CULT_SIMIL]*** – This variable is computed in three steps. First, it applies the composite index developed by Kogut and Singh (1988)[3], which many studies have subsequently used as a measure of cultural distance (Barkema *et al*., 1996; Padmanabhan and Cho, 1996). Based on this composite index, it implies that a lower value of this index indicates low cultural distance of the *j*th country to Brazil; conversely a higher value means high cultural distance. It is necessary to "weight" this composite index in order to obtain a "high weight" for countries with low cultural distance (high cultural similarity), and a "low weight" for countries with high cultural distance (low cultural similarity) to Brazil. Thus, the second step transforms the composite index into a "weight" (WCS_j) by subtracting the cultural distance index from a constant value[4]. However, the new variable of cultural similarity (WCS_j) needs some other adjustments[5]. Thus, the third step is to apply the "weighted average" of the cultural similarity index of different countries that the parent firm established subsidiaries[6].

In order to control the effect of both firms' international experiential knowledge in

terms of length of time [INT_LENGTH] and in terms of experience in countries with similar cultures [INT_CULT_SIMIL], an interaction term is considered in the analysis [INT_LENGTH*INT_CULT_SIMIL].

Local experiential knowledge

- ***Length of time of local experiential knowledge [LOC_LENGTH]*** **–** it is based on the parent firm's years of experience in the local market. It is computed as the logarithmic form of the total number of firm's years of experience in the host country.
- ***Scope of local experiential knowledge [LOC_SCOPE]*** – This variable measures the parent firm's network of subsidiaries in the host country. It is defined as the number of subsidiaries the parent firm established in the local market.

Subsequent Investment

- ***Scope of local experiential knowledge for subsidiaries of first-time entrants [1_INVEST]*** – This dummy variable measures the subsidiaries of first-time investors. It is assigned "1" for subsidiaries of a parent firm with only one investment in the local market, and "0" otherwise. In other words, this dummy variable refers to subsidiaries of parent firm without subsequent FDI in the local market.
- ***Scope of local experiential knowledge for subsidiaries of a parent firm with two to four investments [2-4_INVEST]*** – This dummy variable measures the subsidiaries of a parent firm with two to four investments in the local market. It is assigned "1" for subsidiaries of a parent firm with two to four investments, and "0" otherwise.

Control Variables

As suggested in previous research (Pan and Chi, 1999), some control variables are included to ensure that the findings have been adjusted for other potential impacts that may influence subsidiary performance. In order to control for industry effects, as in Kogut and Singh (1988), a dummy variable [INDUST] is included which gives a value of "1" for manufacturing firms and value of "0" for non-manufacturing firms.

The degree of control of the parent firm over its subsidiary also figures prominently (Luo and Peng, 1999). According to Tallman and Shenkar (1994), the multinational company has a greater influence over its wholly-owned subsidiaries than over joint ventures. Therefore, a dummy variable [D_CONTROL] is coded as "1" if the parent firm has full control over its subsidiary (wholly-owned subsidiary), and "0" if the firm shares the control with a local partner (international joint ventures)[7].

Following Delios and Beamish (1999b) study, a dummy variable is considered to compare the main line of business of the Japanese parent firm with the subsidiary's industry [RELATED], where related entries are coded as "1", and "0" for unrelated entries.

The subsidiary age is considered to control the effects of operation length in the local market. But when the length of time is considered in terms of operations years in the host country, this measure is highly correlated with the parent firm years of operation in the local market [LOC_LENGTH]. Thus, it is assigned a dummy variable [SUB_AGE] to control for this effect based on the mean and median of a subsidiary age (28 years) in the sample. Therefore, it is coded "0" for subsidiaries with less than 27 years of operation (52 cases), and "1" for subsidiaries with more than 28 years of operation in the local market (58 cases).

A logarithmic transformation of the number of employees in the subsidiaries [SUB_SIZE] is used to control the size of subsidiary (Tallman and Li, 1996), and the size of parent company [PAR_SIZE] is controlled using a logarithmic transformation of the parent firm's total sales (Siripaisalpipat and Hoshino1999).

For international experiential knowledge, it is necessary to control the decaying effect of international experience. Previous research has indicated that the benefit of experience to organizations may decay over time due to forgetting and antiquation of learning (Argote *et al*., 1990). In order to control the possibility of decaying effect of experience, a control variable is considered by using the coefficient of variation in firms' international experience [CV_INT_EXP]. The coefficient of variation is computed by dividing the standard deviation of international experience in year *t* (i.e. 1998 to 2002) of the parent firm X by the mean of international experience in year *t* of the parent firm X. By using the coefficient of variation, it is possible to estimate the variance of firms' international experience.

Empirical analysis and discussion

This study attempts to investigate how the international and local experiential knowledge of a foreign parent firm affect performance of its subsidiaries.

As a preliminary step to run the statistics, the correlation among the independent variables was verified for possible signs of multicollinearity. Due to a page limitation, the correlation matrix is not reported in this paper and is promptly available upon request. A high correlation was found between the variables LOC_SCOPE with INT_SCOPE (0.899), thus the orthogonalization technique was applied in *Model 3,* using a modified Gram-Schmidt procedure (Cohen and Cohen, 1983) that partials out the common variance creating transformed variables that are uncorrelated with one another. The order of variables determines the orthogonalization. In this case, LOC_SCOPE is the most important predictor for a subsidiary performance (ROS), thus this variable is listed first followed by INT_SCOPE. After this transformation in these models, the variance inflation factor (VIF) was examined to determine the existence of multicollinearity under each model in *Table 1*. The results reveal that the VIF scores for each independent variable does not achieve the critical point of 10 (Chatterjee and Price, 1991), indicating that multicollinearity should not be a problem with these data.

In order to examine the impact of firms' international and local experiential knowledge on subsidiary performance, a random-effects model of generalized least squares with AR(1) disturbance was applied to cross-sectional time series data[8]. Performance of a subsidiary is explained by the following model:

Subsidiary Performance = f [Parent firm's international experiential knowledge, Parent firm's local experiential knowledge (Subsequent FDI decision)]

The model can be expressed as:

$$y_{it} = \alpha + x_{it}\beta_1 + \nu_i + \varepsilon_{it} \qquad i = 1,...,N; \qquad t = 1,...,T_i \qquad (1)$$

where $\varepsilon_{it} = \rho\varepsilon_{i,t-1} + \eta_{it}$ and where $|\rho| < 1$ and η_{it} is independent and identically distributed (i.i.d) with mean 0 and variance σ_η^2 .It is assumed ν_i to be realizations of an i.i.d. process with mean 0 and variance σ_η^2 . Furthermore ν_t are assumed to be independent of both the ε_{it} , and the covariates x_{it} (random-effects model).

Five different models with all control variables are tested and reported in *Table 1*. *Model 3* considers all variables together, however because the variables [INT_SCOPE] and [LOC_SCOPE] are highly correlated as mentioned earlier, the orthogonalization technique was applied using a modified Gram-Schmidt procedure in order to make them mathematically independent (Cohen and Cohen, 1983).

Model 1 considers the effect of parent firm's international experiential knowledge on subsidiary performance. As shown in *Table 1*, the coefficients of length of time of international experiential knowledge [INT_LENGTH] and the scope of international experiential knowledge [INT_SCOPE] are positively and significantly associated with performance. This suggests that the accumulation of parent firm's international experience, in terms of time and scope, enhances subsidiary performance. For the variable that considers the cultural similarity between *j*th countries and Brazil [INT_CULT_SIMIL], it shows to be positively and significantly associated with performance. This implies that the parent firm's international experience in countries of similar culture to the focal market has impact on a subsidiary performance. This is associated with the firm's absorptive capacity, which is the ability to recognize the value of new, external information, and to assimilate and apply it (Cohen and Levinthal, 1990). Experience outside the local market is likely to be helpful if firms can select routines that are beneficial for transfer to the local market. The interaction term between length of time [INT_LENGTH] and cultural similarity [INT_CULT_SIMIL] of international experiential knowledge [INT_LENGTH*INT_CULT_SIMIL] shows a negative but insignificant coefficient.

With regards to control variables, the coefficients of subsidiary size [SUB_SIZE] and parent size [PAR_SIZE] are statistically significant, but interestingly both are negatively related to performance measure. This means that size of subsidiary [SUB_SIZE] matters for subsidiary performance, implying that small-sized subsidiaries achieve a high level of profitability than large-sized firms. Luo and Peng (1999) also found this negative relationship between subunit size and performance using a sample of subsidiaries operated in a developing country (China), and noted that size is only marginally important for sales growth, but irrelevant to other performance measures. In another study involving Japanese investment in a developing country (Thailand), Siripaisalpipat and Hoshino (1999) found that a firm size seems to be negatively associated with performance, and suggested that large-sized firms usually aim at maintaining stable and long term growth, thus satisfying with moderate profit rates. In addition, the negative effect of parent firm size on subsidiary profitability can also be explained by the transfer pricing. Larger firms may be more likely to "move" taxable income from Brazilian subsidiaries. For other control variables [INDUST, RELATED, D_CONTROL, SUB_AGE, CV_INT_EXP], it is found not to be statistically significant with subsidiary performance.

Model 2 tests the impact of firms' local experiential knowledge on subsidiary performance. In accordance with expectation, the coefficients of length [LOC_LENGTH] and scope [LOC_SCOPE] of firms' local experiential knowledge are positively and statistically significant related to subsidiary performance. These findings suggest that accumulation of firms' market-specific knowledge constitute an important force to increase the profitability of its subsidiary. As a firm gains experience by operating its subunits for a long period of time in the local market, it helps to learn more about the host country, and consequently it reduces operational uncertainty and enhances subsidiary performance. In addition, as the firm expands with more investments, increasing the network of subsidiaries into the same local market, a greater scale of economy is achieved by sharing facilities, personnel and other resources across subsidiaries (Song, 2002), it also leads to improvement of the profitability of its subunits. In other words, the firm subsequent investment decision allows to efficiently transfer knowledge and experience within subsidiaries, and consequently it reflects on achieving a higher level of subsidiary profitability. For the control variables, the findings showed the same results as reported in *Model 1*.

Model 3 considers the impact of both firms' international and local experiential knowledge on subsidiary performance. The results show that firms' international experiential

knowledge [INT_LENGTH and INT_CULT_SIMIL] and also the firms' local experiential knowledge [LOC_SCOPE and LOC_LENGTH] are positively and significantly associated with subsidiary performance. This implies that the firms' international experiential knowledge in terms of length of time operating in international markets, and the accumulation of firms' local experiential knowledge in terms of length of time of operation and scope of subsidiaries in the local market, help firms to increase the profitability of its subsidiaries. In addition, the international experience in countries that are more culturally similar to the local market has positive effect on a subsidiary performance. The coefficient of international experiential knowledge in terms of scope of subsidiaries [INT_SCOPE] becomes not statistically significant when considered with all variables in the analysis. The interaction term [INT_LENGTH*INT_CULT_SIMIL] reveals a negative but insignificant coefficient. For the control variables, the findings showed the same results as reported in *Model 1*.

In *Model 1, Model 3* and *Model 5* the decaying effects of international experience is controlled with the coefficient of variation of firms' international experience [CV_INT_EXP]. Another way of capturing the decaying effects can be obtained by computing a discount factor in the variable [$\frac{INT\_LENGTH}{Discount}$]. Although not reproduced in this paper (available upon request), three discount factors are considered in the analysis as suggested by Ingram and Baum (1997). First, the discount factor is equal to square root of the age of the first international experience which assumes that depreciation of the experience is initially slower than linear, and slows further with time. Second, the discount factor is equal to the age of the first international experience, which assumes a linear depreciation in the value of prior experience. Third, the discount factor is equal to the age of the first international experience squared, which assumes that the value of past experience depreciates more rapidly than linear at first, and then accelerates further with time. The results reveal similar findings as shown in *Table 1*. This implies that the length of time of international experience [$\frac{INT\_LENGTH}{Discount}$] is positively and significantly associated with performance. But the benefit of experience to organizations may decay over time due to forgetting of knowledge gained from experience in the past and possible antiquation of learning due to environmental change (Argote *et al*., 1990).

In order to improve the analysis by considering at the same time in the regression model the subsequent FDI and the scope of firms' local experiential knowledge, two dummy variables are applied: [1_INVEST] refers to subsidiaries of first-time investors; and [2-4_INVEST] considers subsidiaries of a parent firm with two to four investments in the local market. Both dummy variables are compared to the subsidiaries of a parent firm with more than five investments in the host country, which is the reference measure. Because these dummy variables are constructed based on [LOC_SCOPE], both dummy variables are used instead of [LOC_SCOPE]. The results are depicted in *Table 1* with *Model 4* and *Model 5*.

Model 4 tests only the effect of firms' local experiential knowledge on subsidiary performance. In terms of subsequent FDI, the result shows that the coefficient of [1_INVEST] is negative and statistically significant. The negative sign means that subsidiaries of first-time investors (i.e. subsidiaries with no subsequent FDI) achieve lower performance than subsidiaries of a parent firm with more than five investments in the local market (i.e. subsidiaries with subsequent FDI). Concerning scope of subsidiaries in the local market, the outcome shows a negative and significant coefficient for subsidiaries of a parent firm with two to four investments [2-4_INVEST]. It suggests that increasing the number of subsidiaries in the local market reflects on a higher level of profitability. The coefficient [LOC_LENGTH] is positive and significant, implying that a longer operation in the host country is an important factor to achieve a higher level of subsidiary performance.

Table 1 – Random Effects GLS Regression with AR(1) disturbances for Subsidiary Performance (Full Sample, Dependent Variable = ROS)

Variables		Model 1	Model 2	Model 3	Model 4	Model 5
Constant		0.417 *** (2.62)	0.255 * (1.71)	0.280 * (1.67)	0.343 ** (1.97)	0.400 ** (2.15)
International Experiential Knowledge						
INT_LENGTH	Length of time of firms' international experiential knowledge	0.029 * (1.87)	-	0.028 * (1.88)	--	0.026 * (1.81)
INT_SCOPEº	Scope of firms' international experiential knowledge	0.0003 ** (2.45)	-	0.017 (1.16)	--	0.023 (1.44)
INT_CULT_SIMIL	Weighted average of cultural similarity	0.122 ** (1.96)	-	0.200 ** (2.08)	--	0.156 * (1.65)
INT_LENGTH*INT_CULT_SIMIL	Interaction term	- 0.024 (1.63)	-	- 0.034 (1.55)	--	- 0.026 (1.45)
Local Experiential Knowledge						
LOC_LENGTH	Length of time of firms' local experiential knowledge	--	0.073 *** (2.82)	0.088 *** (3.25)	0.068 *** (2.54)	0.077 *** (2.80)
LOC_SCOPEº	Scope of firms' local experiential knowledge	--	0.009 ** (2.44)	0.060 ** (2.85)	--	--
1_INVEST #	Subsidiary of a firm with only 1 investment in the local market	--	--	--	- 0.092 ** (2.02)	- 0.129 ** (2.48)
2-4_INVEST #	Subsidiary of a firm with 2 to 4 investments in the local market	--	--	--	- 0.084 ** (2.06)	- 0.098 ** (2.33)
Control Variables						
INDUST	Industry (1=Manufacturing)	- 0.017 (0.54)	- 0.003 (0.12)	- 0.010 (0.32)	0.006 (0.19)	- 0.002 (0.06)
RELATED	Relatedness (1=Related Industry)	0.044 (0.92)	0.029 (0.65)	0.031 (0.67)	0.011 (0.26)	0.015 (0.34)
CONTROL	Degree of Control (1=WOS)	- 0.060 (1.61)	- 0.019 (0.59)	- 0.038 (1.11)	- 0.018 (0.56)	- 0.039 (1.13)
SUB_AGE	Subsidiary Age	- 0.006 (0.31)	- 0.019 (1.00)	- 0.024 (1.21)	- 0.018 (0.94)	- 0.023 (1.16)
SUB_SIZE	Subsidiary Size	- 0.044 *** (5.30)	- 0.045 *** (5.70)	- 0.049 *** (5.67)	- 0.044 *** (5.50)	- 0.045 *** (5.52)
PAR_SIZE	Parent Size	- 0.016 * (1.67)	- 0.018 ** (2.13)	- 0.023 *** (2.40)	- 0.015 * (1.87)	- 0.024 ** (2.40)
CV_INT_EXP	Coefficient variation of firms' intern. experience	- 0.019 (0.53)	--	- 0.016 (0.45)	--	- 0.011 (0.32)
Number of Observations		550	550	550	550	550
Number of firms (# observation/firm)		110 (5)	110 (5)	110 (5)	110 (5)	110 (5)
Wald *chi*-square (d.f.)		48.75 (12)	56.48 (9)	65.96 (14)	54.95 (10)	63.82 (15)
Overall R^2 (Model Significant)		0.2209 (0.000)	0.2479 (0.000)	0.2723 (0.000)	0.2448 (0.000)	0.2684 (0.000)

Notes: *z-value* in parentheses; significant at the *10% level; **5% level; ***1% level.

º Indicates that in *Model 3* highly correlated variables (INT_SCOPE and LOC_SOCPE) have been orthogonalized. In this case, LOC_SCOPE is listed first to determine the orthogonalization, because it is the most important predictor for performance.

The reference measure is the subsidiary of a firm with more than five investments in the local market.

Model 1: effects of international experiential knowledge and control variables; *Model 2* and *Model 4*: effects of local experiential knowledge and control variables; *Model 3* and *Model 5*: effects of both international and local experiential knowledge, and control variables.

In *Model 5*, both coefficients [1_INVEST] and [2-4_INVEST] are negative and statistically significant, which means that subsidiaries of a parent firm with more investments in the local market (i.e. more than five investments), and consequently with more market-specific knowledge by operating many subsidiaries in the same focal market, reflect on high level of subsidiary profitability. Most importantly, it shows that subsidiaries of first-time investors achieve lower level of profitability than subsidiaries of firms with subsequent FDI decision in the host country. As in *Model 4*, [LOC_LENGTH] shows a positive and significant association with subsidiary profitability. With regards to firms' international experiential knowledge, the parent firm's experience accumulated by operating for a long time in international markets [INT_LENGTH] and the international experience in countries with more cultural similarity to the local market [INT_CULT_SIMIL] are important factors for subsidiaries in improving its profitability level. The coefficient of scope of overseas subsidiaries [INT_SCOPE] is positive, but insignificant.

Although not included in this paper due to a page limitation, some statistical tests were performed in order to compare subsidiary performance differences between firms with subsequent investment decision and first-time investors (no subsequent FDI). The results showed a significant mean difference between both groups ($p<0.005$). This suggests that subsidiaries of firms with subsequent investments (345 cases, ROS mean = 0.0743) obtained a higher level of profitability than subsidiaries of first-time investors (205 cases, ROS mean = 0.0259). Furthermore, in order to test whether or not the increasing number of investments in the same local market in fact affects subsidiary profitability, the group of firms with subsequent investment was divided in two sub-groups based on median values of the number of subunits in the host country. Hence, one group is formed by subsidiaries of firms with two to four investments (35 subsidiaries, 175 observations) and other sub-group with more than five investments (34 subsidiaries, 170 observations). Subsidiaries of firms with more than five investments showed a higher level of profitability (ROS mean = 0.1334) than firms with two to four investments (ROS mean = 0.0269) and first-time investors (ROS mean = 0.0259). The difference in mean between groups (ANOVA) shows a significant result ($p<0.001$). Moreover, when performance of firms with more than five investments is compared to other sub-groups by applying post hoc test, the difference in mean was also statistically significant. Comparing to firms with two to four investments and firms with no subsequent investment, it is significant at 0.001 level. Although there is no significant performance difference between firms with two to four investments and first-time investors, the results revealed a higher level of subsidiary profitability for the firms with subsequent investment decision.

Therefore, *Hypothesis 1* is supported by *Model 1*, while partially supported by *Model 3* and *Model 5*; *Hypothesis 2* is supported by *Model 1, Model 3*, and *Model 5*; *Hypothesis 3* is confirmed by *Model 1*, *Model 3, Model 5,* and *Model 5*; *Hypothesis 4* is supported by *Model 4* and *Model 5*.

Conclusion

This study examines the effects of firms' experiential knowledge and subsequent investment decisions on subsidiary performance. Using profitability subsidiary-level data of Japanese investments in Brazil during the fiscal year from 1998 to 2002, the findings of this study make some contributions to the international business literature.

First, the results show that both firms' international and local experiential knowledge can positively affect subsidiary performance. It implies that when firms are investing in a foreign market, the firm experiential knowledge accumulated by operating international

business, and the firm network of FDI established abroad exert an important influence on increasing the level of profitability of multinational company's subsidiary. A longer experience of international operations allows firms to better understand the complexity of cognitive, normative, and regulatory domains in different markets, and consequently more knowledge the firm has acquired (Blomstermo *et al*., 2004), but the benefit of international experience to organizations may decay over time (Argote *et al*., 1990). In addition, firms also acquire knowledge by operating a number of subsidiaries in a variety of countries (Huber, 1991).

Second, this study shows that investing firms may need other complementary knowledge and experience to operate successfully in culturally dissimilar countries (Padmanabhan and Cho, 1996). Because of the large geographical and cultural distance between Japan and Brazil (Hofstede, 1980, 1991) in addition to the constant changes in political and institutional environments in the host country, the accumulation of market-specific knowledge provides context for interpreting business environment, increasing knowledge of clients, suppliers, competitors, government, institutional framework, rules, norm, and values (Eriksson *et al*., 1997). This allows the firm to perceive opportunities, reducing uncertainty (Kogut and Singh, 1988), and consequently enhancing subsidiary profitability (Makino and Delios, 1996).

Third, the findings suggest that firms can acquire local experiential knowledge not only by operating for a long time in the local market as shown by previous research (Luo and Peng, 1999), but also by increasing the number of investments in the target country, in other words, making subsequent FDI in the host country. The empirical tests using accounting-based measure of performance over five year's period of Japanese investments in Brazil shows credible evidence that subsidiaries of parent firms with subsequent investment decision in the same host country are more profitable compared to subsidiaries of first-time investment firms. Increasing the firm's network of subsidiaries in the target country, allow the firm to have a greater scale economies by sharing facilities, information, personnel, and other resources across subsidiaries (Song, 2002). Thus, the findings demonstrate that subsequent FDI in the same host country is an effective strategy for improving the level of profitability of multinational firms' subsidiaries in an emerging country.

Finally, this study shows that the knowledge obtained by the firm experience from outside markets offer some benefits that can reflect on subsidiary performance. The benefit of learning from outside market implies that experience in countries with similar culture to the local market. The results show significant association between subsidiary performance and the parent firms' experience in markets that have cultural similarity to Brazil. Firms can learn from outside the local market and transform their experience into competitive advantage (Teece *et al*., 1997).

The results have to be interpreted within the context of some limitations in conjunction with the discussion of some possible future field of research. First, by focusing on performance of Japanese investment in Brazil, it has both strengths and weaknesses of the study. As argued earlier, on the one hand it holds the country effects constant, which allows for greater theoretical and empirical attention to firms FDI performance (Hennart, 1991). On the other hand, some of the findings may be unique in the case of Japanese firms or in the Brazilian market. Future research should be undertaken to extend the sample to non-Japanese parents operating in other developing country in order to investigate whether the finding of this study can be generalized. However, it has to be noted that the financial performance data of foreign subsidiaries in many emerging economies is very hard to obtain.

Second, the profitability measures used in this study (ROS) are merely an explicit

measure of performance. In some cases, a firm accepts moderate profit rates for some strategic reasons such as market share orientation, transferring pricing, long term growth (Siripaisalpipat and Hoshino, 1999). A future research should consider a multidimensional construction of performance measurement, including not only financial measures but also cover market and strategic criteria.

Third, this study has conducted the analyses based on performance data derived from archival sources. Hence, it is generally difficult to affirm that the results imply causality. Although the findings suggest a positive relationship between the subsidiary performance and subsequent FDI, the database does not give precise information whether or not the subsequent investments lead to a high level of profitability or the high level of profitability lead to additional FDI. A future research should cover this limitation by collecting its own data based on face-to-face interviews with top managers of those parent firms or subsidiaries in order to confirm the findings obtained in the empirical results.

Nevertheless, the results of this study illustrate the importance of firms' international and local experiential knowledge and subsequent investment decision to enhance the level of subsidiary profitability.

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[1] According to Hofstede, the following dimensions of cultural scales (Brazil, Japan): *power distance* (69, 54), *individualism* (38, 46), *uncertainty avoidance* (76, 92), *masculinity* (49, 95), and *long-term orientation* (65, 80).

[2] In addition to ROS, it was also tested another financial performance measure: return of equity (ROE = Profit before tax divided by Shareholder's equity). Both results are similar and there is a high correlation between ROS and ROE. However, when considering ROE as a performance measure, the sample decreases to less than 100 cases. Another measure of performance, ROA (return on assets: profit before tax divided by total assets) is considered. However, due to the existence of many missing values for this dependent variable in the sample (only 80 cases have ROA data) this measure could not be considered for analysis. Hence, it is worth showing only the outcomes obtained by ROS measures.

[3] The composite index developed by Kogut and Singh (1988) is represented algebraically as:

$$CD_j = \sum_{I-1}^{4} \left\{ \left(I_{ij} - I_{ib} \right)^2 / V_i \right\} / 4$$

where CD_j is the cultural difference of the jth country from Brazil, I_{ij} represents the index of the ith cultural dimension and the jth country, b stands for Brazil and V_i is the variance of the index of the ith dimension.

[4] It is applied to the equation WCS_j = *Constant Value* - CD_j. The constant value is considered as "4" in order to have all the calculated values of "weight" higher than zero (the highest index of cultural distance is $CD_{Denmark}$=3.8845).

[5] It is because most of the Japanese parent firms had international experience in many different countries. If the parent company had international experience in only one different country to Brazil, the value of cultural similarity is the value of WCS_j of this jth country with Brazil. But when the parent firm established subsidiaries in many different countries, the measure of cultural similarity is calculated considering the "weighted average", which means that it takes into account the proportional relevance of each cultural similarity index (WCS_j), rather than treating each cultural similarity index equally.

[6] The equation is computed as:

$$WACS_j = \frac{\sum_{i=1}^{n} INT\_LENGTH_{ij} \times WCS_{ij}}{\sum^{n} INT\_LENGTH_j}$$

where $WACS_j$ is the weighted average of cultural similarity, INT_LENGTH_{ij} is the international experiential knowledge accumulated in country jth, WCS_{ij} is the cultural similarity of country ith to Brazil.

[7] The following classification was considered for subsidiary equity:
- *Wholly-owned subsidiary* - Japanese parent firm(s) holds at least 95% of the subsidiary equity.
- *International Joint-Venture* - formed between Japanese partner(s) and local partner(s). A single Japanese parent firm holds at least 10% and less than 95% of the subsidiary equity.

[8] The Hausman specification test is applied to examine whether or not the fixed or random effects model should be used. The null hypothesis test whether or not the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. It was found an insignificant p-value (Prob>chi2=0.4603), which means that the random effects model may be more powerful and parsimonious. The Wooldridge test (Wooldridge, 2002) was performed for autocorrelation test in panel data, where the null hypothesis stems that there is no first-order autocorrelation. It was found a significant p-value (Prob>F=0.0064), which indicates the presence of serial correlation. Hence, in order to account for first serial correlation, it was considered the random-effects model with AR(1) disturbances.