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Process and intensity of internationalization of IT firms – Evidence from India

Justin Paul^{a,b,*}, Parul Gupta^c

^a Graduate School of Business Administration, University of Puerto Rico, San Juan, PR, USA

^b University of Washington, Foster School of Business, Seattle, USA

^c Army Institute of Management & Technology, M-1, P-5, Greater Noida, India

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ABSTRACT

This paper provides insights and evidence related to the process and intensity of internationalization of firms in the Information Technology (IT) sector, which is the driving force of high economic growth in the Indian sub-continent during the last two decades. Research objectives were set as (i) to examine the existence of born global firms in the IT sector, (ii) to identify the process of internationalization adopted by firms in the IT industry, (iii) to measure the intensity of internationalization of IT firms. The paper is based on data collected from annual financial reports of firms listed in the CNX IT Index of National Stock Exchange of India. Two clusters were extracted using hierarchical clustering method followed by *k*-means clustering to analyze the characteristics of the variables. We find that the firms in both clusters are true global firms with 66 and 85% of their income from foreign markets with a very high level of international intensity. Though the findings provide some evidence for the gradual internationalization of Indian IT firms; the empirical results indicate that firm age has no impact on internationalization. The results from our study also show that firms, especially in certain industries such as IT, do have access to information that reduces the risk aversion.

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1. Introduction

As part of growth strategy, many firms go global and orientate themselves more and more internationally. When we discuss the process of internationalization, the first set of traditional theories is often referred to as the Uppsala theories (e.g. Carlson, 1975; Johanson & Vahlne, 1977; Johanson & Wiedersheim-Paul, 1975; Welch & Loustarinen, 1988; Welch & Wiedersheim-Paul, 1980). These theories postulate that firms go through gradual process as they progress toward becoming multinational corporations. Researchers at Uppsala University in the mid 1970s made empirical observations that internationalization frequently started in foreign markets that were close to the domestic market in terms of physical distance.

The original Uppsala model is based on the assumption that firms go global once entrepreneurial opportunities are identified and proven in the domestic market. Cumulative processes play a central role in the subsequent internationalization of the firm. Indeed, how the underlying opportunity recognition process

functions, i.e. how managers search for, recognize and act upon opportunities leading to internationalization in the first place is an under-developed field in the international business literature (Mathews & Zander, 2007). The lack of attention to pre-internationalization processes may partly explain why internationalization process theory has only recently started addressing the particular characteristics of International New Ventures or so called 'born-global' (Bloodgood, Sapienza, & Almeida, 1996; Madsen & Servais, 1997; Oviatt & McDougall, 1994, 1995).

Another important feature of Uppsala model, which deserves a mention here is that the model assumes incremental commitments to foreign markets and the stepwise introduction of new activities in each local market. They also assumed that learning and commitment building take time (Johnson & Vahlne, 1977). The fundamental perspective is internationalization from one focal point and added resources and activities in a number of foreign locations. Here emerges an issue, how foreign units may internationalize them, i.e. how these units in turn expand outside the borders of the national market in which they are located? This is a highly relevant issue addressed by Andersson, Forsgren, and Holm (2002) in their study which concluded that foreign units are increasingly able to contribute to the strategic and technological development of the MNC group and it is known that they are increasingly active in international markets themselves (Forsgren, Holm, & Johanson, 1992; Holm & Pedersen, 2000).

* Corresponding author at: University of Puerto Rico, USA/University of Washington, USA. Tel.: +1 206 412 4707.

E-mail addresses: profjust@uw.edu, justinpaul@hotmail.com (J. Paul), parulvishalgupta@yahoo.co.in (P. Gupta).

Thus, the original Uppsala model views the firm as a reactive actor. Their model can be considered as a theory of rational internationalization. They stressed that the general market knowledge is fundamental to a firm's internationalization, and in particular, the knowledge grows with experience. [Johanson and Vahlne \(2009\)](#) believe that the correlation between the order in which a company enters foreign markets and psychic distance has weekend. Perhaps, the propensity of firms to take bigger risks is higher today in some cases, may be in the case of internationalization of IT companies. Another model within the set of Internationalization theory is: the Product Life Cycle Theory by [Vernon \(1966, 1971, 1979\)](#). According to [Vernon \(1966, 1971\)](#), the internationalization process of the firm follows the development of the product Life Cycle: firms usually introduce new products only in their home market and then they eventually go abroad in the product maturity phase. Globalization, outsourcing, virtual economy and development in communication standards are external factors that drive firms to approach the global market in a different way as compared to one described by the traditional stage model ([Oviatt & McDougall, 1994](#)).

Some researchers have identified a set of firms, as 'born-global' ([Knight & Cavusgil, 1996](#); [Madsen & Servais, 1997](#); [Rennie, 1993](#)) that internationalize soon after their inception. The concept of born-global firms was coined in a survey-based report for the Australian Manufacturing Council by the McKinsey consultants ([Rennie, 1993](#)). The existence of two types of exporters is explained in that study. The first one, including around 75% of the firms, is called domestic-based firms, which were "well established in local market, with strong skills, solid financial situation, and sound product portfolio". The firms inside this group do business globally but they keep "the primary focus of their competitive activity on home market". Rennie had shown that the average age of those firms at their first export was 27 years and their export sales, count for 20% of their total sales. The second group, called born-global firms, "began exporting, on average, only two years after their foundation and achieved 76% of their sales through exports". The born global firms are successfully competing with larger multinational firms and their subsidiaries are established in different geographic areas. The study shows that this type of firms is present in all industries and exposed to competition from other firms. They can win the competition with "quality and value created through innovative technology and product design" and being closed to customers "by understanding and satisfying their needs better than anyone else in the world". Born Global firms normally compete in niche markets, are very flexible and also move fast.

Born-global firms begin exporting their products or services within a couple of years after their inception and most of them advance through subsequent stages of internationalization, such as collaboration with foreign partners, or undertaking of direct foreign investment. Findings from Denmark and Australia confirm that, although born-global firms are presumed to have the intent to internationalize from inception; internationalization is not necessarily an objective in the founding process ([Rasmussen & Madsen, 2002](#)). On the other hand, a study based on 328 export oriented enterprises, which consisted of the firms from Sweden, Norway, Finland and Denmark, revealed that most export enterprises began their international business right after their establishment, the offshore business was about 20% within one year, and could reach more than 50% after two years ([Madsen & Servais, 1997](#)). Such organizations started using the resources of many countries at the very beginning and selling the products in many countries to attain the competitive advantage. The responsiveness and the capability are the main factors of consideration ([Oviatt & McDougall, 1994](#)). [Madsen and Servais \(1997\)](#) describe them as the firms, which take the international or global step after their initiation. [Knight and Cavusgil \(1996\)](#) further explained that the born global enterprises are those small tech-oriented companies with the employee less

than 500, operating in the global market in the initial stage, using the cutting edge technology, meeting the demands of niche market with its high-tech products, the annual amount of sales less than \$100 millions, and the offshore business reach a quarter of the total sales within three years.

The managers of born-global firms do not see foreign markets as a mere addition to their domestic markets. They proactively and aggressively compete in international markets; they take risks, and innovate. The skills of top management teams have been found important for a more dynamic form of internationalization, particularly in the knowledge-based sectors ([Andersson & Evangelista, 2006](#); [Loane, Bell, & McNaughton, 2007](#)). Many born-global firms are technology firms and they are often at the leading technological edge of their industry or product category. Such firms exploit business opportunities based on the development of new products or services that are better-designed and higher quality than competitors' offerings. Typically, these firms do not operate in "commodity" markets ([Cavusgil & Knight, 2009](#)). However, recent studies suggest that the born global phenomenon is widely spread beyond the technology sector ([Moen & Servais, 2002](#); [Rennie, 1993](#)). For example, [Madsen and Servais \(1997\)](#) found born-global firms in industries such as metal fabrication, furniture, processed food, and consumer products, in Denmark.

Information Technology firms seem to have special ability to gain knowledge that drives their internationalization process. This paper aims to contribute to the literature in the area of internationalization process by providing empirical evidence about the process and intensity of internationalization of IT firms from India, the second fastest growing economy. Our findings indicate that most firms internationalized gradually, and did not expand the business internationally immediately upon birth. But majority of the participating firms in this study were found to have higher level of international expansion intensity and commitment. Those firms showed consistent involvement and interest in foreign markets by investing regularly outside the country. This confirms the global orientation of Indian IT firms. We isolate and analyze firms that, according to accepted definitions, appear to be actively involved in international business. Cluster analysis of these firms reveals that older and bigger IT firms internationalized their operations cautiously with slower approach. Despite their late entry to foreign markets, those firms have been consistently investing abroad and developing the foreign markets. In our study, most of the firms were found to be not born-global, though our results show that the internationalization process has no relation with firm age.

The study of IT firms from India is particularly suitable for analyzing the process of internationalization, for several reasons. First, Indian economy has emerged as the second fastest growing economies of the world. Second, Indian IT sector contribute to the growth of economy to a great extent. Third, while countries like China has grown on the basis of exports of labor-intensive manufactured goods, India has succeeded on services. Although there are other emerging markets where the share of services in GDP exceeds the share of manufacturing, India stands out for the size and dynamism of its service sector. Fourth, the IT industry has played a key role in putting India on the global map. Over the past decade, the Indian IT-BPO sector has become the country's premier growth engine, crossing significant milestones in terms of revenue growth, employment generation and value creation. Last, but not least, India also retains its low-cost advantage when viewed in combination with the business environment and the availability of skilled people.

2. Literature review

In traditional models such as product life cycle theory, firm internationalization is seen as a gradual process of capability

build-up by which firms slowly accumulate the resources necessary to face foreign market uncertainty. These models suggest that firms grow in their domestic markets before they start to export extensively. This is supposedly so because there is a learning process involved in facing unknown markets, and such a process requires knowledge and resources to face and overcome uncertain outcomes and costly investments. One of the earliest and most influential studies in the vast literature in international business studies are by [Johanson and Vahlne \(1977\)](#). They emphasized that market-specific knowledge can only be gradually gained through experience in foreign markets, putting forward the idea that firms follow an “internationalization process” of increasing involvement in foreign markets. Their study stressed the difficulty that firms face to gain knowledge about characteristics of the specific national market, its business environment, cultural patterns, structure of the market system, and most importantly characteristics of the individual customer. The firms acquire knowledge and resources progressively through experience, first in known domestic markets and then in larger foreign markets.

Conventional models of internationalization have drawn criticism. There is empirical evidence that shows the existence of small, young firms, endowed with very limited resources, which begin to export immediately after their foundation. For instance, [Moen and Servais \(2002\)](#) reported, for a sample of Norwegian, French, and Danish firms, the existence of many firms exporting a large share of their total sales shortly after their establishment. Such empirical evidence suggests that the Uppsala model is not the only possible way to describe the firm internationalization processes.

The born global concept states that firm internationalization does not have to go through the progressive accumulation of resources and capabilities. It proposes that firms can start exporting from the moment they are created, and it asserts that firms are capable of penetrating markets that are far away, both geographically or “psychically” (on account of their different cultural and language traits), despite having limited resources and little accumulated organizational learning. McKinsey & Co. coined the definition of born-global firms in a report that analyzed a sample of Australian exporting firms ([McKinsey & Co., 1993](#)). The term born-global was used to describe firms that, apparently, had undergone faster process of internationalization than would have been expected for firms of similar size, age, and nature. It was thus proposed that these firms were born global firms. [Cavusgil \(1994\)](#), and also [Knight and Cavusgil \(1996\)](#), elaborated McKinsey & Co.’s empirical observation to argue against traditional models of internationalization. [Cavusgil \(1994\)](#) went as far as to state that “gradual internationalization is dead”. These claims sparked an academic debate revolving around different theories of internationalization. However, [Lopez, Kundu, and Ciravegna \(2009\)](#) provide empirical evidence about the process of internationalization of firms in the software industry of a small developing country, Costa Rica. They have found that most Cost Rican software firms followed a gradual approach to internationalization and there are few born – global firms among Costa-Rican software firms.

A study conducted by [Andersson, Gabrielsson, and Victor \(2004\)](#) point out, one of the potential limitations with studies about global firms is that they examine internationalization only in terms on international revenues, while foreign sourcing and foreign R&D alliances should be included, as well. There is a broad definition of International New Ventures (INV) given by [Oviatt and McDougall \(1994\)](#). They defined an INV as a business organization that, from inception, seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries. Some authors have given tentative classification of factors fostering global approach. [Andersson et al. \(2004\)](#),

for example, have distinguished between firm-level and industry-level elements, while indicating the importance to better study decision maker attitudes and characteristics. In a similar way, [Madsen and Servais \(1997\)](#) state that factors explaining the propensity to become born global can be divided into three categories related to characteristics of: founder, organization and environment. Some authors have suggested that the specific industry and its characteristics (in particular its structure) can heavily influence new ventures and determine born global behaviors ([Fernhaber, McDougall, & Oviatt, 2007](#)). In 1993 McKinsey & Co. stated that born global firms produced leading technological products and many of the available studies focus on firms operating in high-technology industries (e.g. [Bell, 1995](#); [Crick & Spence, 2005](#); [Laanti, Gabrielsson, & Gabrielsson, 2007](#)). [Jolly, Alahuhta, and Jeannet \(1992\)](#), for example, talked about “High Technology Start-Ups” instead of “Born Global”. In a similar way [Laanti et al. \(2007\)](#) focused on the Finnish wireless technology sector. The rationale behind such statement is that firms operating in high-tech and technology-based industries may be forced to internationalize more rapidly to avoid obsolescence or imitation processes ([Andersson et al., 2004](#)). Once created, many knowledge-intensive products, such as software, can be replicated at low marginal cost. Because of this, small knowledge-intensive firms can bypass the home market and target foreign markets, or enter domestic and international markets simultaneously ([Bell, 1995](#)). [Autio, Sapienza, and Almeida \(2000\)](#) found that firm knowledge-intensity was positively correlated to international sales growth, and several studies ([Bell, 1995](#); [Boter & Holmquist, 1996](#); [Coviello, 1994](#)) have proved the tendency for firms in knowledge-intensive sectors to internationalize rapidly.

Another proposition often made for born global firms is that the home market has little importance to the point of conjecturing that a small local demand might drive the firm’s efforts to seek opportunities abroad. [Madsen and Servais \(1997\)](#) stated that the differences between traditional exporters and born-global firms could be attributed largely to differences in the background of their founders. The founder’s international experience may affect the extent to which psychic distance from strategic markets is perceived to be an obstacle to internationalization. It is possible that entrepreneurs with international experience have a well-developed network of contacts that allows them to internationalize earlier ([Contractor, Hsu, & Kundu, 2005](#); [Kundu & Katz, 2003](#)).

It appears from above discussion that there are many empirical evidences in support of the existence of born global firms. This notwithstanding, extant theoretical developments and empirical studies are far from proving that “gradual internationalization is dead” ([Cavusgil, 1994](#)). The literature of born global concept still lacks the precise definition of born global firms. [Moen and Servais \(2002\)](#) asserted, for instance, that “although firms that follow this incremental development pattern may still exist, the normal pattern may be different in the new millennium”. Their assertion is supported by the fact that between 30 and 40% of the exporting firms in their sample of Norwegian and French firms were exporting within 2 years of their creation. [Knight, Madsen, and Servais \(2004\)](#), for instance, operationalize born-globals as firms younger than 20 years that started to internationalize within 3 years of their founding and obtain more than 25% of total sales from foreign markets.

Another proposition, which cannot be ignored, is the country specific advantage. In the absence of country-specific advantages, one should expect a strong firm-resource endowment in order for firms to expand abroad successfully ([Rugman & Verbeke, 2005](#)). Finally, The born-global argument can be made empirically stronger by simply defining the criteria to classify the firms as born-global. Since there is no consistency in the criteria laid down

for the test of born global firms, it becomes all the more difficult to compare this phenomenon across different studies.

3. Research objectives

Our review of the theory and relevant literature suggests that born-global firms are likely to be prevalent in knowledge-based industries, and especially in developing countries with open economies. Therefore, our research question addresses the process of internationalization adopted by knowledge based firms in the Information Technology sector in the Indian sub-continent, as mentioned earlier. The research objectives of this study can be specified as follows:

Research Objective 1 (RO 1) – To test the existence of born global firms in the Information Technology (IT) sector from India.

Research Objective 2 (RO 2) – To identify the process of internationalization adopted by IT firms.

Research Objective 3 (RO 3) – To measure the intensity of internationalization of IT firms.

4. Data

The Information Technology (IT) sector is amongst the fastest growing industries in the world particularly, in India. Information Technology (IT) industry has played a major role in the Indian economy during the last two decades. India's information and communication technology market size has crossed US\$ 24 billion as per 2010 statistics. Simultaneously, the IT and ITES (Information Technology enabled services) exports are estimated to, more than double in the near future. These IT firms have diversified beyond core offerings and markets through new business and pricing models.

A number of large, profitable Indian firms today belong to the IT sector and a great deal of investment interest is now focused on the IT sector. In order to have a good representative benchmark of the Indian IT sector, National Stock Exchange in India has developed the CNX IT sector index. Firms in this index are those from IT related activities like software development, hardware manufacture, vending, support and maintenance. The index is a market capitalization weighted index with the base date being January 1, 1996. There are twenty IT firms listed on this index. Since required information of one company was not available, the final sample comprised of 19 firms from CNX IT Index.

CNX IT Index is an index comprised of the most liquid IT stocks, with maximum market capitalization traded on the National Stock Exchange (NSE), engaged in the business of software or hardware. CNX IT provides investors and market intermediaries with an appropriate benchmark that captures the performance of the IT segment of the market. Firms selected in the index have to be IT stocks which should rank high in terms of market value represented by their market capitalization and liquidity.

We collected panel data from 19 Indian IT firms listed on CNX IT Sector Index. Although the sample size might seem small, it is actually a sizeable percentage of the total revenue generated by Indian IT sector as a whole. i.e. we chose CNX IT sector index firms for this study because CNX IT Index stocks represented about 80.33% of the total market capitalization of the IT sector as on March 31, 2009. Thus the firms participated in this study truly represent the whole population of IT firms operating in the country at the time of the study. We collected the data relating to other variables from the annual reports of these 19 firms for six financial years (2004–2010). Data on the no. of years taken to set up first international subsidiary by the firms were used as criteria to

examine the process of internationalization. This data was collected from Prowess database of Center for monitoring Indian Economy.

5. Measures

We gathered information on two groups of variables for this exploratory study. The first group was related to international orientation of firms. Here we used four measures. The first was a measure of total income from foreign market as a percentage of total income in last six financial years (2004–2010). The first measure is often referred to as one of the variables used in several empirical studies of process of internationalization (Axinn, 1988; Bello & Williamson, 1985a,b; Bilkey, 1985; Kundu & Katz, 2003; Sullivan, 1994). This measure follows in the tradition of much work that accounts for export intensity by taking into account growth of export sales (Zou & Stan, 1998). Vernon's (1966) pointed that subsequent opportunities to serve third markets from a subsidiary might become apparent; the company increases its commitment to the foreign market by increasing capacity with a view to serving foreign markets. Recalling Vernon's (1966) opinion, second and third variables were defined as, total investment in subsidiaries as a percentage of total investment and investment for foreign market development. These variables were used to complement the more traditional degree of internationalization measure. This measure is an important complement of global expansion intensity, particularly to determine, how serious the company is for international market development. The fourth variable is foreign/international subsidiaries as a percentage of total subsidiaries of the company. This variable was used to measure the commitment of the company for global market development and FDI decisions.

The second group of variables measured firm level characteristics. It includes firm size, firm age and international experience. The size of the firm was operationalized using total sales and number of employees. Firm age was measured as the number of years that had elapsed since the firm was founded until the time of the study. International experience was measured in terms of number of years the firm had been operating through its subsidiaries from different foreign markets.

6. Methods and results

Researchers have recognized and emphasized the crucial role in a company's export involvement and commitment played by the specific managerial traits such as international orientation (Bilkey & Tesar, 1977; Cavusgil, 1980; Cavusgil & Nevin, 1981; Dicht, Koglmayr, & Muller, 1990; Dicht, Leibold, Koglmayr, & Muller, 1983; Ellis, 1995; Reid, 1981; Simmonds & Smith, 1968; Sullivan & Bauerschmidt, 1990; Weidersheim-Paul, Olson, & Welch, 1978; Yaprak, 1985), perception of profit, risks and costs in export markets (Brooks & Rosson, 1982; Joynt, 1982; Kedia, 1985; Ogram, 1982; Simpson & Kujawa, 1974), quality and dynamism (Bilkey & Tesar, 1977; Ogram, 1982; Reid, 1981). Unfortunately, it appears that although, conceptually and intuitively, the notion of truly global orientation is clear, its operationalization has followed diverse guidelines. It moreover, requires a careful definition of the measure that is going to be used to define the company's global orientation. In the empirical works, the rationale for investing outside country for international expansion or export percentage is not clearly established. Drawing numerical lines, either in terms of Investment outside country for international expansion or in the percentage of sales from foreign market in order to be considered as a truly global company, is somewhat arbitrary. The born global argument is, in essence, an assertion regarding the very nature of a company, the assertion being that there are firms that are so intrinsically different in nature from others that they start

venturing internationally much earlier. We examine the RO 1 – whether there is existence of born-global firms in our sample as per the definition given by Knight et al. (2004) that ‘born-globals’ are firms that internationalize within 3 years and obtain more than 25% of total sales from foreign market.

From the above discussion, it appears that although, conceptually and intuitively, the notion of early internationalization is clear, its operationalization has followed diverse guidelines. There is a review by Knight and Cavusgil (2005), which defines born-global firms as “firms that, from or near their founding, obtain a substantial portion of total revenue from sales in international markets”. This definition is in accordance with those of Oviatt and McDougall (1994) and Rennie (1993), among others. The exact time elapsed to be considered “near” their founding has many interpretations in much empirical work. It, moreover, requires a careful definition of the measure that is going to be used to define the company’s outward orientation.

Following these studies, we used five variables to group firms of similar characteristics. The first was a measure of foreign income intensity, in terms of the average percentage of total income from the foreign markets during last six financial years. A second measure that also emerges in these studies is the temporal proximity between company inception and establishment of first international subsidiary. To characterize this, we take into account at the percentage of total number of international subsidiaries set up in the last six years and the time elapsed from inception to establish first international subsidiary. Another measure taken into consideration was the intensity of international expansion. We recorded the average percentage of total investment in subsidiaries and percentage of total amount invested outside domestic country for business expansion from reserve and surplus to estimate and compare based on this measure. In addition to these measures of international orientation, we also included variables such as company size, in terms of number of employees; time elapsed in setting up first international subsidiary and company age in years.

We first explored these variables visually. As expected, inspection of our data showed that most firms in our sample were found to have high-level international orientation. A few firms were found to have less than 50% of the income coming from foreign markets. In our sample, most of the firms have substantial portion of their income coming from foreign market (average percentage of total income of last six years). 14 out of 19 firms received, more than 50% of their income from foreign markets. 11 firms earned over 75% of business from other countries. The data also revealed that majority of the firms invested consistently in foreign markets to expand internationally. We found that majority of firms have set up their subsidiaries in different parts of the world, but the firms took an average of 13 years from their

Table 1
Means, and standard deviations – descriptive statistics.

| Variables | Mean | Std. deviation | N |
|----------------------------------------------------------|---------|----------------|----|
| 1. Income from foreign market | 68.8005 | 31.87590 | 19 |
| 2. Investment in subsidiaries | 41.7616 | 27.19145 | 19 |
| 3. Investment for foreign market development | 22.4432 | 26.00879 | 19 |
| 4. International subsidiaries as % of total subsidiaries | 69.6600 | 27.78169 | 19 |
| 5. Firm size | 3.23E4 | 44,454.234 | 19 |
| 6. Firm age | 25.16 | 13.078 | 19 |
| 7. Time elapsed to set up first international subsidiary | 11.95 | 7.299 | 19 |

founding to establish first international subsidiary. However, the average time taken in establishing international subsidiaries was found to be much less in younger firms in comparison to older ones. This in turn reveals more aggressive approach of younger firms toward international expansion.

After compiling the data, we used clustering techniques as an exploratory tool that would permit us to unveil whether firms in our sample could be grouped around the variables that emerge in the literature as the characteristics of the global firm. Cluster analysis is used as an exploratory technique, though it compels a structure on the data. That is why variables must be chosen with a good theoretical basis (Aldenderfer & Blashfield, 1984). We deemed seven variables appropriate, for they stem from the literature as the fundamental constructs supporting the global orientation of firms, which is the basis for the choice of variables. All variables were screened to explore their distributions, missing value patterns, and outliers. The mean and standard deviation for these seven variables have been reported in Table 1. Table 2 reports estimated Pearson correlation coefficients, for the variables. Generally speaking, international orientation, measured by the percentage of income from foreign markets, out of total income shows significant positive correlations with investment in subsidiaries and investment for foreign market development. These are the variables explaining global expansion intensity of firms. This reveals the fact that more commitment in terms of investment for foreign markets will yield more income from the same. This variable was also positively correlated with firm size but not with firm age. The time elapsed to setup first international subsidiary showed a weaker relationship with income from foreign markets. As expected, the correlation of income from foreign market with firm age had a negative sign, showing that younger firms are more globally oriented in comparison to older ones. The data show little correlation structure, with a Gleason–Staelin redundancy measure of .33, which is considered low.

As recommended by Punj and Staelin (1983), to perform cluster analysis, we used a hierarchical method, Ward’s technique with

Table 2
Estimated Pearson correlation coefficients.

| Variables | Income from foreign mkt | Investment in subsidiaries | Investment for foreign mkt development | International expansion through international subsidiaries | Firm size | Firm age | Time elapsed to set up first international subsidiary |
|-------------------------------------------------------|-------------------------|----------------------------|----------------------------------------|------------------------------------------------------------|-----------|----------|-------------------------------------------------------|
| Income from foreign mkt | | | | | | | |
| Investment in subsidiaries | .169 | | | | | | |
| Investment for foreign mkt development | .251 | .622** | | | | | |
| International subsidiaries as % of total subsidiaries | .344 | .336 | .059 | | | | |
| Firm size | .388 | -.071* | -.055* | .297 | | | |
| Firm age | -.072* | -.149 | -.324 | .093 | .588** | | |
| Time elapsed to set up first international subsidiary | .083 | -.133 | -.269 | .435 | .637** | .724** | |

* $p < .1$.

** $p < .01$.

Table 3
Final cluster center.

| Variables | Cluster | |
|-----------------------------------------------------------------------------------------|-----------------|---------------|
| | 1 (Young firms) | 2 (Old firms) |
| Time elapsed to set up first international subsidiary | 11 | 25 |
| Income from foreign market | 65.64 | 85.64 |
| Investment in subsidiaries | 43.29 | 33.61 |
| Investment for foreign market development | 24.24 | 12.87 |
| International expansion through international subsidiaries (as % of total subsidiaries) | 67.40 | 81.69 |
| Firm size | 15,272 | 123,006 |
| Firm age | 21 | 45 |

Euclidean distance, to select an appropriate number of clusters. We determined the final number of clusters by examining the dendrogram generated with Ward's method, and the agglomeration distance coefficients. By examining changes in cluster densities we reached at a two-cluster solution. We deleted the outlier from further analysis, again following the recommendation of [Punj and Staelin \(1983\)](#). Owing to the small size of the sample we decided to deal with missing data by carefully evaluating multivariate imputation. We did this by imputing one value at a time, and examining sensitivity upon our clustering result by rerunning Ward's technique every time. The clusters formed by this procedure were stable throughout. We followed the recommendation of [Aldenderfer and Blashfield \(1984\)](#) on not performing discriminant analysis on an ex-post basis to validate the clustering results. These authors found in their study that *k*-means clustering appeared to be more robust than any hierarchical method, even, plausibly, when random starting points are used to get the iterative procedure going. We found that the cluster assignments using *k*-means were fairly consistent with the hierarchical procedure used first. Moreover, with respect to the usefulness of the procedures, both permitted us to draw the same conclusions.

One group of firms, under cluster 1 in [Table 3](#), consisted of relatively young and relatively small and medium scale firms (21 years on average). Majority (App. 84%) of the firms listed on CNX IT sector index were found to be a part of this cluster (16 out of 19 firms in our sample). These firms are engaged in sizeable export activities. The firms in this group took; on an average 11 years to expand their business internationally, while the firms in cluster 2 took average 25 years for the same, after their establishment (The cluster 2 firms are much bigger and older with an average age 45 years.). This shows the higher level of orientation of younger firms for international markets. The firms in the cluster 1 generate average 65% of their business from foreign markets (see [Table 3](#)).

The firms in cluster 2 earned more than 85% of their income from foreign markets during 2004–2010 thought they had taken average 25 years to expand internationally after their foundation. These are very big firms having, on average 123,006 employees in comparison to cluster 1 which consists of much smaller firms having, on average 15,272 employees only. Practically no firm in cluster 2 had undertaken global business during their first decade. This could be also because there were more restrictions on international business during their initial years, when they were established.

When we compared international expansion on the basis of investment for foreign market development we found that cluster 1 was more active for international market expansion. Cluster 1,

Table 4
Number of firms in each cluster.

| Cluster | |
|-----------------|--------|
| 1 (Young firms) | 16.000 |
| 2 (Old firms) | 3.000 |
| Valid | 19.000 |
| Missing | .000 |

which is representing the majority of CNX IT sector index showed keen interest in foreign market and invested, on average 43.29% in international subsidiaries. On the other hand cluster 2 firms appeared to be little slower in international market expansion and invested, on average 33.61% in subsidiaries outside domestic market. Cluster 1 confirmed it's more for aggressive international expansion approach by investing a reasonably big share of reserve and surplus (24.24 on average) for foreign market development. The companies in cluster 2 were found to be less interested in investing money for foreign market development. They invested on average 12.87% of reserve and surplus. The main differences between the firms in clusters 1 and 2 are their age, size and international expansion intensity.

Both groups have in common that their export activities and income from foreign markets. It appears appropriate to infer from these results that cluster 1 firms had internationalized much earlier and kept developing foreign market consistently since then while cluster 2 firms started operating in the home market, and expanded internationally after two decades. Our clustering analysis reveals a second, smaller, group of firms with significantly different average characteristics. Firms in cluster 2 could be described as 'Cautious Internationalizers'. They are not aggressive players of Indian IT sector. This group appears to have focused on domestic market more and strengthened their business in domestic market before going international. Though they also are earning big share of their total income in the recent years (2004–2010) from foreign markets still their investment in foreign markets was found to be less than that of cluster 1 firms. The estimated negative correlation coefficient between firm age and percentage of income from foreign market reveals that young companies have internationalized their operations earlier than the older companies (cluster 1 compared to cluster 2) (see [Table 4](#)).

Despite having significantly different characteristics, both the groups of firms were found to be actively involved in international business. All the firms were earning considerably significant percentage of their total income from foreign markets and were actively involved in foreign market development. Thus, we find that both the groups of firms possess higher level of international expansion intensity but different set of strategies. Moreover the group of firms (cluster 2) with gradual internationalization approach is just three compared to 16 in the other group (cluster 1). Although both the clusters are adopting different strategies for global market development still the data collected during this study (financial year, 2004–2010) confirms a high level of global orientation of Indian IT firms.

7. Gradual shift in the process of internationalization

The findings of the study reveal a gradual shift in the process of internationalization of the firms from gradual internationalization to early internationalization. The study identified a cluster of old and bigger firms believed in the gradual development of foreign market development suggested by traditional internationalization theories. However, another cluster of young and smaller firms adopted a faster process of internationalization and foreign market development, ignoring the stages of internationalization suggested by the traditional theories of the process of internationalization.

This unfolds a shift of process of internationalization adopted by firms from older time to recent time.

The study confirms the fact that internationalization process of firms is currently proceeding faster on both dimensions (commitment for international market expansion and entry in foreign market through wholly owned subsidiary-entry mode) than traditional theory predicts. (Uppsala model by Johanson & Vahlne, 1977/1990.) As mentioned in the previous sections of the study, traditional internationalization theories describe a process in which the firm gradually becomes involved in international business and develops the foreign market gradually. However, later, Johanson and Mattson (1988) pointed out that some firms follow other internationalization patterns. They argued that the degree of internationalization of markets (i.e. the frequency, intensity, and integration of relationships across borders in the particular industry market) has an impact on the internationalization process of the individual firm. In highly internationalized markets, firms may skip some of the stages of the process of internationalization.

This study presents a process of internationalization of firms which can be accommodated somewhere between the traditional theories of internationalization and born global concept. As the study indentified a bigger group of young Indian IT firms (cluster 1) which cannot be eventually termed as born-global firms but simultaneously do not belong to the category of firms following the internationalization process based on traditional theories of internationalization. Cluster 1 firms adopted a process of internationalization which is close to the process suggested by Johanson and Mattson and pretty away from the process suggested by the traditional theories of internationalization.

Levitt (1983) argued that technology is the underlying force that is driving the world toward one convergent unit. The word markets pace has been proposed to underline the shift from a physical domain to a virtual environment (Rayport & Sviokla, 1994). Yamin and Sinkovics (2006) used the term Active Online Internationalization (AOI) in their study to define the strategic conduct of business transactions across national boundaries in a virtual rather than a spatial domain. Firms can virtually and simultaneously have access to multiple foreign markets by simply launching a website (Kotha, Rindova, & Rothaermel, 2001). Empirical evidence has shown that the high level of interaction with customers in online internationalization creates insights on consumer preferences and behavior, as well as understandings of the environmental basis of such behavior (Yamin & Sinkovics, 2006). The virtual and decentralized nature of the Internet has made it possible to move the source of necessary knowledge from the market to the customers. This rejects the opinion of Penrose (1959) who distinguished and offered an exhaustive description of the two most important types of knowledge: objective or general knowledge and experiential or market-specific knowledge. According to him, the former can be easily taught but the latter can only be learnt through personal experience and can never be transferred or separated from the primary source (tacit knowledge).

Knight and Cavusgil (1996) also presented an argument that the slowness of the process described in traditional internationalization literature, may be an indication of management's aversion to risk-taking and their inability to acquire relevant knowledge and information. The fact that the process seems to be faster now, may partly be explained by the so called born global management being less risk-averse and/or they having easier access to relevant information. The international business environment has changed a lot since the "traditional internationalization theories" were developed. Rapid globalization in many industries may make out part of an explanation for the observed increase in pace of internationalization of firms. This rapid globalization, which is

believed to lead the people to perceive the world as smaller, may thus also make the firms perceive the risk of entering foreign markets, as smaller. One of the drivers of globalization is believed to be the advancement of the communication technology i.e. an industry described as having high degree of globalization will by definition be characterized by having information transferred easily and faster than in industries less globalized.

It is one of such industries in the world having quicker access to information, which helped in bridging the psychic distance between countries, which have previously been seen as a major obstacle for international expansion of firms (e.g. Johanson & Vahlne, 1977). Young Indian IT firms also have been fortunate to witness the globalization era. Thus the shift has been from experiential learning to "virtual learning" of the foreign market through online interactivity, especially in the highly globalized industries like IT industry. This may be one of the explanations for their quicker internationalization of young Indian IT firms in comparison to old Indian IT firms.

Oviatt and McDougall (1994) suggest that recent technological innovation and the presence of increasing numbers of people with international business exposure have established new foundations for the firms involved in international business. Traditionally these firms were developed from large, mature, domestic firms, but the facile use of low-cost communication technology and transportation means that the ability to discover and take advantage of business opportunities in multiple countries is not the preserve of large, mature corporations anymore. The firms grouped in cluster 1 seem to adopt a process of internationalization which holds true in the recent time for the sectors where the impact of globalization can be seen.

The findings of the study indicate that 'younger IT firms' (cluster 1) adopted a faster process of internationalization by taking the advantage of the developments taking place in the recent time. This group skipped some stages of process of internationalization and showed more commitment for international market expansion and made an early entry in foreign market through wholly owned subsidiary. However, this group does not qualify to be classified as born-global because those firms took more time to go global than the average time taken by born global firms (we go by the definition given by Knight et al., 2004). At the same time, cluster 2 firms, consisting of old and big firms seem to be a follower of traditional internationalization theories. On the contrary, we observe a shift in the process of internationalization adopted by IT firms because our correlation results show that firm age has no relation with internationalization.

8. Conclusion

The findings of this research could be useful for further research related to the process of internationalization adopted by firms, particularly from knowledge-oriented industries. The estimated negative correlation coefficient between firm age and percentage of Income from foreign market reveals that younger firms have internationalized operations earlier than the older firms. Therefore, we put forward a theoretical proposition.

The younger the firms, the higher the likelihood to have an aggressive approach for earlier and faster international expansion.

Other important points from our results can be summarized as follows:

- (i) The results of the cluster analysis confirm the gradual Internationalization of IT firms, even though firm age has no impact on Internationalization: i.e. over a period of time.
- (ii) Cluster 1 firms invest more money for foreign market development, being relatively new firms. But their income from foreign market is less than that of cluster 2 firms. This

could be due to the fact that firms in Cluster 2 are relatively big with more years of track record and they might be still in a position to leverage their brand value to generate more income from foreign market (85.64%), even they spend less amount for foreign market development (12.87%).

- (iii) Indian IT firms in both clusters were found to have high level of intensity of Internationalization.
- (iv) Indian IT firms took average 12 years in establishing their first international subsidiary after gaining enough knowledge and expertise in the domestic market.

The findings of the study, to a considerable extent, corroborate the results of Lopez et al. (2009) who gives evidence for gradual Internationalization of majority of Costarican software firms.

Our study identifies the need for undisputable criteria to define born-global firms. We suggest that firms will tend to go through a process of resource accumulation by engaging in different markets after some experience.

It is worth noting that the firms, especially in certain industries do have access to information that reduces the risk aversion, i.e. we conclude that internationalization can be considered as a process in which knowledge and learning are critical.

Appendix A

See Tables A1 and A2.

Table A1
Constituents of CNX IT firms.

| S. no. | Company name | Industry | Symbol | Series | ISIN code |
|--------|-----------------------------------------|------------------------------|------------|--------|--------------|
| 1 | CMC Ltd. | COMPUTERS – HARDWARE | CMC | EQ | INE314A01017 |
| 2 | Core Projects & Technologies Ltd. | COMPUTERS – SOFTWARE | COREPROTEC | EQ | INE247G01024 |
| 3 | Educomp Solutions Ltd. | COMPUTERS – SOFTWARE | EDUCOMP | EQ | INE216H01027 |
| 4 | Financial Technologies (India) Ltd. | COMPUTERS – SOFTWARE | FINANTECH | EQ | INE111B01023 |
| 5 | Firstsource Solutions Ltd. | COMPUTERS – SOFTWARE | FSL | EQ | INE684F01012 |
| 6 | GTL Ltd. | TELECOMMUNICATION – SERVICES | GTL | EQ | INE043A01012 |
| 7 | HCL Info systems Ltd. | COMPUTERS – HARDWARE | HCL-INSYS | EQ | INE236A01020 |
| 8 | HCL Technologies Ltd. | COMPUTERS – SOFTWARE | HCLTECH | EQ | INE860A01027 |
| 9 | Infosys Technologies Ltd. | COMPUTERS – SOFTWARE | INFOSYSTCH | EQ | INE009A01021 |
| 10 | MindTree Ltd. | COMPUTERS – SOFTWARE | MINDTREE | EQ | INE018I01017 |
| 11 | Moser Baer India Ltd. | COMPUTERS – HARDWARE | MOSERBAER | EQ | INE739A01015 |
| 12 | Mphasis Ltd. | COMPUTERS – SOFTWARE | MPHASIS | EQ | INE356A01018 |
| 13 | Oracle Financial Services Software Ltd. | COMPUTERS – SOFTWARE | OFSS | EQ | INE881D01027 |
| 14 | Patni Computer Systems Ltd. | COMPUTERS – SOFTWARE | PATNI | EQ | INE660F01012 |
| 15 | Polaris Software Lab Ltd. | COMPUTERS – SOFTWARE | POLARIS | EQ | INE763A01023 |
| 16 | Rolta India Ltd. | COMPUTERS – SOFTWARE | ROLTA | EQ | INE293A01013 |
| 17 | Tata Consultancy Services Ltd. | COMPUTERS – SOFTWARE | TCS | EQ | INE467B01029 |
| 18 | Tech Mahindra Ltd. | COMPUTERS – SOFTWARE | TECHM | EQ | INE669C01028 |
| 19 | Tulip Telecom Ltd. | TELECOMMUNICATION – SERVICES | TULIP | EQ | INE122H01019 |
| 20 | Wipro Ltd. | COMPUTERS – SOFTWARE | WIPRO | EQ | INE075A01022 |

Source: www.nseindia.com > Indices > IISL Indices.

Table A2
Datasheet of CNX IT firms.^a

| S. no. | Name of the Company | Income from foreign mkt (% of consolidated income) | Investment in subsidiaries (% of total investment) | Investment for foreign mkt development (% of reserve and surplus) | International expansion through international subsidiaries (% of total no. of subsidiaries) | Firm size (total no. of employees) | Firm age (years) | Time elapsed to set up first international subsidiary (years) |
|--------|-------------------------------------|----------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------|------------------|---------------------------------------------------------------|
| 1 | CMC Ltd. | 24.63 | 53.05 | 3.31 | 100.00 | 5551 | 35 | 16 |
| 2 | Core Projects & Technologies Ltd. | 67.35 | 96.21 | 65.35 | 60.00 | 10,000 | 25 | 20 |
| 3 | Educomp Solutions Ltd. | 18.29 | 34.92 | 14.87 | 37.32 | 12,101 | 16 | 8 |
| 4 | Financial Technologies (India) Ltd. | 50.61 | 23.76 | 34.07 | 29.56 | 1137 | 22 | 16 |
| 5 | Firstsource Solutions Ltd. | 91.12 | 74.91 | 341.11 | 82.26 | 24,860 | 9 | 2 |
| 6 | GTL Ltd. | 38.54 | 33.79 | 22.67 | 85.03 | 7066 | 23 | 9 |
| 7 | HCL Infosystems Ltd. | 26.93 | 1.05 | 4.95 | .60 | 7096 | 34 | 23 |
| 8 | HCL Technologies Ltd. | 96.59 | 45.95 | 23.37 | 88.71 | 64,557 | 19 | 8 |
| 9 | Infosys Technologies Ltd. | 90.93 | 22.64 | 2.36 | 82.62 | 92,688 | 29 | 23 |
| 10 | MindTree Ltd. | 90.52 | 8.13 | 2.63 | 23.61 | 7657 | 11 | 9 |
| 11 | Moser Baer India Ltd. | 70.35 | 57.88 | 12.07 | 55.92 | 6146 | 27 | 15 |
| 12 | Patni Computers | 96.49 | 30.31 | 18.14 | 95.83 | 14,000 | 17 | 15 |
| 13 | Polaris Software Lab Ltd. | 90.39 | 17.01 | 5.78 | 82.12 | 10,000 | 32 | 4 |
| 14 | Tata Consultancy Services Ltd. | 92.01 | 36.50 | 15.30 | 83.91 | 160,429 | 42 | 11 |
| 15 | Oracle Financial Services | 94.32 | 96.40 | 16.21 | 85.05 | 9083 | 21 | 12 |
| 16 | Mphasis | 95.60 | 69.11 | 59.30 | 75.66 | 29,000 | 10 | 5 |
| 17 | Tech Mahindra | 97.34 | 15.32 | 5.05 | 96.25 | 33,524 | 23 | 6 |
| 18 | Tulip | 1.21 | 34.83 | .04 | 80.56 | 2571 | 18 | 10 |
| 19 | Wipro | 73.99 | 41.70 | 20.95 | 78.53 | 115,900 | 65 | 40 |

^a All the above figures are showing the mean values of the respective variable for last six financial years (2004–2010) for each company.

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Justin Paul is an author of 4 text books titled Export-Import Management, International Marketing, Business Environment and International Business pub by Oxford University Press, McGraw-Hill, and Prentice Hall respectively. He has taught in

Denmark, France, Japan, US, UAE and conducted corporate training for hundreds of diplomats and managers in India, Middle East, Mauritius & China. His website is drjustinpaul.com. He is with the Graduate school of Business, University of Puerto Rico, US & University of Washington, Seattle.

Parul Gupta is an Associate Professor, Army Institute of Management, Greater Noida, National Capital Region, India.