

Stock Market Performance and Internationalization Strategies. An Empirical Analysis of the Software Industry

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This study provides a specific focus on shareholder value creation in the form of stock market reaction to announcements of cross-border equity entry modes performed by software firms listed on European stock exchanges. The empirical findings from a sample of 204 announcements during the period 2001-2010, suggest that software firms create value through their internationalization strategies. This value created is largely dependent on entry modes, country of destination and level of complementarity between acquirer and target firm.

JEL Codes: F21, G34 and M16

1. Introduction

Over the past five years, the European software market has seen a large growth in terms of total revenues, with an annual growth rate (CAGR) of 3.9% between 2006 and 2010.

Market performance is forecast to accelerate, which is in turn expected to drive the market to a value of \$109.4 billion by the end of 2015 (Datamonitor 2011). However, the existence of a large number of software firms has dramatically cut firms' growth with a consequent intensification in the software industry of equity investments through mergers and acquisitions (M&As), joint ventures and minority stakes purchases. Equity investments, particularly M&As, are the quickest way in which a firm can grow but, at the same time, there is limited evidence that equity investments create value in the software industries.

Even if it is possible to integrate the two businesses immediately, in practice the technical integration of the software products may take much longer, compromising the potential planned synergies. Particularly, these investments do not often add value in the case of geographical diversification strategies where the technical integration problems are associated with cultural distance, differences in values, norms and dispositions.

This research re-examines these cross-border equity investments trying to answer to the following questions: Do cross-border equity entry modes create value in the software industry? And which are the main determinants of value creation? By relying on the event study methodology, we analyze the stock market reaction in response to internationalization announcements of a sample of software firms listed on European stock exchanges. In order to answer the second research question, we selected industry specific determinants such as level of complementarity and diversification between acquiring and target firm; country specific determinants such as country of destination and country risk; and deal specific determinants such as entry modes and size.

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The results of the study provide different findings from previous researches: stock markets seem to be confident in the capabilities of software firms to seize value, in the short term, from investments in foreign markets. The results are largely affected by the complementary nature of the deals and the entry modes.

The remainder of the article is organized as follows: Section 2 provides the theoretical background and hypotheses behind cross border internationalization strategies performed by software firms; Section 3 illustrates data and methodology; Section 4 provides the main results; Section 5 discusses results and underlines the main limitations of the study.

2. Literature Review

The software industry is often considered to be a hypercompetitive industry (D'Aveni & Gunther 1994), characterized by high-velocity innovation (Brown & Eisenhardt 1997), technological change (Schmalensee 2000) and turbulence in revenues, market shares, and profits of firms (Baldwin & Clark 2000; Shapiro & Varian 1999).

International expansion for software firms is a strategic option to gain access to markets that offer a large customer base for its products and services. Software firms are not geographically confined by nature and, in recent years, European software's firms have increased their investments abroad to seize upon new opportunities for growth in terms of network effects and profitability.

Network effects are defined by the benefits of having a larger number of consumers purchasing compatible products (Farrell & Saloner 1985, Shapiro & Varian 1999) and they seem to be the main reason for firms to make investments aimed at increasing their market share. Network effects stem from the benefits of having a large customer base where standardized products provide access to larger physical networks (for example, in applications software such as word-processing and spreadsheets where users have the need to share files). However, it is also possible to find an indirect network effects in which complementary products benefit from the customer base of the partner (for example, a large customer base in hardware is an incentive for stronger competition in the complementary software market). Previous statements imply the following research hypothesis:

Hypothesis 1: Software firms are expected to show a positive and significant stock market reaction in response to announcements of equity-based internationalization strategies.

In the software industry, decision-making and strategy are shaped by the existence of complementarities.

The complementary nature of software is manifest when two or more components made by different manufacturers using different technologies may have to be used together and systems have to be interoperable. Following Milgrom and Roberts (1990) the returns obtained from combining the activities are greater than the sum of the returns of both activities in isolation. The more the products complement each other, the more they create incentives for producers to enter into complementary markets and to use partnerships between players to promote interoperability.

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In other words, complementary assets are much more valuable, rare, difficult to imitate, and difficult to substitute than the firm's stand-alone assets (Barney 1991). The mutual dependency between complements affects the performance outcomes of both firms and, for our purposes, the complementary nature of products and services is a source of value creation (Porter & Siggelkow 2008; Rothaermel & Hill 2005; Tanriverdi & Venkatraman 2005; Lee et al. 2010).

We investigate if abnormal returns are higher for cross-border equity investments performed by companies whose activity more closely matches the activity of the target companies. In the software industry most companies are specialized in one specific business and rely on other companies to offer complementary components (Gerstner 2003). Revisiting the Gao and Iyer (2006) classification, we divide the software industry into different segments (layers, using a common approach in software architecture) including also the service and hardware industry which may complement the software firms. We use the following classification:

- Service industry;
- System software - includes operating systems, network and database management and other systems software;
- Middleware software - connects software components or applications;
- Application software - includes general business productivity and home use applications and other application software;
- Hardware industry.

Each segment depends on the complementary segment below. Higher segments can use only the facilities of lower segments according to a strict order of relations. At the same time, if relations are followed, these segments may interact without knowing how they were implemented. In software markets, the main source of value creation has been the ability of firms to establish platforms with high levels of integration and high associated switching costs for users.

In the study, we have used the 4-digit level SIC codes that reflect an increasing scale of relatedness. If both the acquirer and target are in the same segment, the value of the index is equal to 0 (i.e., the distance between both firms is 0). If the acquirer is exclusively a software firm and the target is exclusively a hardware firm or a service firm, the value of the index is 1 (i.e., both firms are in different industries). The index increases with the percentage of sales of the target in different segments of software, hardware or service industry (i.e., the more hardware or service the target produces, the larger the distance between the acquirer and target). The way the index is defined, in this particular case, generates values that are between 0 and 1, where 1 is the largest possible distance between acquirer and target. Previous statements imply the following research hypothesis:

Hypothesis 2: The value creation is higher for complementary deals.

Numerous empirical studies have analyzed the relationship between stock market reaction to internationalization operations and diversification in related or unrelated businesses.

Two perspectives can be outlined: the first one focuses on the advantages of diversification; diversified firms can benefit from the so called co-insurance effect in the sense that they may balance gains and losses of different business units leading to

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cash flow stabilization (Stein 1997; Doukas & Kan 2008). Another strand of literature focuses on inefficient internal capital markets and the increase of agency costs stemming from diversification (Shin & Stulz 1998; Rajan, Servaes & Zingales 2000).

Whether unrelated diversifiers perform better or worse than related diversifiers is an open question with mixed empirical results. In the software industry, diversification between players in terms of segmentation and portfolio of products eases competition. However, some segments are more strongly held by existing companies than others (e.g. Microsoft in operating system, Oracle in middleware) or by the presence of multinational incumbents, such as IBM, Microsoft, Oracle, SAP etc.

Predicted market growth connected with the characteristics of the software industry may provide opportunities for software firms to enter in unrelated businesses. However, firms, particularly larger ones, use acquisitions in related businesses to rapidly obtain intellectual property from the company that originally generated it or otherwise to decrease rivalry. In the study, we have used the 4-digit level SIC codes to define industry relatedness. Previous statements imply the following research hypothesis:

Hypothesis 3: The value creation is higher in investments made in related industries.

In accordance with the transaction cost theory, the entry mode is viewed as a strategic choice whose purpose is the reduction of costs associated with management and control of transactions (Zhao, Luo & Suh 2004). In such a way the choice of entry mode for a firm can be considered an efficient economic solution and above all a trade-off between the degree of control and the resources needed to accomplish the investment in a condition of risk and external uncertainty (Brouthers, Brouthers & Werner 2003).

The amount of empirical research focusing on the relationship between internationalization and entry modes is huge and has mixed results (Ahern & Weston 2007). In the software industry, value creation through M&A activities results from economies of scale and scope; extending technological capabilities; industry consolidation strategies; industry roll-ups; new capabilities and managerial skills; first mover advantages; customer relationships and globalization. Value destruction at the expense of shareholders is largely explained by behavioral theories of M&As such as hubris, stock market misvaluations, agency and integration problems.

Dunning (1988) analyzed the relationship between entry modes and the advantages of internationalization in terms of ownership advantage, localization advantage, internalization advantage. He found a higher performance in the case of FDI entry modes than when other kinds of entry modes were adopted. Subsequent studies found that the ability of firms to enter a market by FDI entry modes is seriously limited by their size, their previous international experience and risk and also concluded that high-equity entry modes are not exclusively related to high potential of markets of destination (Agarwal & Ramaswami 1992). Considering the percentage of the target acquired to be a proxy for the degree of integration, Zaheer, Castaner and Souder (2005) argue that business similarity and product complementarities are associated with negative performance if integration is low. They become more valuable when the degree of integration increases.

We divide equity entry modes into two categories: high-equity vs. low-equity entry modes. The first ones include mergers and acquisitions, the second ones include joint

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ventures and purchase of minority stakes in foreign companies. Previous statements imply the following research hypothesis:

Hypothesis 4: International mergers & acquisitions generate higher gains for their shareholders than those shown in joint ventures.

A variable typically considered as a value creation determinant is the relative size of the deal. Several studies found that abnormal returns of the acquiring firm increase in relation to relative size of the target (Asquith, Bruner & Mullins 1983; Jarrell & Poulsen 1989).

The familiar way to measure relative size, is to calculate the ratio between the purchase price of the stake and the market capitalization of the acquiring firm. We can define three groups of dimensional class: small, medium, and large deals.

According to Moeller, Schlingemann and Stulz (2004), returns to shareholders of smaller acquiring firms should be higher, therefore, we also analyze the size of the acquirer. Previous statements imply the following research hypotheses:

Hypothesis 5a: Relative size of the target has a positive and significant impact on stock returns of firms that announce an equity cross-border expansion.

Hypothesis 5b: Size of investing firm has a negative and significant impact on stock returns of firms that announce an equity cross-border expansion.

Other variables of interest are related to the characteristics of the host country. Rothaermel, Kotha, and Steensma (2006), found that for the U.S. Internet firms select a country of destination with a preference for countries with a high level of GDP per capita. This variable increases the attractiveness of the country and decreases the effects of country risk, cultural distance, and national cultural values.

However, qualitative studies related to the internationalization of software firms hypothesize that SMEs in the software industry do not enter at first into countries with a large market size. They do so only later when the process of internationalization is positively related to a large market size (Bell 1995; Coviello & Munro 1997; Moen, Gavlen & Endresen 2004).

Mixed results can also be found by analyzing market size. Numerous studies demonstrate that firms prefer countries of destination with a large market size particularly for multinational firms (Brewer 2001; O'Farrell, Wood & Zheng 1997; Robertson & Wood 2001). On the other hand, studies on SMEs have found support for the notion that entrepreneurial firms focus first on countries with a low geographic distance and then on larger markets (Bell 1995; Coviello & Munro 1997; Moen, Gavlen & Endresen 2004).

The level of development of the country of destination is another variable that must be considered. Drawing on the distinction proposed by the International Monetary Fund, we classify the host countries into two groups - Advanced Economies vs. Emerging and Developing Economies.

The degree of development is not always related to the country risk (i.e., the lower the development of the host country, the higher the country risk is likely to be). Drawing on rating scores issued by Standard & Poor's and other rating agencies, countries such as

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China, Poland, Hong Kong, are low risk emerging economies. This means that the two variables capture different characteristics of the host country and deserve to be treated separately.

This evidence leads us to argue that, on the one hand, internationalization in an emerging country benefits from both the higher growth rate of the host country, and the lower correlation between emerging and advanced markets (Van Agtmael & Errunza 1982). On the other hand, emerging markets are more likely to be exposed to sudden changes both in the political and institutional environment and the exchange and interest rate policy, which make market entrance much more exposed to risk. Previous statements imply the following research hypothesis:

Hypothesis 6: Host country determinants affect value creation of firms that announce a cross-border expansion.

3. Data and Methodology

The sample consists of 204 transaction announcements which have the following characteristics:

- a) acquirer firms are software firms;
- b) the deals include pure equity strategies such as mergers and acquisitions, joint ventures and minority stake purchases;
- c) all deals are cross-border;
- d) announcing firms are listed in European stock exchanges;
- e) target firms are non-financial firms;
- f) the deal is announced during the period 2001-2010.

Table 1 shows the distribution of announcements by year of the operation and country of origin. A large share of the transactions is initiated by British (31.86%), German (31.86%), and French (27.45%) firms.

Target firms come from all over the world, especially from US (34.30%), France (6.86%), Germany (6.37%), Great Britain (5.80%) and Netherlands (5.80%).

Deals among European firms represent the bulk of all operations (51.70%). Sample firms (92.16%) expand either into the same business or into close sectors, conglomerate growth strategies are infrequently pursued (7.84%).

Target firms cover the same sector as the acquirer's firm (software 60.29%) or a wide range of close sectors: Computers related services (12.74%), Information retrieval services (7.35%) and Technology Hardware & Equipment (5.80%).

Table 1: Distribution of events by year of the operation and country of origin

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Belgium	0	0	0	0	0	1	2	0	1	1	5
Finland	0	1	0	0	0	0	0	0	0	0	1
France	7	7	2	6	7	7	2	7	5	6	56
Germany	4	3	4	3	8	12	13	7	8	3	65
Ireland	0	0	0	0	0	0	0	1	2	0	3
Italy	0	0	0	0	0	0	0	0	1	1	2
Netherlands	0	0	0	1	0	0	0	0	0	0	1
Norway	0	0	0	0	0	0	1	1	0	0	2
Sweden	0	0	0	0	0	1	1	1	0	0	3
Switzerland	0	0	0	0	0	0	0	0	1	0	1
UnitedKingdom	5	1	3	5	9	10	9	10	4	9	65
Total	16	12	9	15	24	31	28	27	22	20	204

The entry mode choice shows M&As to be the most common expansion strategy adopted by sample firms (87.88%), followed by minority stakes (5.05%), and joint ventures (7.07%) (Table n. 2).

The analysis of the stock price reaction to the announcement of an event involving a software firm's international expansion is carried out in two steps according to the event study methodology (Brown & Warner 1985):

- 1) Estimation of abnormal returns in the period around the event announcement;
- 2) Analysis of the statistical significance of abnormal returns.

According to Brown and Warner (1985), we use daily returns and a 300-trading day window for estimation period starting at day -340 and ending at day -41. For the event period, we focus on windows: (-15,+15), (-5, +5), (-1, +1). We employ the simple market model without any correction to take into account concerns related to infrequent (non-synchronous) trading. The second step is performed by following Mikkelson and Partch (1988) methodology.

Information concerning internationalization announcements and deal prices has been collected from Bloomberg and Lexis-Nexis, data related to stock returns and market indexes have been collected from Datastream Thomson Financial.

Table 2: Distribution of events by entry mode, country of origin and target region

		UK	Germany	France	Others	Total
M&As	North America	27	22	18	2	69
	South America	0	0	1	0	1
	Europe	26	21	28	11	86
	Asia	5	8	1	2	16
	Africa	1	0	0	0	1
	Oceania	1	0	0	0	1
	Total M&As	60	51	48	15	174
Minority stakes	North America	1	3	0	1	5
	South America	0	0	0	0	0
	Europe	1	3	0	1	5
	Asia	0	0	0	0	0
	Africa	0	0	0	0	0
	Oceania	0	0	0	0	0
	Total Minority stakes	2	6	0	2	10
Joint ventures	North America	0	0	2	0	2
	South America	0	0	0	0	0
	Europe	3	4	4	1	12
	Asia	0	0	0	0	0
	Africa	0	0	0	0	0
	Oceania	0	0	0	0	0
	Total Joint ventures	3	4	6	1	14

4. The Findings

Table 3 provides the results of the event study analysis (window -1;+1) for the whole sample and for each variable analyzed. For the entire sample, the cumulative average abnormal return is positive (1.3%) and statistically significant at the 1% level. The market reaction denotes investors to be confident in the ability of software firms to increase their value through internationalization strategies.

British firms are shown to be the best performers (CAAR_{-1,+1} 2.8%; significant at the 1% level). The value creation extends also to France and Germany which show positive but statistically insignificant abnormal returns. The results also show that in all countries except Germany, the percentage of positive cumulative abnormal returns is far higher than 50%.

With reference to industry-specific determinants, value creation is significantly higher for software firms that internationalize in the same industrial sector or in highly related industries of the target firm (CAAR_{-1,+1} 1.42%, significant at the 1% level). We find that operations in which acquirers and targets occupied the same segments of the software industry earn smaller abnormal returns than acquisitions in which acquirers and targets are part of different segments, confirming hypothesis 2 on the importance of the complementary nature of the deal (CAAR_{-1,+1} 1.09%, significant at the 1% level).

As it is explained in literature, similarities and complementarities are associated with positive performance when the percentage of a target acquired is high. In our case, we

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found a CAAR_{-1,+1} equal to 1.36%, significant at the 5% level for announcements of international mergers and acquisitions.

Table 3: Abnormal returns: Whole sample and breakdown by country of acquirer, complementary nature, diversification, entry modes, characteristics of the host country, acquirer size and deal size.

All sample and country of acquirer				
(-1, +1)	CAAR	t-test		Percentage of positive CARs
All sample - 204 events	0.013006	3.121772	***	53.2%
Great Britain - 65 events	0.028986	3.787105	***	64.6%
France - 56 events	0.005672	0.758523		53.6%
Germany - 65 events	0.005084	0.277312		43.1%
Complementary nature				
(-1, +1)	CAAR	t-test		Percentage of positive CARs
High complementary - 131 events	0.010962	2.687666	***	53.4%
Low complementary - 41 events	0.02296	1.359447		49.0%
Null complementary - 32 events	0.00862	0.5374		58.1%
Diversification				
(-1, +1)	CAAR	t-test		Percentage of positive CARs
Related - 166 events	0.014284	2.760215	***	52.4%
Unrelated - 38 events	0.007424	0.729695		57.9%
Entry modes				
(-1, +1)	CAAR	t-test		Percentage of positive CARs
M&A - 174 events	0.013638	2.557678	**	55.7%
Joint Ventures - 14 events	0.016513	0.385084		50.0%
Minority stakes - 10 events	0.006753	1.131483		40.0%
JV & Minority stakes - 24 events	0.010273	1.024482		45.8%

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Table 3: Abnormal returns (continued)

Characteristics of host country				
(-1, +1)	CAAR	t-test		Percentage of positive CARs
Advanced – 179 events	0.014487	3.198008	***	54.7%
Emergent – 25 events	0.002404	0.329601		40.0%
High GDP per capita – 35 events	0.022023	0.755582		57.1%
Low GDP per capita – 169 events	0.001529	0.252688		42.3%
High country risk – 20 events	0.005495	1.102256		53.1%
Low country risk – 184 events	0.025871	0.255556		42.0%
Acquiror size				
(-1, +1)	CAAR	t-test		Percentage of positive CARs
SMEs - 61 events	0.021666	3.649662	***	55.7%
Large firms - 65 events	0.027437	3.194362	***	58.4%
Extra large firms - 78 events	-0.00579	-1.60755		47.4%
SME employees <500, Large>500<3000, Extra large >3000				
Deal size				
(-1, +1)	CAAR	t-test		Percentage of positive CARs
Small deals - 26 events	0.03152	1.554884		46.1%
Medium deals - 50 events	0.013662	2.201893	**	60.0%
Large deals - 26 events	0.006553	1.014394		40.0%
Small deals (the ratio between purchase price and market capitalization of the acquiring firm is lower than 25th percentile), medium deals (the ratio between purchase price and market capitalization of the acquiring firm ranges from 25th to 75th percentile), large deals (the ratio between purchase price and market capitalization of the acquiring firm is greater than 75th percentile)				

Moving onto our examination of the country of destination, we show that, if the variable is analyzed without any interaction with other variables, the results are straightforward: market reaction is positive and significant ($CAAR_{-1,+1} = 1.44\%$, significant at the 1% level) if the country in which the firm internationalizes is advanced. No significant price reaction ($CAAR_{-1,+1} = 0.24\%$) comes out of announcements of internationalization strategies in emerging countries.

The expansion in richer countries appears to affect the value creation but is not supported by a statistical significance.

Finally, the size of acquiring firm has a negative and significant impact on stock returns of firms that announce an equity cross-border expansion. An interesting result comes from relative size of the deal. Market reaction is higher ($CAAR_{-1,+1} = 1.36\%$, significant at the 5% level) for medium deals, but the scarce number of observations means that general conclusions cannot be drawn.

5. Summary and Conclusions

The evidence shows that stock markets seem to be confident in the soundness of strategies carried out by software firms in foreign countries. This result appears to be

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contrary to the recent literature that shows zero or negative abnormal returns for acquirers (Kohers & Kohers 2000, Fee & Thomas 2004). A possible explanation of our result is that stock markets seem to appreciate when acquirer decides to gain market share through cross-border investments. Previous studies have considered samples where both domestic and international investments were analyzed.

Another possible explanation is that our results are not affected by the Internet bubble. The Internet bubble increased the volatility of software firms leading to lower standardized abnormal returns therefore a lower rejection rate of the null hypothesis of zero abnormal returns. In our sample, announcements of international operations carried out in that period were significantly fewer than that of operations performed in other years.

Entry modes as well as complementary nature between acquirer and target are relevant variables which affect market reaction and seem to interact with each other. More involving entry modes seem to receive higher market appreciation if they are oriented to acquiring a firm with a related and complementary business. M&As between companies that are in adjacent segments earn higher abnormal returns than M&As between companies which are in the same segments. According to prior literature (Gao & Iyer 2006), segments that are closer together exhibit stronger complementary nature in the software industry. Stock markets seem to appreciate acquirers and targets that already work together as complementary components of a network system more than firms of the same segment that primarily have to overcome integration problems.

The study shows that the value creation is affected by the country of destination. The target country also affects the link between entry mode and market reaction in the sense that M&As create value when performed in advanced economies but not in emerging countries. A possible reason for this result arises from the fact that international expansion strategies in advanced economies are often accompanied by a more complete disclosure of information. This allows the market to perform a more accurate assessment of the right transaction value. Given that most announcements involve European target countries (51.70%), our results seem to confirm the benefits of geographical proximity.

Further improvements and research avenues of the study are linked to some issues and limitations that have to be sorted out. First, the size of the sample can be enlarged. Future work will consist of enlarging the time period of the survey to at least 20 years. Second, the use of additional variables such as R&D intensity, cultural distance, FDI experience of the investing firm, etc., could be a step forward in enhancing the work. The last point pertains to the econometric setting. In order to analyze the determinants of the stock market reaction to announcements of cross-border operations, we will run OLS regressions to better understand the cross-sectional determinants of value creation.

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