ENTRY LEARNING, AGE AT INTERNATIONALIZATION, AND FOREIGN

VENTURE PERFORMANCE OF YOUNG TECHNOLOGY FIRMS

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Abstract

The central question that this research addresses is how young technology firms learn about foreign markets when venturing abroad for the very first time. Drawing on learning theory we develop and test a model for the entry learning and foreign venture performance of young technology firms. Our empirical results show that market learning leads to postponing the first internationalization, whereas network learning and imitation lead to earlier international venturing. Further, results show that the earlier technology firms venture into foreign markets the higher the foreign venture performance of the firm.

Keywords: Entry Learning; Age at internationalization; Foreign venture performance;

Technology Firms

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Introduction

A large body of empirical evidence in the field of international entrepreneurship focuses on knowledge intensive firms which pursue an international strategy right from their inception (e.g. Bloodgood, Sapienza & Almeida, 1996; Karagozoglu & Lindell, 1998; Lee, Lee & Pennings, 2001; Qian & Li, 2003; Zahra, Neubaum, & Huse, 1997). Studies show that such an early exposure to international markets is essential for the growth and survival of young technology firms (Sapienza, Autio, George & Zahra, 2006; Autio, Sapienza & Almeida, 2000). However, when venturing into foreign markets for the very first time, young technology firms are unfamiliar with the foreign market environment and face "liabilities of foreignness" (Zaheer, 1995) which may endanger their growth ambitions and even firm survival (Sapienza et al, 2006). Thus, to handle the liabilities of foreignness young technology firms need to learn about foreign market particularities prior to venturing abroad for the first time.

Entry learning describes the mechanisms a firm applies in order to acquire the necessary foreign market knowledge prior to venturing into the market for the very first time. So far, most of the discussion in the international business and entrepreneurship field focuses on experiential learning once the internationalization process has been initiated (Bilkey & Tesar, 1977; Cavusgil, 1984; Forsgren & Johanson, 1992; Johanson & Vahlne, 1977; Johanson & Wiedersheim-Paul, 1975; Luostarinen, 1979). Opportunities for preentry learning receive less scientific attention, leaving room for the following questions: How are young technology firms – lacking a stable resource endowment and international experience - able to acquire the necessary foreign market knowledge when venturing abroad for the very first time under time constraints? Does an early international venturing yield higher foreign venture performance for these firms?

Addressing these questions the aim of this article is twofold: First, we develop a model to explore the foreign market entry learning of young technology firms by drawing on learning theory (Levitt & March, 1988; Schwens & Kabst, 2009). This model shows that entry learning is conceivable for young technology firms. However, the mechanisms applied when acquiring knowledge about the foreign market have different impacts on the age at internationalization. Whereas market learning about foreign market particularities postpones the age at internationalization, network learning and imitation lead to earlier international venturing. Second, we show that earlier venturing abroad leads to higher foreign venture performance of technology firms.

Our paper makes two major contributions to the research field: First, we contribute to a better understanding of the entry learning of young technology firms. So far studies focus on the antecedents of learning effort (Sapienza, De Clerq & Sandberg, 2005), on the antecedents of technological, market, and social learning (Yeoh, 2004), on the effect of early internationalization on technological learning (Zahra, Ireland & Hitt, 2000), and on the

impact of different types of learning on early internationalization opposed to late internationalization (Schwens & Kabst, 2009). Studies elaborating the influence of different types of learning on age at internationalization are largely missing. Second, we show that age at internationalization has foreign venture performance implications for young technology firms. Whereas prior research has shown that age at internationalization has an influence on firm growth (Autio et al., 2000), studies examining the impact of age at internationalization on foreign venture performance are largely missing. Thus, our work shows that "the acquisition of local-market knowledge is critical for successful planning and implementation of entry" (Pedersen & Petersen, 2004: 104; Lord & Ranft, 2000).

In the next section we introduce our theoretical framework which is based on learning theory (Levitt & March, 1988) and derive hypotheses. These are tested on dataset of internationally operating German firms from four different technologies: Nanotechnology, Biotechnology, Microsystems, and Renewable Energies (n=248). We finally discuss the results, point out limitations of our study and draw some implications for future research.

Theory and Hypotheses Development

Aspects of learning have found widespread attention in entrepreneurship research. In a special issue of "Entrepreneurship Theory and Practice"[1], the scope for applying concepts of learning within the field of entrepreneurship (Harrison & Leitch, 2005, p. 351) has been elaborated in depth. The special issue addresses dynamic learning perspectives (Cope, 2005), the process of entrepreneurial learning (Politis, 2005), the nature of entrepreneurial opportunities (Dutta & Crossan, 2005), organizational learning and opportunity-recognition (Lumpkin & Lichtenstein, 2005), experiential learning (Corbet, 2005), and explorative and exploitative learning (Schildt, Maula & Keil, 2005). Further, reviewing the literature on

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[1] Entrepreneurship Theory & Practice 2005, Vol. 29, Issue 4.

organizational learning shows the importance of dynamic aspects, organizational change as well as imprinting effects over time (Grant, 1996; Nonaka, 1994; Spender, 1996; Weick, 1991).

Although most of the internationalization literature largely excludes the opportunities of entry learning, some studies argue that entry learning is conceivable. Forsgren (2002, p. 272) indicates that the obvious failure of some rapidly internationalizing firms demonstrates that entry learning is an important factor even determining firm survival. Casson (1994) has also stated that it is hard to conceive foreign market particularities without acquiring entry learning about the foreign market environment. Thus, in line with Pedersen & Petersen (2004 p. 106) and Schwens & Kabst (2009), we not only assume that entry learning is conceivable, but that it is essential for the success and in some cases even for the survival of a firm in the foreign market. Therefore, firms have to emphasize entry learning even if, or particularly when they venture into foreign markets early in their lifecycle.

In order to study entry learning of young technology firms, we apply learning theory building on the works by Levitt and March (1988). The authors differentiate between three types of learning 1) learning from direct experience describes the extent to which a firm conducts own *market learning* through analyzing the foreign market situation and conditions prior to venturing abroad, 2) learning from experience of others is the extent to which the firm uses *network* contacts to learn about the foreign market before foreign market entry, and 3) learning from paradigms of interpretation is the extent to which the firm learns by *imitating* routines of firms, which are perceived to be best practices in the focal market.

One possibility to learn as pointed out by learning theory is market learning. Market learning describes the extent to which the firm conducts comprehensive analyses of the foreign market situation prior to venturing abroad. Accumulating own knowledge about foreign markets over time and combining new and existing knowledge enables firms to

develop a solid resource base, easing the initial move from an established domestic market into an international one (Julien & Ramangalahy, 2003). However, market learning by searching and noticing new information (Huber, 1991) may be a time-consuming process which does not necessarily forward an early venturing into foreign markets. It takes time to collect the necessary information about the foreign market and to verify if the information identified is helpful to reduce the liabilities of foreignness the firm faces in the target market. Therefore, we posit that market learning is more of a process of stepwise knowledge development postponing the foreign market entry of technology firms.

H1:   Market learning is positively related to age at internationalization.

Network learning constitutes another learning mechanism as suggested by Levitt and March (1988) and describes the extent to which the firm uses external sources in order to acquire knowledge about the foreign market. Network learning facilitates tapping into the knowledge base of network partners operating in the foreign market thus opening up the opportunity for acquiring knowledge which is already catered to the prerequisites of the foreign market. Knowledge of network partners may help technology firms to more quickly overcome the liabilities of foreignness a firm faces prior to first internationalization. Access to networks provides learning opportunities about foreign markets without gaining own experiential knowledge (Kale, Singh & Perlmutter, 2000).

Young technology firms – short in resources due to their firm age – may have a strong need to learn from others. In addition, young technology firms may also have a greater ability to learn from others. Less resistance within the company enables faster and better transfer of outside knowledge throughout the organization (Rosenkopf & Nerkar, 2001) allowing for an earlier international venturing. "[m]arket-specific, tacit knowledge can be acquired through

interaction with other organizations, which, in the context, also means that the prediction that internationalization is a slow process may not always hold true" (Forsgren, 2002, p. 264). There has been a stream of research supporting the argument that inter-organizational learning in business relationships allows for acquiring even tacit knowledge from the different actors in the network (Greve & Salaff, 2003; Ellis, 2000; Anand & Khanna, 2000; Andersson, Forsgren & Pedersen, 2001; Eriksson, Hohenthal & Johanson, 1998; Lane & Lubatkin, 1998; Uzzi, 1996). Having acquired the necessary foreign market knowledge in a fast and efficient way from network partners allows for an earlier international venturing. Therefore we argue:

H2:   Network learning is negatively related to age at internationalization.

Another mechanism of acquiring knowledge about foreign market particularities as forwarded by Levitt and March (1988) is to learn through imitation. Imitating business rules and norms of firms which are perceived to be best practices in the focal market may allow for a fast learning and knowledge acquisition about the particularities of the foreign market. By trying to organize their routines according to benchmark firms, young technology firms may adapt organizational practices that better fit the host country environment (Levitt & March 1988; Aldrich, 1999). "For instance, it has been argued that organizations tend to imitate actions that have been taken by a large number of organizations, because such practices are legitimized, or their success is taken for granted" (Forsgren, 2002, p. 264). Referring to authors like Meyer and Rowan (1977) or Scott (1987), organizations not only have to be efficient; they must also be legitimated. Legitimacy can be acquired by adopting structural elements that socially constructed environments regard as rational (Zucker 1987; DiMaggio & Powell 1991; Fligstein, 1985; Haunschild & Miner, 1997; Haveman, 1993; Kraatz, 1998).

Thus, technology firms may imitate those organizations in the target market that they perceive to be successful. Through mimetic isomorphism, technology firms tend to become similar to those organizations, reducing liability of foreignness and risk of foreign market entry (Scott & Meyer 1992). "[…] By imitating organizations with a high degree of legitimacy, the firm can reduce its perceived uncertainty about the foreign market without having to wait until its own market-specific knowledge has reached the required level. Internationalization itself can be seen as a legitimacy creating activity that will stimulate other firms to invest abroad much earlier than they would otherwise have done." Thus, imitation may be another mechanism allowing for fast international venturing.

H3:   Imitation is negatively related to age at internationalization.

In addition to elaborating the entry learning behavior, we examine the imprinting effects of age at internationalization on foreign venture performance. We base our arguments on two interrelated rationales. First, according to Hannan & Freeman (1984) and Hannan, Laszlo, and Carroll, (2002) the older a firm gets the more it faces *organizational inertia* hampering the internal knowledge transfer process. Second, according to Autio et al. (2000) and Sapienza et al. (2006), younger firms possess some *learning advantages of newness* over older firms with more established routines.

The older a firm at the timing of internationalization the more it possesses an existing resource stock generated from years of its business activities. Venturing into foreign markets for the first time new knowledge about foreign markets needs to be integrated into the existing knowledge base. This can be a challenging process the older the firm is at its internationalization. Operational routines which have been employed for years by operations on the domestic market may not fit the needs of the international market. Some parts of the

organization might resist or be unable to easily adapt existing routines to the new requirements of the foreign market (Sapienza et al., 2006). The ability to identify new knowledge, select valuable information, and assimilate it to the organization may be blocked "[…] by impermeable organizational boundaries" (Aldrich, 1999, p. 31). Older organizations may have become more rigid, narrow and simple in their perceptions (Vermeulen & Barkema, 2001), and may more likely be characterised by organizational inertia (Hannan & Freeman, 1984; Hannan et al., 2002). The firm finds itself in a competency trap (Levitt & March, 1988). "A competency trap can occur when favourable performance […] leads an organization to accumulate more experience with it, thus keeping experience with a superior procedure inadequate to make it rewarding use" (Levitt & March, 1988, p. 322). A competency trap might hamper the efficient growth and foreign venture performance of the firm (Cohen & Levinthal, 1990). Older firms may get locked out of new knowledge or at least hampered to integrate new knowledge as they do not acquire foreign market knowledge with the openness and the speed of younger firms do (Hannan, 1998). The competency trap manifests even more over time as knowledge is path-dependent leading to misfits between existing and new knowledge (Ahuja & Lampert, 2001). "These traps not only constrain what can be effectively pursued but also limit firms´ ability to recognize and exploit new opportunities" (Sapienza et al., 2006, p. 922).

Younger firms, on the contrary, possess learning advantages of newness (Autio et al., 2000; Sapienza et al., 2006). Entrepreneurial companies do not need to unlearn established routines. Venturing into foreign markets for the first time, the firm is exposed to new routines, values, and knowledge. When interfacing with their new environment, younger firms are better able to identify, value, select, and assimilate new knowledge explicitly catered to the prerequisites of the foreign market. Younger firms are less hampered to observe and implement the necessary information for market entry and are faster able to fit

the prerequisites of the new institutional environment (Cohen & Levinthal, 1990, p. 131; Zahra & George, 2002). Younger firms "[…] are usually more flexible and better able to transfer outside knowledge throughout the organization since there is less internal resistance" (Gopalkrishnan & Bierly, 2006, p. 6; Rosenkopf & Nerkar, 2001). The learning advantages of newness allow younger internationalizers to compensate for some of the disadvantages they undoubtedly possess due to scant resources, lack of industry experience, as well as a lack of experience in the workforce compared to older firms. Learning advantages of newness put young technology firms in a more competitive position allowing for a faster and better suited foreign market entry leading to a more successful internationalization. Hypothesis 4 summarizes our argumentation.

H 4:   *Age at internationalization is negatively related to foreign venture performance of young technology firms.*

Figure 1 summarizes our theoretical argumentation and illustrates our research model with its underlying hypotheses.

Insert Figure 1 about here

Methods

Data

To collect data we conducted a questionnaire-based survey of young German technology firms in 2007. In order to include a reasonable number of young technology firms with a high

degree of internationalization, we searched for technology populations that fit these prerequisites. Our final population of firms included four different technologies: Nanotechnology, Biotechnology, Microsystems, and Renewable Energy. The survey instrument was pretested using interviews with the CEOs of 12 firms (3 firms from each technology area).

Questionnaires were sent to CEOs, export managers, or firm owners as they are perceived to have the most profound knowledge about the firm's internationalization practices and strategic decisions. We sent out questionnaires to the total population of German firms from the four technologies mentioned above. In total, we sent out N=1,944 questionnaires. The response rate was about 17.2%, representing 335 questionnaires. As we surveyed the total populations of German Nanotechnology (N=305), Biotechnology (N=526), Microsystems (N=292), and Renewable Energy (N=821) firms, our sample included both international firms and firms with activities exclusively in the domestic market. Our final sample includes N=248 firms with international activities and N=87 firms with activities only on the domestic market. This is a percentage of 74% internationally acting and 26% domestically acting firms, consistent with secondary data that we collected prior to the questionnaire-based survey. The average firm age of the companies in our sample was 9.13 years and the average age at first internationalization was 3.4 years.

To test for nonresponse bias, we followed Armstrong and Overton (1977), examining differences between early and late respondents in terms of the variables market learning, network learning, and imitation. A *t*-test showed no significant differences for all variables. Thus, results do not indicate problems of non-response bias.

Asking for the entry learning at first internationalization, we applied a retrospective recall in our survey. The obvious disadvantages of this methodology merit further comments. In organizational research, retrospective reports have been used extensively to study strategic

decision making processes (Bourgeois and Eisenhardt 1988; Mintzberg, Raisinghani and Theoret 1976). The primary problem is that key informants may not be able to accurately recall the past. As Golden (1992), Huber and Power (1985), Wolfe and Jackson (1987), and many others have suggested, inaccurate recall in retrospective reporting can result from inappropriate rationalization, oversimplifications, faulty post hoc attributions, and simple lapses of memory. Asking for information about learning and internationalization activities from the firms in our dataset could be a problem due to the age of some of the companies. However, descriptive statistics (mean = 10 years, modus = 3 years) reveal that the vast majority of the technology firms in our sample conducted their internationalization activities in the last couple of years. Further, most of the firms in our sample are owner-managed and family businesses. In family businesses strategic decisions like the internationalization of the firm are often determined by the owner and/or founder of the firm. This may significantly reduce the risk of informant fallibility (Golden 1992; Miller, Cardinal & Glick, 1997), and leads to higher retrospective accuracy of our data.

The measures of our constructs are self-reported and collected from the same source and, therefore, there could be a problem with common method bias. Following Podsakoff & Organ (1986), we used the Harman's one-factor test to assess the influence of common method bias. Principle component factor analysis based on the 6 variables of our model revealed two factors with an eigenvalue above 1. These two factors accounted for 53.9% of the total variance; the first factor accounted for 34.4% and the second factor for 19.5% of the total variance. This indicates that the data do not suffer from common method variance. A substantial amount of common method variance is present, either if a single factor will emerge from the factor analysis, or if one general factor will account for the majority of the covariance among the variables (Podsakoff & Organ, 1986; Podsakoff, MacKenzie & Lee, 2003). Further, we checked firm website information, brochures, and other available

information of our sample firms (Cloninger & Oviatt, 2007). Additionally we collected
secondary data from three different databases ("Hoppenstedt" and "Markus" firm directory
and "Factiva") to verify the information from our survey.

Measurement

The variables in our model have been adapted from established scales in the
entrepreneurship, international business, and management literature. Whenever possible, we
used multiple-item measurements to minimize measurement error and to enhance the content
coverage for the constructs in our model. We measured statement-style items on 5-point
Likert-scales.

Foreign venture performance was measured by a three-item scale (Cronbach´s
α=.886). We selected overall success, sales growth, and market share from Brouthers and
Nakos´ (2004) performance scales. These criteria have also been found in other studies
particularly on export performance (Madsen, 1998; Cavusgil and Zou, 1994). In line with
Madsen (1998) we asked about the perceived achievement of performance goals of the three
performance criteria. We asked the respondents if the goals for the overall success, the goals
for the sales growth, and the goals for the market share have been achieved for the first
foreign venture of the firm. We decided for subjective performance measurement as in the
context of young technology firms objective measures are not only hard to capture, but may
be misleading as well. In early years after firm inception, the establishment of a unique
technology and know-how instead of making profits may be the primary aim of technology
firms. However, this is not captured by the traditional objective performance measures.
Hence, in line with Brouthers and Nakos (2004) we utilize subjective measures as they
provide valuable insights not necessarily attainable through objective financial measures.

We measured market learning by adapting a three-item scale (Cronbach´s α=.887) from Yli-Renko et al. (2002). We asked questions about the extent to which the firm conducted analysis of the foreign market prior to foreign market entry (1=low extent to 5=high extent). We measured network learning with two-items (adapted from Burgel & Murray, 2000; Ellis & Pecotich, 2001), asking about the extent (1=low extent to 5=high extent) to which the firm learned from network partners prior to first internationalization (Cronbach's α = .759). We measured imitation by a three-item scale adapted from Haunschild (1993). Respondents were asked to what extent (1=low extent to 5=high extent) the firm observed actions of firms perceived as best practices in the foreign market (Cronbach's α = .795). Age at internationalization was measured by subtracting the year of foundation of the firm from the year in which the firm entered the first foreign market (Autio et al., 2000).

As foreign venture performance of the firm may be affected by the number of years the firm operates in the foreign market, we decided to control for this issue. We included the number of years the firm operates in the foreign market into our model. The variable was measured by subtracting the year in which the firm internationalized for the first time from the year of data collection (2007).

Results

We tested our hypotheses using structural equation modelling. To estimate our model, we applied a two-stage approach consistent with common structural equation modelling literature (Anderson & Gerbing 1988). First, we estimated the measurement model using confirmatory factor analysis in order to test the reliability and validity of the constructs. In a second step, we tested the hypothesized relationships between the constructs. As our research question elaborates entry learning perspectives and foreign venture performance, we had to exclude domestic firms from our empirical analysis. Therefore, n=248 entered our final structural equation model.

Table 1 shows the means, standard deviations, and bivariate correlations between the independent, dependent, and control variables. Looking at the bivariate correlations, all correlations stay below 0.7. Thus, no serious risk of multicollinearity between the independent, dependent, and control variables can be detected. Further, we calculated the variance inflation factor (VIF) values to test for how much the values of the coefficients are increased because of collinearity. Our analyses for the relevant variables show several VIF values with the highest value of 1.50, thus, showing no risk for multicollinearity as all values were below 2.5 (Allison, 1999).

Insert Table 1 about here

Table 2 summarizes the latent constructs, their measurement items, the estimated values, and the reliability of the items. All standardized factor loadings are above .70. Cronbach´s alpha values are all above .75, showing good internal consistency and thus reliability in all of the constructs.

Insert Table 2 about here

Measurement Model

We estimated the measurement model prior to testing the final structural model. The measurement model had a Chi-square of 52.172 (df = 45; p<.001) and the results showed

good model fit. The Tucker Lewis Index (TLI), which has been viewed as robust to sampling characteristics, was .989, suggesting good model fit. The comparative fit index (CFI), comparing the target model with the null model, was also above .95 (.994). According to Hu and Bentler (1999), a CFI > .95 shows good model fit. The incremental fit index (IFI) showed good model fit, with a value of .994 (Bollen 1989). The root mean square error of approximation (RMSEA), expressing whether the model is a good approximation of the population model, had a value of .025. According to Hu and Bentler (1999), RMSEA values < .06 suggest a good model fit. Thus, according to all fit indices, the measurement model shows a good model fit.

The measurement model can be used to evaluate discriminant validity which is essential in research using multiple items and latent constructs. Constructs demonstrate discriminant validity if the variance extracted for each is higher than the squared correlation between the constructs (Fornell and Larcker, 1981). We examined each pair of constructs in our measurement model and found that all demonstrate discriminant validity.

Final Structural Equation Model

Having satisfied the requirements of the descriptive statistics, the model estimates, and the measurement model, we tested the final structural model as hypothesized. Figure 2 illustrates the results of the non-standardized coefficients.

Insert Figure 2 about here

Table 3 shows the results of our final (hypothesized) structural equation model. The proposed model has a good model of fit, as evidenced by the fit indices. The Tucker Lewis index (TLI) was .942. The comparative fit index (CFI) is above .95 (.962). The incremental fit index (IFI) shows good model fit with a value of .963 (Bollen 1989). The root mean square error of approximation (RMSEA) had a value of .055. The final structural equation model had a Chi-square of 103.883 (df=59). Thus, according to all fit indices the model shows a good model fit, suggesting high consistency.

Insert Table 3 about here

Table 4 includes the path coefficients of the final structural equation model. The unstandardized path coefficients indicate significant relationships among the different constructs. Market learning is significantly positive related to age at internationalization supporting hypothesis 1. Network learning and imitation are significantly negative related to age at internationalization supporting hypotheses 2 and 3. Finally the negative and significant relationship between age at internationalization and foreign venture performance supports hypothesis 4.

Insert Table 4 about here

Discussion

Our research results support the hypotheses derived from our theoretical framework. The empirical results show that market learning is positively related to age at internationalization. Acquiring sufficient knowledge about the particularities of the foreign market via market learning prior to venturing abroad is a time-consuming process, which postpones the initial internationalization action. Network learning and imitation are negatively related to the age at internationalization. Thus, in line with Schwens & Kabst (2009) we could show that these two types of learning allow for a fast knowledge acquisition process leading to an earlier venturing into foreign markets.

Further, our results suggest that the age at internationalization influences the foreign venture performance of the firm. Firms venturing into foreign markets earlier in their lifecycle possess learning advantages over older firms that may suffer from organizational inertia. Younger firms are better able to assimilate the knowledge they experience in the new environment into their organizational routines and seem to be better able to use this knowledge for commercial ends in the foreign market (Cohen & Levinthal, 1990). Thus, a fast and proactive international venturing is not just a particular internationalization strategy opposed to more incremental internationalization patterns, but it has some clear foreign venture performance implications.

As foreign venture performance of the firm could be an effect of the number of years the firm operates in the foreign market rather than of the age at internationalization, we controlled for this issue. The longer a firm is in the market, the more familiar it may become with the market´s rules, norms, values, and particularities leading to a better foreign venture performance. However, the number of years the firm operates in the foreign market did not have any foreign venture performance implications in our model.

Limitations and Implications for Future Research

Although learning plays a pivotal role in the seminal work by Oviatt and McDougall (1994) and in the internationalization process theories (Johansson & Vahlne, 1977/1990), empirical studies elaborating aspects of learning in the field of young technology firms venturing abroad are largely missing. Our paper addresses this deficit by examining the entry learning of young technology firms and the foreign venture performance.

Our empirical results show that market learning is positively related to the age at internationalization of technology firms, whereas network learning and imitation provide faster mechanisms of knowledge acquisition and lead to earlier initiation of internationalization. Further, our results suggest that the age at internationalization has foreign venture performance implications.

Thus, our paper makes several contributions to the research field. First, we address how entry learning of technology firms unfolds. Whereas the state of knowledge on learning and internationalization of technology firms is limited per se, we address a particular gap on the entry learning. So far, most studies excluded or did not pay particular attention to entry learning. We try to make a contribution to overcome this deficit and to increase knowledge on how entry learning unfolds. Further, we show that entry learning feeds forward into foreign venture performance. The earlier a firm ventures abroad, the more successful the technology firm is in the foreign market. However, an early venturing is only possible when firms apply network learning and imitation.

As it is the case for most studies, limitations also apply to our study. We conceptualized market learning, network learning, and imitation as discrete mechanisms of learning. It may be questioned whether the different types of learning shall be considered more complementary. We do not exclude the possibility that a firm applies all three types of learning in order to acquire necessary foreign market knowledge allowing for international

venturing. It may be that a firm imitates foreign market best practices and learns from customers in the foreign market as well as it conducts prior foreign market analysis. Our assumption here is that the different types of learning have different implications for the age at internationalization. Forsgren (2002) supports that such a learning pattern for rapid internationalization may exist. He argues (2002, p. 271) "[…] that the perceived risk [of venturing abroad] can be affected through other means than own experience. These 'shortcuts' to lower perceived risk include 'grafting' the experience of others into the firm, […] and imitating firms that for some reason are considered to be market leaders (Björkman, 1996). […] The important point here is that the firm will approach the foreign markets more rapidly and maybe in another pattern than is predicted by the Uppsala Model" (Forsgren, 2002, p. 271).

Furthermore, our study is limited to young technology firms. Our study does not allow for generalizations to other technologies or industries. Due to the high degree of knowledge intensity of the firms in our sample, it may be that the effects are strongest for technology firms which need to internationalize from early on in order to realize economies of scale, amortize R&D investments, and serve niche markets worldwide. Future studies may examine whether our reasoning holds true for other industries and technologies as well(Andersson, 2004; Fernhaber, McDougall, and Oviatt, 2007).

Whereas the focus of this paper was more on the types of learning and how this is related to the age at internationalization, future research may focus on the content of learning answering what a firm learns at which stage of the internationalization process. Our study applied retrospective data in order to identify how the learning at the timing of first internationalization impacts the firm´s foreign venture performance. Although our results are clear and explicit, real longitudinal data would definitely make the results more powerful. This is a clear limitation of our study and an implication for future research.

While our study shows that age at internationalization is negatively related foreign venture performance, we have a survival bias in our data. We do not know about the learning behavior of the technology firms which have not survived the internationalization process. Thus, we still know very little about how age at internationalization impacts the survival of a firm. Sapienza et al. (2006) have made a first conceptual attempt to research this area. However, empirical testing is still largely missing. Future research needs to provide for more in-depth longitudinal evidence (Keupp & Gassmann, 2009).

Our study has some important managerial implications. Venturing into foreign markets early in the firm´s lifecycle is an important issue in particular for technology firms. However, when entering into foreign markets technology firms should not underestimate the liabilities of foreignness in order to avoid post-entry "shock effects". Entry learning is not only conceivable, but it is the foundation for a successful international venturing of technology firms and even feeds forward into the future development of the firm. Making use of valuable network contacts and imitation in order to acquire knowledge about the foreign market before entry are worthwhile mechanisms in order to reduce the risks of early foreign market venturing. When taking these precautions into consideration, young technology firms can pursue promising avenues of growth and success in international markets.

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TABLES

Table 1: Means, Standard deviations, and bivariate correlations (mean = mean value; s.d. = standard deviation; Significance levels: *** ≤ .001; ** ≤ .01; * ≤ .05)

	Variable	mean	s.d.	1	2	3	4	5	6
1	Foreign venture performance	3.28	1.07	1					
2	Market learning	2.53	1.16	.245**	1				
3	Network learning	3.27	1.23	.246**	.257**	1			
4	Imitation	2.77	1.06	.300**	.508**	.346**	1		
5	Age at internatio-nalization	3.40	4.17	-.093	.043	-.177	-.163*	1	
6	# years in the foreign market	7.89	7.32	.056	-.131	-.064	-.189**	.201**	1

Factor name	Measurement item	Estimate	Cronbach´s α
Market learning	Conducted analysis of the foreign market situation prior to foreign market entry	.924	.887
	Conducted site analysis of the foreign market prior to foreign market entry	.870	
	Conducted information analysis of the foreign market prior to foreign market entry	.767	
Network learning	Learned from cooperation partners prior to foreign market entry	.738	.759
	Learned from customers prior to foreign market entry	.829	
Imitation	Tracked competitors´ actions in the foreign market prior to foreign market entry	.771	.795
	Analyzed competitors´ brands and products prior to foreign market entry	.776	
	Oriented towards best practices in the foreign market prior to foreign market entry	.700	
Age at internationali-zation	Year of first internationalization – year of firm foundation		
Foreign venture performance	Goals for the overall success of the foreign market achieved	.809	.893
	Goals for sales growth of the foreign market achieved	.930	
	Goals for market share of the foreign market achieved	.840	

Table 2: Factors, measurement, estimate values, and reliability

Table 3: Final Structural Equation Model Fit Indices (N=248)

Chi-square	Degrees of freedom	CMIN/DF	TLI	IFI	CFI	RMSEA	P
103.883	59	1.761	.942	.963	.962	.055	.000

Table 4: Path coefficients and tested hypotheses (Significance levels: *** ≤ .001; ** ≤ .01; * ≤ .05)

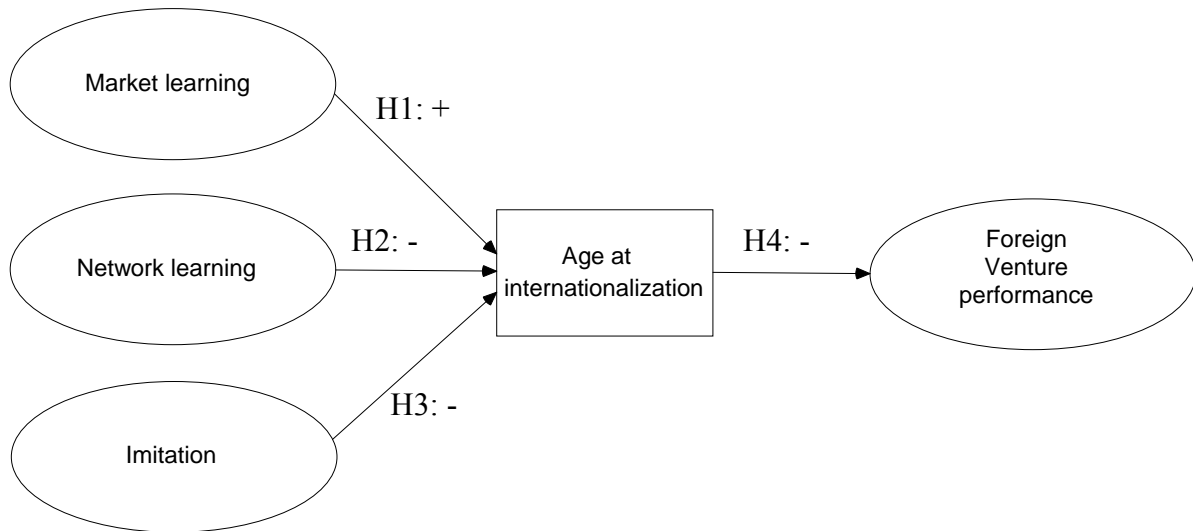|	Hypothesis	Coefficient unstandardized
Market learning → Age at internationalization	H 1	.813***
Network learning → Age at internationalization	H 2	-.668*
Imitation → Age at internationalization	H 3	-1.047**
Age at internationalization → Foreign venture performance	H 4	-.029*
# of years firm operates in the market → Foreign venture performance	Control	.009

FIGURES

Figure 1: Research model

Figure 2: Final model

This is a simplified version of the actual model. It does not show error terms, control variables, or the indicator variables of the latent constructs. An exogenous unobserved error variable was attached to each of the endogenous variables to account for the variance not explained by the observed exogenous variables. The error coefficients were fixed to unity to enable model identification. Number of years the firm operates in the foreign market was included as control variable. Path coefficients are standardized maximum likelihood parameter estimates. Latent variables are represented by ovals, the observed variable by a rectangle. The drawn through lines show the direct effects between the different constructs.