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Speed of Internationalization of New Business Units: The Impact of Direct and Indirect Learning

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Abstract To date, surprisingly little research has been devoted to speed, which is arguably one of the most important time-based dimensions of a firm's internationalization process. We address this gap, focusing on the learning processes during internationalization of established MNEs' new business units, in particular their accumulation of business knowledge and internationalization knowledge and the temporal order of their knowledge acquisition. We argue that new business units benefit from the corporate environment of the parent MNE into which they are born as this may enable them to acquire business knowledge and internationalization knowledge not only by means of direct learning but also by means of indirect learning. Thus, we hypothesize that (1) internationalization speed increases with new business units' relatedness to their parent MNEs' portfolio of businesses, (2) new business units will increasingly rely on indirect learning to obtain business knowledge as relatedness increases, and (3) that the positive effect of direct learning of internationalization knowledge decreases the more new business units have been relying on indirect learning to obtain business and internationalization knowledge during the ramp-up process. We examine the internationalization of 788 new business units of 90 established German MNEs and find support for our arguments.

Keywords Internationalization process · Speed of internationalization · Learning sequences · Direct learning · Indirect learning · New business units

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1 Introduction

Firm internationalization is typically conceptualized as a process (Welch and Luostarinen 1988; Hewerdine and Welch 2013; Steen and Liesch 2007; Johanson and Vahlne 1977; Welch and Paavilainen-Mäntymäki 2014). Given that *process* refers to the progression of events over time (Langley 2007), *time* should play a central role within firm internationalization research. However, with few exceptions (for example, Vernon 1966; Buckley and Casson 1981; Pedersen and Shaver 2011; Jones and Coviello 2005; Hashai 2011), research has typically given little explicit consideration to time (Casillas and Acedo 2012). As Eden (2009, p. 535) has reasoned, the dominant paradigms in international business have focused on 'why', 'where', and 'how' questions, with little attention to 'when'. However, George and Jones (2000, p. 658) proposed that although time may often be considered only as a boundary condition (Whetten 1989), "it can and should play a much more important and significant role in theory and theory building because time directly impacts the what, how, and why elements of a theory".

With the emergence of international entrepreneurship research and the 'born-global' phenomenon, scholars have explicitly acknowledged time as a central issue in firm internationalization (Jantunen et al. 2008). In particular, *speed of firm internationalization*—which is arguably among the most important time-based dimensions—has become the focus of substantial research (Hurmerinta-Peltomäki 2003; Prashantham and Young 2011; Hewerdine and Welch 2013; Weerawardena et al. 2007; Chetty et al. 2014). However, despite the considerable attention which internationalization speed has received in international entrepreneurship research, the concept of speed has still, by and large, been overlooked in internationalization research on established firms (for notable exceptions see, for example, Vermeulen and Barkema 2002; Chang and Rhee 2011; Pedersen and Shaver 2011; Casillas and Moreno-Menéndez 2014). An underexplored question therefore is: What explains differences in internationalization speed in the context of established firms?

The paper makes the following contributions: First, we explicitly investigate the speed of internationalization in the context of established firms, in particular, established multinational enterprises (MNEs) and their newly founded business units (NBUs). Second, our theory focuses on the learning sequence that is based on the temporal order of acquiring business knowledge before internationalization knowledge. We test hypotheses about the influence of the learning modes—direct and indirect learning—on the speed of internationalization.

In more detail, our reasoning is as follows. In order to sustain growth, established MNEs found new business units, which in our context are defined as newly founded lines of business focusing on a product market in which the respective MNEs have not been previously active (e.g., Chang 1995; Lee and Lieberman 2010). Typically, these NBUs are incorporated in a single market and subsequently expand internationally. We contend that due to their embeddedness in the corporate environment of their established parent MNEs, NBUs face substantially different conditions as compared to newly founded firms, as established MNEs usually possess more resources and more experience than newly founded firms (Knight and

Liesch 2002). We propose that the ability to engage in knowledge transfer with the existing business units of their parent MNEs affects NBUs' speed of internationalization, since support from the parent MNEs may boost NBUs' internationalization readiness (Tan et al. 2007). In particular, we hypothesize that speed of internationalization increases with NBUs' relatedness to their parent MNEs' portfolio of businesses.

Our hypotheses are based on organizational learning theory, especially the tradition of the Uppsala model of firm internationalization (Johanson and Vahlne 1977), which posits that experience that grows out of a firm's current activities is pivotal to the firm's learning process and, by extension, its internationalization process (Johanson and Vahlne 2009, p. 1415). The Uppsala model has been one of the most influential theories in international business research and several scholars have challenged and extended the model's assumptions (for example Andersen 1993; Fletcher and Harris 2012). Forsgren (2002), for example, criticized the Uppsala model for concentrating on experiential learning and largely neglecting other learning modes. Our study addresses these criticisms. We incorporate more recent organizational learning contributions that focus on the temporal aspects of acquiring knowledge. Bingham and Davis (2012) introduced the term 'learning sequence' to describe the effect of the temporal order between different learning processes, in particular between direct and indirect learning. In the context of NBUs we focus on direct or indirect learning of business knowledge and the subsequent direct learning of internationalization knowledge and the effect on the NBUs internationalization speed. Our focus on NBUs—which are born into the corporate environment of their parent MNEs—enables us to explore the possibility that NBUs acquire knowledge by means of indirect learning from other areas of the MNE; a clear distinction to the Uppsala model which focuses on direct learning through the firm's own experience. As indirect learning can be assumed to occur faster than direct learning, NBUs which receive knowledge from related business units of their parent MNE are able to set up their business within a country more quickly. These NBUs are consequently enabled to move forward and enter an additional foreign market at a higher speed, as compared to NBUs that have to rely to a greater extent on direct learning through their own experience.

We examine the international expansion activities of 788 NBUs of 90 established German MNEs in the period between 1985 and 2007 using event history analysis. We find support for our hypotheses. We find that the speed of internationalization is significantly faster for NBUs with the highest possible relatedness to the already existing portfolio of business units of their respective parent MNE. We also find that NBUs' own internationalization experience significantly increases the speed of internationalization. Finally, we find significant evidence that the more an NBU relies on indirect learning during the ramp-up process, the lower the positive effect of its internationalization experience that it has obtained by means of direct learning.

In advance, it seems appropriate to point to an important limitation regarding the methodology of our study: We ground our theoretical framework in organizational learning theory. However, we do not directly observe and measure the direct and indirect learning processes that may occur in the new business units within our

research setting. This shortcoming is mainly due to our longitudinal research setting, encompassing more than two decades. Though such a longitudinal approach is necessary in order to explore internationalization processes over time, it also inhibits primary data collection by means of, for example, interviews or direct observation. As such, we are left with the same problem faced by comparable studies: for example, Chang (1995) or Autio et al. (2000). Hence, given that we are not able to directly assess and measure direct and indirect learning processes, we have to infer from NBUs' actual internationalization behavior.

2 Theoretical Background and Hypotheses

2.1 Knowledge Acquisition Processes

Following previous research, we define organizational learning as the change in a firm's behavior or cognition that occurs as the firm acquires experience (Steen and Liesch 2007; Levitt and March 1988; Cyert and March 1963). The acquisition of experience, in turn, is associated with changes in the firm's knowledge base, which may include both explicit and tacit components (Argote and Miron-Spektor 2011). A firm's knowledge is regularly stored in what has been called routines, which may be defined as the "forms, rules, procedures, conventions, strategies, and technologies around which organizations are constructed and through which they operate" (Levitt and March 1988, p. 380).

In the context of firm internationalization the types of knowledge stored within these routines have been discussed by Eriksson et al. (1997). They distinguish between two types of knowledge: *Internationalization knowledge* reflects the routines associated with the process of managing a business across borders, as well as transferring knowledge to new foreign markets (Clarke et al. 2013; Pedersen and Shaver 2011; Fletcher and Harris 2012). *Business knowledge*, in turn, encompasses knowledge of how to run the business in the context of its specific industry—that is, technical characteristics of the product, the characteristics of the market with the customers, competitors and partners, as well as the institutional environment of the respective industry (Eriksson et al. 1997; Kogut and Zander 1992).

However, before the firm stores internationalization or business knowledge in its routines, it must first acquire experience, either through direct learning or indirect learning (Huber 1991; Bingham and Davis 2012; Fletcher and Harris 2012; Schwens and Kabst 2009; Forsgren 2002; Chang 1995). We define d*irect learning* as a process in which the firm undertakes an action and where the consequences of the completed action lead to a change in the firm's knowledge base and may entail a change in the firm's future behavior or cognition (Bingham and Davis 2012). What is important about direct learning is that it occurs only *after* the firm experiences the consequences of its action. Conversely, a firm may also acquire knowledge through indirect learning. *Indirect learning* refers to a process in which the firm learns from the experience of others, rather than firsthand. Indirect learning occurs whenever a firm transfers knowledge from another source to obtain information on the outcomes of the others' actions and subsequently alters its behavior or cognition in response to

this information (Argote and Miron-Spektor 2011; Bingham and Davis 2012; Schwens and Kabst 2009).

The knowledge transfer process itself has been the subject of previous studies, especially how knowledge is transferred between business units. Notwithstanding that the "how" dimension of knowledge transfer is beyond the scope of the present study, it is important to keep in mind which factors may have an influence, since in practice several hurdles may inhibit successful knowledge transfer (Szulanski 1996). Nonaka (1994) has developed an elaborate model of knowledge creation which describes how tacit (socialization, externalization) and explicit (internalization, combination) knowledge can be transferred. In the context of the MNE, we may see that business and internationalization knowledge or decision heuristics are transferred through socialization: for example, if managers and employees of the NBU come from an already existing business unit or are trained by staff from an existing area within the parent MNE (Nonaka 1994; Pedersen et al. 2003). The 'combination' mode of knowledge transfer may also be applied, when guidelines or corporate documentation that contain business and internationalization knowledge is utilized by the NBU to increase its knowledge stock. However, knowledge transfer between any two business units requires sufficient communication between them (Ghoshal and Bartlett 1988), in the same way good communication between headquarters and a local subsidiary in a foreign country is usually required (Karlsen et al. 2003). Good relations between both business units may improve the knowledge transfer between them (Hansen and Løvås 2004); in particular, sufficient motivation of the persons within the sending unit, as well as in the receiving unit, is indispensable (Szulanski 1996; Gupta and Govindarajan 2000). Finally, managers also require sufficient discretion to ensure that the conditions for knowledge transfer between both units are favorable and that the NBU is benefiting from existing knowledge (Pedersen et al. 2003). Thus, through indirect learning the firm may gain the benefits of acquiring novel knowledge, while avoiding the costs of accumulating firsthand experience (Bingham and Davis 2012).

The remainder of the paper is guided by our assumption concerning the typical temporal order by which an NBU obtains knowledge. After inception an NBU usually lacks the substantive business knowledge which is required to successfully run the business (Lee 2008), as well as the internationalization knowledge to steer its internationalization process. Being born into the corporate context of its parent MNE may enable the NBU to complement direct learning with indirect learning from other business units. This may yield the possibility of shortening the learning process (Bruneel et al. 2010). Once a sufficient amount of knowledge has been acquired, the NBU is internationalization ready (Tan et al. 2007). The NBU may then begin to internationalize. Although during its internationalization process the NBU may continue to acquire internationalization knowledge by means of indirect learning, it now additionally acquires substantial internationalization knowledge by means of direct learning. Put differently, in line with the behavioral nature of firm internationalization, our assumption is that an NBU will first seek the possibility to acquire substantial business knowledge by means of indirect learning before engaging in internationalization (Pedersen and Shaver 2011). During the internationalization process, the NBU will then make use of its indirectly acquired

internationalization knowledge and additionally add further internationalization knowledge that it acquires by means of direct learning.

2.2 The NBU's Ramp-up Phase: Indirect Learning of Business and Internationalization Knowledge

When an NBU is set up, it typically faces a knowledge gap, since it initially lacks substantial knowledge about how to operate in the industry to which it belongs (Lee 2008), nationally and internationally. During the ramp-up process the NBU accumulates business knowledge based on a direct learning process and closes the knowledge gap step by step (Carroll et al. 1996). Usually, this direct learning process is time consuming and requires a significant amount of scarce management capacity (Dierickx and Cool 1989; Penrose 1959). As management capacity cannot be extended at short notice, the NBU is likely to search for possibilities to speed up and shorten the learning process and, in doing so, economize on scarce managerial capacity. One such possibility is to make use of indirect learning; that is, to engage in a knowledge transfer process and learn from the experience of others.

For an NBU born into a corporate environment, the potential sources of knowledge—the "others"—include the existing business units of the MNE, which may operate in a variety of industries (Kim 1989). Accordingly, the NBU's relatedness—and as such its comparability—to the parent MNE's existing business units varies. By definition, existing business units with the highest relatedness to the NBU are those whose industry context is most similar to the NBU's own industry context. Drawing on Teece et al. (1994), we refer to the existing business unit with the most similar industry context as the "nearest neighbor". This is important since, as Baum and Dahlin (2007, p. 370) have argued, "the value of others' experience for learning depends on comparability; the more comparable the organizations, the more similar the situations they face, and the greater the potential relevance of their experience". A similar point has been made by Madhok (1997, p. 47) who states that because knowledge is context-specific, it typically suffers erosion due to imperfect applicability in a new context. This implies that an NBU may also learn from an existing business unit exhibiting a rather low degree of relatedness. However, this knowledge may barely be applicable to the NBU. Therefore, it seems reasonable to assume that in such situations only limited knowledge transfer occurs.

The higher the relatedness between the NBU and its "nearest neighbor" business unit, the higher is the applicability of the knowledge that the NBU may obtain from this existing business unit by engaging in a process of knowledge transfer (Dimov and Martin de Holan 2010; Tanriverdi and Venkatraman 2005). Since the context of the nearest neighbor usually yields the highest potential for knowledge transfer, and as the capacity to absorb knowledge from existing business units is usually limited (Cohen and Levinthal 1990), the NBU is likely to concentrate its knowledge transfer activities on its nearest neighbor. During the ramp-up of the NBU, the focus will be on acquiring business knowledge, since this is required immediately upon establishing the NBU in the local market (Lee 2008). However, if the NBU succeeds in establishing a knowledge transfer process with its nearest neighbor it may at the same time make use of this channel to acquire internationalization

knowledge. This indirect learning of internationalization knowledge, even though it will not be used until internationalization commences, may provide the foundations for further direct learning that begins the moment the NBU takes its first internationalization steps.

Thus, an NBU which is able to engage in knowledge transfer with a highly-related nearest neighbor may not only complement the acquisition of business knowledge through direct learning with the indirect learning of business knowledge, but may also obtain internationalization knowledge through the same means (Bruneel et al. 2010). Given the nature of indirect learning, this is likely to shorten the ramp-up process significantly. Therefore, a high degree of relatedness implies a high degree of indirect learning within an NBU's knowledge acquisition process, and as a result a fast ramp-up process. Conversely, a low degree of relatedness implies a low degree of indirect learning and therefore a slow ramp-up process.

We posit that an NBU will typically internationalize only after having acquired a sufficient amount of business knowledge during the ramp-up. Our argument is based on the following two reasons. First, the behavioral theory which underlies internationalization process theory argues that firms try to keep the risk from internationalization at low levels (Cyert and March 1963; Johanson and Vahlne 1977). Business knowledge, however, helps the NBU to offset at least some of the liabilities of foreignness it may face upon entry into a new foreign market (Zaheer 1995; Pedersen and Shaver 2011). Accordingly, the NBU is likely to internationalize only after having acquired sufficient business knowledge. For the same reason, having already obtained internationalization knowledge may help the NBU to assess the risk of internationalization options (Johanson and Vahlne 1977). Second, being a complex task, internationalization requires a fair amount of managerial capacity (Kumar and Seth 2001; Penrose 1959) in order, for example, to assess internationalization opportunities (Knight and Liesch 2002). However, if the NBU is still busy learning how to run the business, we argue it is unlikely that sufficient managerial capacity would be available to use for internationalization (Buckley and Casson 2007; Kumar 2009). This may change only after the NBU has accumulated sufficient business knowledge, has assessed internationalization opportunities, and has become internationalization ready (Knight and Liesch 2002; Tan et al. 2007). However, as elaborated above, the speed with which the NBU acquires sufficient business knowledge is likely to depend upon the availability of related knowledge within the corporate environment of the parent MNE. Furthermore, the prior acquisition of some internationalization knowledge may support the assessment of internationalization options (Fletcher and Harris 2012). Summarizing the argument from above, we therefore hypothesize:

Hypothesis 1: The more related a new business unit is to the nearest neighbor business unit of its parent MNE's overall business unit portfolio, the faster its subsequent internationalization speed.

2.3 The NBU's Internationalization Phase: Direct Learning of Internationalization Knowledge

In the course of setting up subsidiaries in new foreign markets, the NBU gains internationalization knowledge (Kogut and Zander 1993). In other words, the NBU directly learns how to manage its business across borders and also how to transfer its business knowledge to new foreign markets (Eriksson and Chetty 2003; Johanson and Vahlne 1977; Pedersen and Shaver 2011; Fletcher and Harris 2012). As Johanson and Vahlne (2009, p. 6) have recently acknowledged, such "general internationalization knowledge […] is probably more important than we had assumed back in 1977". From the point in time the NBU starts internationalizing, it acquires its own direct experience. This direct experience is crucial, since it allows the NBU to put the knowledge obtained from the nearest neighbor into perspective and adapt it to its own internationalization process. Reliance on indirect learning alone is not sufficient, since some aspects of internationalization processes are very tacit and hard to grasp for someone who has not dealt with the situation before (Knight and Liesch 2002). A firm that is entering a new country will therefore not be able to plan the whole entry in advance, but will have to obtain knowledge about the country and adjust its establishment in the country (Johanson and Vahlne 1977). This indicates that direct internationalization experience cannot be replaced, but only supplemented, by indirect learning.

The accumulation of internationalization knowledge is likely to follow the general learning curve (Lieberman 1984). This implies that with greater internationalization the NBU becomes increasingly accustomed to transferring its business knowledge to foreign markets (Zander and Kogut 1995; Knight and Liesch 2002), but that the rate of improvement reduces with each additional step. Furthermore, managers responsible for internationalization may become increasingly confident as they learn how to assess the risks associated with potential target locations for the NBU. This acclimatization to uncertainty, as well as the accommodation of risk by the management of an internationalized NBU, may lead to faster decisions about the subsequent internationalization steps (Liesch et al. 2011). Also, managers may learn how to assess the effort of knowledge transfer to the new location of the NBU more accurately, thereby reducing the risk of the additional internationalization step (Knight and Liesch 2002). However, the benefits of additional internationalization are likely to decrease with each internationalization step, since an establishment of routines regarding, for example, the accommodation of risk may lead only to minor adaptions of these routines in response to new internationalization experience if substantial internationalization experience has already been obtained.

Pedersen and Shaver (2011, p. 266) have similarly argued that

> "a firm that extends its activities beyond national borders for the first time typically needs to adjust its architecture and systems in order to support and reap the benefits of the cross-border activities […] However, once the company has made these changes, it does not have to make the same level of investment should it expand its international operations to other countries. In fact, when the infrastructure of the firm (the architecture, systems, and mind-set) are adapted to

support international operations in the first place, it is much easier to 'plug-in' and add more international activities into this infrastructure".

We therefore hypothesize:

Hypothesis 2: The more internationalization knowledge the new business unit has obtained through direct learning, the faster its subsequent internationalization speed, albeit at a decreasing rate.

2.4 The Effect of Indirect Learning on Direct Learning

Following our reasoning that NBUs typically progress through two phases during their development, it is likely that the way in which business and internationalization knowledge is acquired during the ramp-up phase influences the direct learning of internationalization knowledge during the internationalization phase. To elaborate on this situation we apply the concept of learning sequences that has recently been introduced by Bingham and Davis (2012). A learning sequence is defined "as an ordered use of learning processes" (Bingham and Davis 2012, p. 612). The authors identify two archetypes of learning sequences: seeding and soloing. *Seeding* learning sequences begin with more indirect learning and continue with more direct learning. Conversely, *soloing* learning sequences focus exclusively on direct learning without a switch of the knowledge acquisition process. Accordingly, an NBU which initially engages in substantial indirect learning due to the presence of a highly related nearest neighbor and subsequently switches to an increasing direct learning during internationalization may be described as relying on a seeding learning sequence. In contrast, an NBU which—due to the lack of a highly related nearest neighbor—has to rely almost exclusively on direct learning to ramp up its business and subsequently engages in direct learning during the internationalization process may be described as relying on a soloing learning sequence. In sum then, the degree of relatedness of the nearest neighbor affects the degree to which an NBU relies on a seeding or a soloing learning sequence.[1]

As learning itself may be subject to learning (Levitt and March 1988; Cohen and Levinthal 1990), an NBU may learn to benefit more from its own experience and also how to best assimilate the knowledge obtained from a highly related business unit. If an NBU has learned how to process its own experience, this knowledge may be applied to different domains (Cohen and Levinthal 1990; Eriksson and Chetty 2003; Kim 1997). Accordingly, an NBU following a soloing learning process may use this knowledge to improve the learning from its internationalization steps, thereby increasing its internationalization speed, since improved learning may reduce the time to process internationalization experience (Zahra and George 2002).

[1] It is important to note at this point that Bingham and Davis (2012) introduced seeding and soloing as two strictly distinct categories. In our conceptualization, however, seeding and soloing refer to the two extreme ends of a continuum. Given that an NBU may even engage in indirect learning with an only marginally related nearest neighbor, we believe that the conceptualization of a continuum as opposed to two distinct categories more appropriately reflects our research perspective. Furthermore, it is important to note that in our understanding of a seeding sequence, indirect learning does not necessarily stop once the NBU's direct learning phase commences.

An NBU following a seeding learning process relies to a lesser extent on its own experience, but much more on the knowledge of a highly related business unit. Through this nearest neighbor it may have already received substantial internationalization knowledge and may still receive some information even during its internationalization phase. As a result, the NBU may benefit less from its own internationalization experience. Coined differently, since the NBU already possesses a certain amount of internationalization knowledge the marginal effect of additional experience is likely to be lower, which is in line with the reasoning regarding the learning curve discussed above. This also implies that the effect on the internationalization speed for seeding NBUs should be lower. In addition, seeding NBUs have been obtaining internationalization knowledge in the ramp-up phase, but have not applied it until the first internationalization step. This means that the seeding NBU has to switch from receiving knowledge to learning from its own experiences, testing what has been learned previously and combining its own experience with the stock of internationalization knowledge it already possesses. This switch may present a challenge for the seeding NBU, as it has not had to manage it before and it thus has to develop the routines for combining these forms of internationalization learning. Until these routines are developed we would therefore expect that the additional internationalization experience has a lower impact on internationalization speed.

Summarizing the above, we therefore expect that the increase in internationalization speed is lower for a seeding NBU as compared to a soloing NBU. In particular, we hypothesize:

Hypothesis 3: The positive effect of more internationalization knowledge on the subsequent internationalization speed decreases, the higher the relatedness of the new business unit to its nearest neighbor business unit within the MNE's overall business unit portfolio.

3 Methodology

3.1 Sample

We test our hypotheses using a sample of 788 NBUs of 90 German HDAX firms[2] for the period between 1985 and 2007. HDAX firms have already been examined in previous articles about internationalization and diversification, and our sample selection approach is similar to Hutzschenreuter and Guenther (2008), Hutzschenreuter and Horstkotte (2013), and Hutzschenreuter et al. (2011). Following the approach introduced by Vermeulen and Barkema (2002), we excluded financial institutions, pure financial holding companies, real estate firms, cross-listed non-German firms and retailers as these firms usually have a different balance sheet structure, leading to different dynamics in comparison to the other MNEs in the sample. Given that this may fundamentally influence their investment behaviour,

[2] The HDAX is a stock market index which consists of the 110 largest firms listed at The Frankfurt Stock Exchange and is made up of the DAX, MDAX and TecDax subindices.

including them might affect our results. The resulting number consists of 135 HDAX companies. For these companies we tried to collect information on the establishment of NBUs and their internationalization. For the time period between 1985 and 2007 we were able to obtain complete information on the internationalization of NBUs for 92 of the 135 firms. Since two firms did not enter new businesses during the study period, the final sample consists of 90 firms. We included firms that entered the HDAX index after 1985, for example due to a later IPO, and also included firms that exited the study before 2007, for instance due to a takeover or bankruptcy. With this approach we attempted to prevent a potential survivor bias. The final sample is therefore an unbalanced panel. In order to avoid a potential sampling bias we conducted a means test, based on the approach of Carpenter and Fredrickson (2001). We used several financial and non-financial measures (e.g., number of employees, return on assets) to test whether the 90 firms included in the study and the 45 firms we had to exclude differ, but found no significant difference.

We used the German equivalent of the 4-digit Standard Industrial Classification (SIC) to identify the business units of the MNEs in the panel. We defined the establishment of an NBU as occurring whenever the MNE invests in a subsidiary that operates in a 4-digit SIC code, in which it is not active at the time of the subsidiary's inception. The location of this subsidiary determines the market of inception, which may be Germany, or any other market of the MNE's country portfolio. We followed the internationalization of the new business units until the end of the observation window. We observed the introduction of the first business unit as early as 1985 and the last introduction in 2006. The final sample consists of 788 NBUs. During the observation window each firm invested in an average of 8.75 new business units. The NBUs were founded in 34 countries, mainly in Germany (69.28 % of all establishments), other developed countries (USA: 7.48 %; France: 2.79 %; UK: 2.41 %), but also emerging markets (China: 2.28 %).

Financial information about the parent MNEs was collected from Thomson Reuters Datastream and information on the SIC codes of the subsidiaries was obtained from the parent MNE's annual reports, supplemented by information from the LexisNexis and the Thomson One Banker Deals databases. We gathered market characteristics from the World Development Indicators of the World Bank and furthermore used geographic distances from the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) (Mayer and Zignago 2006).

3.2 Model

We used a Cox event history model to test our hypotheses. Event history analysis has been frequently used in management and international business research (Chang 1995; Delios and Henisz 2003; Pedersen and Shaver 2011; Yeniyurt et al. 2007; Powell 2014; Thomas et al. 2007). Event history analysis has several advantages that make it suitable for the evaluation of the speed of NBU internationalization. Event history models use a time-dependent, binary outcome variable (1/0) as the dependent variable. For this variable a conditional likelihood, the so-called hazard rate, is calculated. This hazard rate is the probability that an event will be observed at time t, given that no event occurred before t (Blossfeld et al. 2007), and has the

unit 1/t. Hence, the reciprocal of the hazard rate has the unit t and represents the time one would expect to wait for an event to occur; that is, the duration until an event happens (Cleves et al. 2010). A significant increase in this hazard rate, in comparison to the baseline hazard rate, may therefore be interpreted as a significant increase of speed (Yu and Cannella 2007). The interpretation of the hazard rate as an indicator of the duration until an event is quite common in management and IB (e.g., Fuentelsaz et al. 2002; Gaba et al. 2002; Powell 2014; Casillas and Moreno-Menéndez 2014).

The units of analysis of this study are the NBUs of our sample firms. We tracked the development of each business unit from its inception until the end of the observation period and observed the years in which they started to operate in additional geographical markets. An event in the sense of event history analysis therefore occurs at the point in time when the new business unit starts operating in at least one new geographical market. This means that the 4-digit SIC code of the NBU appears in the business unit portfolio of any foreign market, in which the NBU has not been active before. Since we are interested in the first *steps* of an NBU, we applied a repeated-event specification, which means that an NBU stays in the sample until the end of the observation period, even though several events may occur in the intervening period. Furthermore, the time is reset each time an event occurs (Box-Steffensmeier and Zorn 2002), which allows us to observe how fast an event followed the previous event. This time reset implies that multiple event 'episodes' are created for each new business unit. We therefore included a clustering at the NBU-level to control for the fact that an NBU is usually represented by several of these episodes (Cleves et al. 2010). For each NBU we created annual spells (new business unit/year) that are marked as 'event' if the new business unit has started to operate in at least one new foreign market, as explained above. The annual spells allowed us to include time-varying covariates as well, such as financial data from the annual reports. These covariates were lagged for 1 year to avoid cause and effect occurring at the same point in time (Blossfeld et al. 2007).

We selected a Cox (1972) proportional hazards model for our analysis. Cox models yield the advantage that no particular shape for the baseline hazard rate has to be assumed. We stratified this model on calendar years to account for time effects. This type of stratification creates common coefficients for the whole observation period, but unique year-specific baseline hazard rates (Iyer and Miller 2008). Finally, we included firm-fixed effects and industry-fixed effects (1-digit SIC code) to account for unobserved heterogeneity between firms and industries.

At 382 points in time we observed that an NBU internationalized and entered at least one foreign market. If an NBU did not internationalize during our observation period, the record of this NBU was censored. However, using event history analysis and modeling a conditional likelihood with the hazard rate, we were able to include these observations and the inherent information about the speed of internationalization in our analysis as well (Cleves et al. 2010). Therefore, our analysis reduces the risk of a survivor bias by analyzing the influence of our independent variables not only for NBUs that have internationalized, but also in the context of NBUs that did not internationalize during our observation window. The minimum number of

internationalization episodes is zero, since some NBUs did not internationalize during our observation window, with the maximum of internationalization episodes being 10.

3.3 Variables

3.3.1 Dependent Variable

The dependent variable of our study is a time-dependent, binary outcome variable. This variable was coded 1, if a new business unit entered at least one foreign market in a certain year, and 0, if no entry event occurred. For this variable we calculated the hazard rate, the conditional likelihood that an event occurs. As outlined above, the hazard rate can be interpreted as the duration or speed until an event occurs (Fuentelsaz et al. 2002), in our case until the new business unit enters a foreign market. We tested how the independent variables influence the baseline hazard rate and thus increase or decrease the internationalization speed of new business units (Yu and Cannella 2007).

3.3.2 Independent Variables

We measured the *MNE nearest neighbor relatedness* by comparing the 4-digit SIC code of each new business unit to the SIC codes of the MNE's other business units at the year before the initial investment. Each comparison received a score from 1, being the most unrelated, to 4, being the most related. Keep in mind that a perfect 4-digit match indicates that an investment is *not* in an NBU, but rather in an existing one. If the 4-digit SIC codes did not match at all we assigned a 1. Reading left to right a 1-digit match received a 2, a 2-digit match a 3 and a 3-digit match between the NBU's SIC code and the existing business unit's SIC code received a 4. The maximum score was selected to identify the relatedness of the new business unit to the most related existing business unit, its nearest neighbor. We included this variable in our model using a categorical operationalization. The base or reference category is the most unrelated new business units, which receive the score 1. For the other categories (2, 3, 4) we included dummy variables which take the value 1, if an NBU belongs to the respective category and 0 if it does not belong to the category. Our relatedness measure is based on the similarity measure used by Haleblian and Finkelstein (1999). The nearest neighbor approach has been previously utilized by Teece et al. (1994) and reflects our theoretical reasoning on the role of the nearest neighbor business unit as facilitator for the new business unit. In our sample we observed a relatedness of 1 for 166 NBUs, a relatedness of 2 for 268 NBUs, a relatedness of 3 for 211 NBUs and a relatedness of 4 for 143 NBUs.

For each NBU we measured the *NBU's internationalization experience* by counting the exact number of markets in which the NBU was operating (Delios and Henisz 2003).[3] In line with our theoretical reasoning we calculated 1 + the natural

[3] It is important to note at this point that NBU internationalization experience counts the exact number of foreign markets in which an NBU is active. Hence, this variable also includes foreign markets that were entered in the same year.

log of the number of markets to account for a decreasing effect of additional international operations (Pedersen and Shaver 2011; Barkema and Drogendijk 2007; Chang et al. 2006).[4]

Consistent with our reasoning, we presume that NBUs process their internationalization experience differently, depending how related they are to their nearest neighbor business unit. In order to test the varying effect depending on the relatedness category we multiplied the experience count variable in its natural log form with the relatedness category, weighting their experience. This relatedness-weighted experience variable was then multiplied with the relatedness dummy variables we created before. The result of this approach comprises four variables representing the processing of the internationalization experience in each relatedness category that we entered into the model instead of the main effect of the new business unit internationalization experience variable. The decision to enter all of these interaction terms instead of the main effect and 3 interaction terms reflects the partition approach described by Yip and Tsang (2007). The advantage of this approach is that we could directly observe the total effect of new business unit internationalization experience for each category instead of splitting it up into a main effect (captured by including the continuous variable) and the individual marginal effects for each category via three interaction terms as done in the traditional baseline approach.

3.3.3 Control Variables

We controlled for the financial situation of the MNEs by including *firm size*, measured as firm sales in millions of euros; *firm profitability*, measured as return on assets; and *capital structure*, measured as the debt ratio. Each of these variables was measured at the beginning of a firm/new business unit/year combination. Furthermore, for each of these controls we calculated its change (Δ) between the previous year ($t - 1$) and the current year (t). Following previous research, we presume that larger MNEs, more profitable firms and parent companies with lower debt internationalize faster, since these firms usually possess more of the resources that are required to internationalize (Hitt et al. 1997). Therefore growth in firm size and profitability, as well as an improvement of the debt ratio, might lead to an increase of internationalization speed as well.

We also added control variables that describe the MNEs' market and business unit portfolios, as well as their age. These controls reflect the firm's experience in dealing with a larger market portfolio and more unrelated business units. The *product diversity* of an MNE at year t is measured using a weighted average relatedness (WAR) measure (Teece et al. 1994). We applied the inverse score to create a diversity measure, where higher values indicate more product diversity. The final product diversity control variable consists of the sum of the relatedness scores of all business units divided by the number of business unit pairs. We presume that MNEs with a higher product diversity internationalize faster (compare Vermeulen

[4] At the beginning NBUs do not possess foreign subsidiaries and the variable would not be defined (log 0). Therefore we add +1 to the number of markets (resulting in the value $\log(1) = 0$ at the start of an NBU) to ensure that the variable is defined in all cases (cf. approach of Chang et al. 2006 and Pedersen and Shaver 2011).

and Barkema 2002), since these MNEs may have more resources to help the NBU during the ramp-up phase.

Similar to the product diversity measure, *geographical diversity* describes the size and dispersion of the MNE's market portfolio at year t. We used the CEPII great circle distance between major cities in 10,000 km (Mayer and Zignago 2006) to calculate the geographical distance between any pair of markets. For the whole MNE market portfolio, we calculated the sum of the geographical distances between all market pairs and divided it by the number of market pairs to obtain the final control variable. Previous research suggests that MNEs with a more diverse market portfolio may internationalize faster (Nadolska and Barkema 2007), since they may have gained more knowledge about foreign markets that may be useful to the NBU. Furthermore, for product diversity as well as for geographical diversity we calculated the change (Δ) between the previous year ($t - 1$) and the current year (t) to control for the recent developments of the MNE's business unit and market portfolio. We presume that capacity constraints in the short-run imply that an increase in product diversity may reduce international growth (Kumar 2009) and thus reduce internationalization speed. The same capacity constraints may also lead to a decrease in internationalization speed, if the MNE has recently been internationalizing strongly. In addition, we controlled for differences between younger and older MNEs by including the *parent MNE's age* in our model. The reasoning is that older MNEs may on the one hand be more experienced (Chang and Rhee 2011) and thus internationalize faster. On the other hand, however, older MNEs may exhibit a higher level of inertia and, as a consequence, internationalize more slowly (Powell 2014). We therefore left open the possibility as to whether parent MNE age will lead to an increase or decrease of speed.

Moreover, the economic situation of the market of inception might affect the speed of NBU internationalization. A favorable market situation in the home market may lead to the NBU concentrating on this market so that internationalization is only considered later (Fan and Phan 2007). Hence, we included the gross domestic product (GDP) of the market of inception, *market of inception GDP* in year t, in our model. As suggested by Delios and Henisz (2003), we used the natural logarithm of the GDP variable. In addition we captured changes in the economic situation of the market of inception by including the Δ *market of inception GDP* variable, measured as a percentage change of the GDP between the previous year ($t - 1$) and the current year (t).

Finally, we also captured differences in the development of NBUs, which might originate from the peculiarities of the parent's investment in the NBU's market of inception, by including an *inception mode* (t_0) variable that indicates whether this first investment was an acquisition (1) or a greenfield (0). This variable indicates whether the business unit is entirely new, as when the firm establishes a greenfield, or whether it was established some time before and is new only to the firm. We controlled for this effect as in the latter case the acquired subsidiary might already be established in the local industry (Slangen and Hennart 2008), in which case the subsequent international expansion might be positively affected. For the same reason, we controlled for the *parent MNE's ownership* of the NBU (t_0) at the time its first subsidiary was established, measured as the equity share the firm owns of the NBU's first subsidiary. Partially-owned subsidiaries may, for example, benefit from

the local experience of joint-venture partners (Chang and Rhee 2011) potentially leading to faster internationalization speed. Finally, we controlled for whether the NBU's inception occurred within or outside of the home country Germany (*non-German inception*). We presume a positive effect for establishments outside Germany, since these NBUs are usually in close contact with the headquarters in Germany and thus may be more used to operating across country borders. Therefore the step of entering into another country may require less effort and thus the company may internationalize faster.

4 Results

In this section, we present the results of our analysis. The descriptive statistics are shown in Table 1 and the results of the Cox event history analysis in Table 2. The control model is shown in the first column of Table 2, in the next two columns the independent variables are included stepwise and the fourth column shows the final model with the combination of the relatedness category and new business unit internationalization experience. We now turn to a discussion of these results in light of our hypotheses.

Hypothesis 1 states that the more related an NBU is to its nearest neighbor business unit of the MNE's overall business unit portfolio, the faster its subsequent internationalization speed. Models 1–3 support this conjecture, showing a positive and significant coefficient for relatedness category 4 in all models. Also relatedness category 3 displays a positive and significant effect, though only at the 10 % (Model 1) and 5 % (Models 2 and 3) significance level.

This indicates that the subsequent internationalization speed for NBUs increases, the higher their relatedness to their nearest neighbor BUs. If we translate the coefficient of Category 4 in the final model 3 into event history terminology using the formula $\Delta h = e^{(\text{coefficient})} - 1$ (Blossfeld et al. 2007) we obtain a hazard rate of 87.76 % [$= e^{(0.63)} - 1$]. This implies that in comparison to the relatedness category 1 the speed of relatedness category 4 is 87.76 % faster. We conducted further analysis to test if a significant difference exists between the other categories (2 and 3, 2 and 4, 3 and 4). We found a significant difference between Category 2 and 4 in Model 2 (5 % level) and marginally in Model 3 (10 % level). Overall these results may imply that only greater differences in relatedness have a significant influence on the NBU's speed of internationalization.

According to Hypothesis 2, the more internationalization experience an NBU has obtained, the faster its subsequent internationalization speed, albeit at a decreasing rate. The positive coefficient (0.48) and the high significance (0.1 % level) shown in Model 2 indicate strong support for this hypothesis. Given that our independent variable is measured using the natural log of the number of markets, the speed of internationalization does not increase linearly, but it increases at a decreasing rate with more internationalization steps.

Finally, Hypothesis 3 predicts that the positive effect of more internationalization experience on the subsequent internationalization speed decreases, the higher the relatedness of the NBU to its nearest neighbor business unit within the MNE's

Table 1 Descriptive statistics (N = 7454 firm-NBU-years)

	Variable	Mean	S.D.	Min.	Max.	1	2	3	4
1	MNE nearest neighbor relatedness = $1^{(t)}$	0.19	0.39	0.00	1.00	1			
2	MNE nearest neighbor relatedness = $2^{(t)}$	0.36	0.48	0.00	1.00	−0.39***	1		
3	MNE nearest neighbor relatedness = $3^{(t)}$	0.25	0.43	0.00	1.00	−0.29***	−0.42***	1	
4	MNE nearest neighbor relatedness = $4^{(t)}$	0.20	0.40	0.00	1.00	−0.25***	−0.36***	−0.27***	1
5	New business unit internationalization experience	0.21	0.48	0.00	3.74	−0.06***	0.03*	0.00	0.03*
6	Firm size$^{(t)}$	14,379.57	17,519.64	3.48	104,875.00	−0.21***	0.11***	0.06***	0.02
7	Δ Firm size$^{(t-1-t)}$	712.96	2865.66	−33,713.00	25,085.00	−0.05***	0.05***	0.00	−0.01
8	Firm profitability$^{(t)}$	3.23	5.77	−60.78	86.78	0.07***	−0.01	−0.02†	−0.04***
9	Δ Firm profitability$^{(t-1-t)}$	0.17	6.53	−84.14	123.34	0.01	−0.01	0.00	−0.01
10	Capital structure$^{(t)}$	16.76	12.50	0.00	88.15	−0.05***	0.05***	−0.03**	0.03*
11	Δ Capital structure$^{(t-1-t)}$	0.55	6.10	−85.51	51.14	−0.03*	0.02*	−0.01	0.00
12	Product diversity$^{(t)}$	3.62	0.24	0.00	4.00	−0.12***	0.06***	0.05***	−0.01
13	Δ Product diversity$^{(t-1-t)}$	0.01	0.18	−4.00	4.00	0.06***	−0.01	−0.03*	−0.02†
14	Geographic diversity$^{(t)}$	13.79	20.37	0.00	83.56	−0.06***	0.05***	0.00	0.01
15	Δ Geographic diversity$^{(t-1-t)}$	0.47	2.64	−16.66	17.75	0.01	−0.01	0.00	0.00
16	Parent MNE age$^{(t)}$	108.29	51.07	0.00	544.00	−0.04**	−0.01	0.05***	0.00
17	Market of inception GDP$^{(t)}$	7.41	0.88	2.99	9.50	0.00	0.05***	−0.03*	−0.02†
18	Δ Market of inception GDP$^{(t-1-t)}$	4.57	2.24	−9.50	17.18	0.00	−0.01	0.00	0.02
19	Inception mode (t_0)	0.57	0.49	0.00	1.00	−0.04***	−0.02†	−0.01	0.08***
20	Parent MNE ownership of the inception subsidiary (t_0)	0.82	0.28	0.00	1.00	0.07***	−0.05***	0.01	−0.02
21	Non-German inception (t_0)	0.27	0.45	0.00	1.00	0.04**	−0.02	−0.01	−0.01

Table 1 continued

	Variable	5	6	7	8	9	10	11	12
1	MNE nearest neighbor relatedness = $1^{(t)}$								
2	MNE nearest neighbor relatedness = $2^{(t)}$								
3	MNE nearest neighbor relatedness = $3^{(t)}$								
4	MNE nearest neighbor relatedness = $4^{(t)}$								
5	New business unit internationalization experience	1							
6	Firm size$^{(t)}$	0.18***	1						
7	Δ Firm size$^{(t-1-t)}$	0.07***	0.38***	1					
8	Firm profitability$^{(t)}$	0.07***	0.00	0.03*	1				
9	Δ Firm profitability$^{(t-1-t)}$	−0.01	−0.01	−0.02*	0.61***	1			
10	Capital structure$^{(t)}$	−0.02	0.07***	−0.03**	−0.20***	−0.06***	1		
11	Δ Capital structure$^{(t-1-t)}$	0.03**	0.11***	0.16***	−0.18***	−0.23***	0.25***	1	
12	Product diversity$^{(t)}$	0.08***	0.30***	0.11***	−0.14***	−0.03*	0.04**	0.04***	1
13	Δ Product diversity$^{(t-1-t)}$	−0.02	−0.04**	0.00	−0.01	−0.04***	−0.02	0.02†	0.12***
14	Geographic diversity$^{(t)}$	0.09***	0.31***	0.11***	0.01	−0.03*	−0.02†	0.03**	0.16***
15	Δ Geographic diversity$^{(t-1-t)}$	−0.01	−0.08***	−0.01	−0.01	−0.07***	0.00	0.03**	−0.06***
16	Parent MNE age$^{(t)}$	0.03**	0.12***	0.04**	0.06***	0.01	−0.13***	0.01	−0.05***
17	Market of inception GDP$^{(t)}$	−0.12***	0.04**	0.01	−0.01	0.02	0.01	−0.01	−0.06***
18	Δ Market of inception GDP$^{(t-1-t)}$	0.02†	0.03**	0.21***	0.08***	0.02	−0.02†	0.05***	−0.03*
19	Inception mode (t_0)	−0.07***	−0.07***	−0.03**	−0.03*	0.00	0.06***	0.01	−0.06***
20	Parent MNE ownership of the inception subsidiary (t_0)	0.03*	−0.03*	−0.02*	0.02†	0.00	−0.02	−0.02†	−0.05***
21	Non-German inception (t_0)	0.20***	0.11***	0.06***	0.12***	−0.01	0.03*	0.03*	−0.06***

Table 1 continued

	Variable	13	14	15	16	17	18	19	20	21
1	MNE nearest neighbor relatedness = $1^{(t)}$									
2	MNE nearest neighbor relatedness = $2^{(t)}$									
3	MNE nearest neighbor relatedness = $3^{(t)}$									
4	MNE nearest neighbor relatedness = $4^{(t)}$									
5	New business unit internationalization experience									
6	Firm size$^{(t)}$									
7	Δ Firm size$^{(t-1-t)}$									
8	Firm profitability$^{(t)}$									
9	Δ Firm profitability$^{(t-1-t)}$									
10	Capital structure$^{(t)}$									
11	Δ Capital structure$^{(t-1-t)}$									
12	Product diversity$^{(t)}$									
13	Δ Product diversity$^{(t-1-t)}$	1								
14	Geographic diversity$^{(t)}$	−0.04***	1							
15	Δ Geographic diversity$^{(t-1-t)}$	−0.02	0.04***	1						
16	Parent MNE age$^{(t)}$	−0.03*	0.16***	−0.02*	1					
17	Market of inception GDP$^{(t)}$	−0.01	0.03*	−0.01	0.06***	1				
18	Δ Market of inception GDP$^{(t-1-t)}$	0.04**	0.10***	0.04***	0.00	−0.12***	1			
19	Inception mode (t_0)	−0.02	−0.02	−0.01	0.09***	0.09***	−0.028*	1		
20	Parent MNE ownership of the inception subsidiary (t_0)	0.01	0.03*	−0.02†	0.08***	0.06***	0.017	−0.18***	1	
21	Non-German inception (t_0)	0.03**	0.10***	0.00	0.01	−0.38***	0.29***	0.016	0.02	1

† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2 Results of Cox event history analysis—speed of new business unit internationalization step

	Control model	Model 1—H1	Model 2—H2	Model 3—H3
Independent variables				
MNE nearest neighbor relatedness = $2^{(t)}$		0.33 (0.20)	0.33 (0.17)*	0.30 (0.20)
MNE nearest neighbor relatedness = $3^{(t)}$		0.39 (0.22)†	0.48 (0.19)*	0.49 (0.23)*
MNE nearest neighbor relatedness = $4^{(t)}$		0.56 (0.22)**	0.63 (0.18)***	0.63 (0.23)**
New business unit internationalization experience			0.48 (0.08)***	
Interaction—MNE nearest neighbor relatedness = 1 × New business unit internationalization experience				0.46 (0.16)**
Interaction—MNE nearest neighbor relatedness = 2 × New business unit internationalization experience				0.26 (0.05)***
Interaction—MNE nearest neighbor relatedness = 3 × New business unit internationalization experience				0.15 (0.05)**
Interaction—MNE nearest neighbor relatedness = 4 × New business unit internationalization experience				0.11 (0.04)**
Controls				
Firm financial controls				
Firm $size^{(t)}$	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Δ Firm $size^{(t-1-t)}$	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Firm $profitability^{(t)}$	0.05 (0.03)*	0.05 (0.03)*	0.05 (0.03)*	0.05 (0.03)*
Δ Firm $profitability^{(t-1-t)}$	−0.01 (0.02)	−0.01 (0.02)	−0.01 (0.02)	−0.01 (0.02)
Capital $structure^{(t)}$	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***
Δ Capital $structure^{(t-1-t)}$	0.03 (0.01)*	0.03 (0.01)*	0.03 (0.01)*	0.03 (0.01)*

Table 2 continued

	Control model	Model 1—H1	Model 2—H2	Model 3—H3
Firm development controls				
Product diversity$^{(t)}$	1.24 (0.61)*	1.26 (0.61)*	1.24 (0.60)*	1.25 (0.60)*
Δ Product diversity$^{(t-1-t)}$	0.52 (0.15)***	0.53 (0.15)***	0.61 (0.15)***	0.62 (0.15)***
Geographic diversity$^{(t)}$	0.23 (0.07)***	0.23 (0.07)***	0.20 (0.07)**	0.21 (0.07)**
Δ Geographic diversity$^{(t-1-t)}$	−0.36 (0.13)**	−0.36 (0.13)**	−0.35 (0.13)**	−0.35 (0.13)**
Parent MNE age$^{(t)}$	−0.03 (0.00)***	−0.01 (0.00)**	−0.03 (0.00)***	0.00 (0.00)
Market of inception-level controls				
Market of inception GDP$^{(t)}$	−0.12 (0.07)†	−0.12 (0.07)†	−0.09 (0.06)	−0.09 (0.06)
Δ Market of inception GDP$^{(t-1-t)}$	−0.05 (0.03)†	−0.06 (0.03)†	−0.04 (0.03)	−0.04 (0.03)
Inception characteristics controls				
Inception mode$^{(t0)}$	−0.04 (0.13)	−0.06 (0.13)	0.00 (0.11)	0.00 (0.11)
Parent MNE ownership of the inception subsidiary$^{(t0)}$	0.45 (0.20)*	0.48 (0.20)*	0.38 (0.19)*	0.38 (0.19)*
Non-German inception$^{(t0)}$	0.52 (0.14)***	0.55 (0.14)***	0.47 (0.12)***	0.47 (0.13)***
Starts in new business unit	788	788	788	788
Events	382	382	382	382
Firm/new business unit/year combinations (N)	7454	7454	7454	7454
Pseudo log-likelihood	−1266.46	−1263.07	−1248.72	−1248.64
Wald test of incremental addition to control model		6.78†	35.48***	35.65***
Wald test of incremental addition to model 1			28.70***	28.87***
Wald χ^2	111,489.19***	129,070.30***	115,898.69***	130,039.49***

Standard errors in parentheses, Firm and industry dummies omitted

† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

overall business unit portfolio is. Model 3 shows the effect of the NBU's internationalization experience depending on the relatedness category, given the main effects for each relatedness category. For each relatedness category, the NBU's internationalization experience shows a significant positive effect at least at the 1 %-level. However, while for the relatedness category 1 the coefficient is 0.46, we find a positive and significant coefficient of 0.11 for Category 4. In a further analysis we tested whether these effects differ significantly from each other, finding that Category 1 differs significantly from Category 3 (p-value: 0.064), as well as

from Category 4 (p-value: 0.307). Furthermore, Categories 2 and 4 (p-value: 0.079) differ significantly. For the other comparisons we did not find significant differences (1 and 2; 2 and 3; 3 and 4). Overall we find support for Hypothesis 3, since we observed that the positive effect of more internationalization experience is lower, the more related the NBU is to its nearest neighbor. However, if we interpret the results of our further analyses conservatively, we have to concede that only for categories that are rather distant (e.g., 1 and 4, 1 and 3, or 2 and 4) do we observe a significant difference in internationalization speed.

We ran several tests to confirm our analysis. First, we tested for multicollinearity between the variables in our models using the STATA "coldiag2" command, which is based on a procedure suggested by Belsley et al. (1980). Multicollinearity does not seem to affect our results significantly, since the condition number in our control model is 30.57, only slightly above the threshold of 30 suggested by Belsley et al. (1980). In the other models it is slightly above 30 (with a maximum of 32.79 in Model 3, caused by a certain correlation between product diversity and market of inception GDP). When we excluded one of the variables the value falls to around 15. Excluding either market of inception GDP or parent MNE product diversity from the calculations did not change our results, i.e., the direction and level of significance of the effects remained the same. As from a theoretical point of view both of these control variables are important influences on the speed of internationalization, we decided to keep both of these control variables in the models despite the borderline condition index value. Second, we conducted a Wald test, following the approach by Gimeno et al. (2005), to compare Model 1, Model 2 and Model 3 with the control model. The χ^2 of the control model—model 1 comparison is 6.78, and only slightly significant (10 %-level), indicating that adding the relatedness dummies only marginally increases the model's goodness of fit, due to the fact that only two of the three dummies have a significant effect. The model fit for Model 2 in comparison to the control model improved significantly (χ^2 35.48, significant at the 0.1 %-level), as well as in comparison to Model 1 (χ^2 28.70, significant at the 0.1 %-level). Finally, Model 3 has a significantly better model fit in comparison to the control model (χ^2 35.65, significant at the 0.1 %-level) and in comparison to Model 1 (χ^2 28.87, significant at the 0.1 %-level).[5]

5 Discussion, Limitations and Conclusion

This study set out to refine internationalization theory by developing a theoretical framework grounded in organizational learning theory (Bingham and Davis 2012) to examine the speed of internationalization of established MNEs' new business

[5] We conducted several additional analyses to check the robustness of our results, applying, for example, a multi-event Cox event history analysis and parametric event history models (Exponential, Weibull and Gompertz models). For the Weibull and Gompertz model, we had to change the operationalization slightly, since these models do not achieve convergence, if the one-year stratification is applied. When we ran the models without the one-year stratification, we obtained results that are similar to the Cox model. Furthermore, we changed the 1-year stratification to a 5-year stratification to control for the effects of longer time periods. The results were similar to our models and are available from the authors upon request.

units. To do so, the study has explicitly taken a processual approach to firm internationalization. Though we ground our reasoning in organizational learning theory, it is important to re-emphasize that we did not directly study learning. Given that learning is a process that takes place over time, yet longitudinal data are rarely available in a way that allows researchers to explore a given topic without simplifying assumptions, a direct study of NBUs' learning processes was not possible. In light of this constraint, we have proposed the assumption that the establishment of the NBU is based on direct and indirect learning; a binary distinction that, given the absence of direct observation, is a necessary simplification of the highly complex phenomenon of organizational learning. Keeping this constraint in mind, we will discuss the findings of our study in this section.

The results of our analysis lend support to our assumption that during the time period immediately following the inception of the NBU, the focus of knowledge acquisition rests on business knowledge. This is because the NBU needs to accommodate itself to the industry in order to become 'internationalization ready' (Tan et al. 2007). However, as we have argued, an NBU may to varying degrees rely on indirect learning while acquiring this knowledge. In this context, our results indicate that the availability of relevant business knowledge—enabling the NBU to complement its direct learning with indirect learning—boosts the internationalization speed of an NBU, since it may enable the NBU to be ready to internationalize earlier (Knight and Liesch 2002).

Apart from business knowledge, an NBU may obtain internationalization knowledge during its ramp-up phase through the same channel it uses to acquire business knowledge. However, only when the NBU starts internationalizing is it able to acquire internationalization experience directly. Our results indicate that more experience in internationalizing leads to an increase in subsequent internationalization speed, even though the boost from more experience decreases with each additional step. This finding is in line with the Uppsala internationalization process model (Johanson and Vahlne 1977, 2009). Internationalization of NBUs occurs as an evolutionary process, where one step builds upon the previous step and managers have to learn how to manage the risk from internationalization activities. As they become more confident they may increase the speed of their internationalization steps. However, this process follows a learning curve and they benefit less from each additional step.

Crucially for a process approach, the results let us draw some conclusions on how the *sequence of learning* affects internationalization speed. It is evident that an NBU that is rather unrelated to the existing business units of its parent MNE must predominantly rely on its own experience in order to acquire business and internationalization knowledge. However, while this may be a lengthy process, our results lend support to the conclusion that since such an NBU becomes accustomed to processing direct experience in an efficient way, it is also more efficient in processing its own internationalization experience. Hence, an NBU that follows a soloing learning sequence benefits more from internationalization experience as compared to an NBU that follows a seeding learning sequence (Bingham and Davis 2012). Thus, overall our results indicate that the concept of learning sequence is able to contribute to explaining internationalization processes, not only for newly

founded firms—the original setting of Bingham and Davis' (2012) study—but also in the context of new business units of established MNEs.

One interesting finding from the empirical part of Bingham and Davis' (2012) study is that in newly founded firms, soloing sequences are more common if the founders possess sufficient business and internationalization knowledge and therefore *do not feel the need* to learn from others. The results of our study may provide an alternative explanation as to why an NBU follows a soloing learning sequence: it might *have no other choice*. If no highly related business unit exists within the parent MNE, an adequate knowledge source is missing. Without such a knowledge source that provides highly relevant knowledge, indirect learning and, thus, a seeding sequence is possible only to a lesser degree. As a result, the NBU is slower to become internationalization ready (Tan et al. 2007). Combining the results of both studies we may therefore conclude that in order to rely on a seeding learning sequence (1) the necessity for external knowledge acquisition has to be perceived (Bingham and Davis 2012), and also (2) adequate knowledge has to be available to be transferred. Seeding may be particularly successful, if the NBU may benefit from first-mover advantages; that is, if it manages to be one of the first players to enter a foreign market (Lieberman and Montgomery 1988; Autio et al. 2000). Therefore (3) a strong market incentive to be faster may incentivize managers to rely on a seeding learning sequence.

An extension to previous internationalization process research is the explicit modeling of the temporal order of the ramp-up phase and the internationalization phase of the NBU and the examination of the NBU's learning during these phases on its internationalization speed. NBUs first concentrate on their ramp-up phase and acquire business knowledge to become internationalization ready. During this phase, the NBU may also receive internationalization knowledge. Obviously, however, the acquired internationalization knowledge is only put to use after the NBU has started its internationalization, during which the NBU will obtain further internationalization knowledge through its own experience. The reasoning underlying this assumption is essentially the Penrosean notion of restricted managerial capacity (Kumar and Seth 2001; Penrose 1959). If managers are busy ramping up their business, they are unlikely to have the capacity to engage simultaneously in the complex task of internationalization. Accordingly, at the beginning an NBU focuses on the acquisition of business knowledge as it seems that this type of knowledge is more important at the outset as compared to internationalization knowledge. After all, an NBU may be perfectly fine operating in only a single market, lacking any internationalization knowledge. However, without business knowledge the successful acquisition of internationalization knowledge is unlikely to be achievable. Even though the NBU may receive internationalization knowledge during the ramp-up phase, it is only required and is only valuable to the NBU once the NBU starts internationalizing. In other words, the internationalization process begins only after the NBU has acquired sufficient business knowledge. In cases in which internationalization starts earlier, time-compression diseconomies are likely to occur (Dierickx and Cool 1989; Knight and Liesch 2002). Classical internationalization process theory did not explicitly discuss the internationalization readiness of firms. Only with recent research in this domain, also fostered through the discussions

surrounding the born global topic, has the time period before internationalization received the attention of researchers (Tan et al. 2007).

5.1 Limitations and Suggestions for Further Research

In our current research design, relying on secondary data and taking a longitudinal perspective on the new business unit's internationalization, we cannot observe the details beyond this broader picture: for example, we cannot observe the micro processes of decisions to internationalize. As stated above we also do not observe how learning takes place, but infer it based on the observation of the effect of our independent variables on the NBU's internationalization speed. Therefore, studies that focus on the micro processes of learning within the NBU and the behavior of managers, for example, in-depth case studies, might help us to uncover which dynamics within the NBU occur during the internationalization process and how these dynamics influence internationalization speed.

Second, an implicit assumption of our study is that in general, NBUs of diversified MNEs are predisposed to internationalization. However, it might be the case that certain business units are meant to remain domestic and lack an international-growth orientation (Jantunen et al. 2008). Since we cannot rule out this possibility given our approach of using secondary data from annual reports, it would be necessary to conduct interviews with managers to uncover their *intention* behind the inception of the NBU and whether it is to internationalize or not.

Third, we used foreign direct investments in foreign markets as indicators of internationalization since, as argued in the Uppsala model, the setup of a subsidiary in a foreign country requires the highest commitment of the NBU to this country (Johanson and Vahlne 1977). However, firms may also internationalize through exports, licensing or alliances and gain internationalization experience through these entry modes as well. The construct we used to measure the internationalization experience—the natural log of the number of countries in which the NBU is active—represents the scope of international experience. Clarke, Tamaschke and Liesch (2013) have suggested that international experience can be conceptualized as a multidimensional construct as well, including the diversity, intensity and length of international experience. For our setting, using the number of countries seems most appropriate, since an NBU's international network is very small at the beginning and, for example, the length of the NBU's internationalization experience (measured as time since first internationalization) will be highly correlated with our dependent variable, internationalization speed. However, we acknowledge the benefits of a multidimensional measure and for studies that observe the influence of internationalization experience on internationalization speed using a different setting—for example, MNEs with a longer history of internationalization—a multidimensional conceptualization might be useful. Furthermore, prior research suggests that firms may undergo a period of gestation before the official inception date, which influences the speed of internationalization after inception (Hewerdine and Welch 2013). Unfortunately this information is usually not publicly available and therefore could not be included in our study. Further studies may focus on other

entry modes and examine, for example, how quickly NBUs begin to export and how the gestation period influences the internationalization speed.

Finally, our empirical study has been conducted using a sample of large German MNEs which have a long history of internationalization and thus the results may have been influenced by the home country context. Therefore, it might be worthwhile to replicate the study in different countries, for example emerging economies, to examine the effect of the home country context of MNEs on internationalization speed. Furthermore, the industry effects may influence the NBU's speed of internationalization. Depending on the NBU's industry conditions a faster internationalization may be necessary; for example, if the industry has low entry barriers and the NBU faces early foreign-based competition in its market of inception (Wiersema and Bowen 2008). We used a cross-industry sample and included industry-fixed effects to control for potential influences of the MNEs' industry, as coherent industry information is not available for the extended time period and the variety of markets, but in subsequent studies it might be interesting to focus on the influence of the NBU's industry on its internationalization speed.

We used a cross-industry sample and included industry-fixed effects to control for potential influences of the MNEs' industry. Given the long time period and the variety of markets covered in our study, coherent industry information was not available. However, future studies might focus on the influence specific characteristics of an NBU's industry have on the internationalization speed of the respective NBU.

5.2 Conclusion

Scholars have long called for more research on the time dimension in order to provide a stronger theoretical ground for firm internationalization (Eden 2009). The present paper contributes to the internationalization process literature, in particular the limited yet growing body of literature on the speed of internationalization in the context of established firms. Classical internationalization process models such as the Uppsala model have focused on the evolutionary and stepwise nature of the internationalization process (Johanson and Vahlne 1977). In this paper, we have focused on the speed of internationalization, thereby adding a further dimension to these models. Moreover, focusing on new business units, the present paper refines the internationalization process theory by clarifying the role that the already existing business units of the parent MNE may have in influencing an NBU's speed of internationalization. While the Uppsala model has focused on direct learning our results suggest both the sources as well as the effect of indirect learning on NBUs' speed of internationalization. In the revised version of the Uppsala model (Johanson and Vahlne 2009) the focus has shifted towards the role of networks during the internationalization process. Under the umbrella of a diversified MNE the business units may be conceptualized as an intra-firm network and a related NBU is benefiting from this network boosting its internationalization speed. Finally, by exploring the correlation between indirect learning and direct learning, our paper also adds to the emerging literature on learning sequences (Bingham and Davis 2012), providing evidence for its applicability in the context of internationalization.

We believe that these areas of research are worthy of further exploration and hope that our present work motivates other researchers to pursue further investigations in these fields.

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