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Firm Growth, Top Management Team Characteristics, and Firm Performance

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List of abbreviations

b	Simple slope
bn.	Billion
CEO	Chief Executive Officer
cf.	Confer
Coeff.	Coefficient
€	Euro
e.g.	Example given
F	F-value
HDAX	Stock index of the Deutsche Börse
IBP	Intercontinental Book and Publishing Group
i.e.	Id est
MNE	Multinational enterprise
N	Number of observations
p	P-value
R ²	Coefficient of determination
RBV	Resource based view
R&D	Research and development
ROA	Return on assets
s.d.	Standard deviation
SE	Standard error
TMT	Top management team
WAR	Weighted average relatedness

1. Introduction

1.1. Research questions

Equity markets increasingly put pressure on firms to increase shareholder value. The shareholder value approach¹ posits that the creation of value for a firm's shareholders is the primary objective for a firm. The shareholder value can be determined by subtracting all non equity claims from the firm value (Rappaport, 1986). Assuming constant non equity claims², shareholder value can be increased by increasing overall firm value. Firm value can be calculated³ as invested capital plus the ratio of the economic profit in the numerator to the weighted average cost of capital minus the firm's growth rate in the denominator (Koller et al., 2005). Hence firm growth is a key driver of a firm's value creation. Not surprisingly firm growth has been reported to be an important objective of a firm's management (Brush, Bromiley, & Hendrickx, 2000; Mishina, Pollock, & Porac, 2004).

However, firm growth does not necessarily lead to value creation. Excessive growth may even destroy firm value. In contrast, firms that shrink, e.g., by divesting certain business areas, may increase firm value. One reason for this is that firm growth may affect the return spread of the firm. Firm growth may positively affect the return spread, e.g., by realizing economies of scale, and may as well be associated with negative effects, e.g., costs of change and complexity (Hutzschenreuter, 2006).

Taken together, this indicates that a better understanding of firm growth and its effects is of high relevance for both managers and academics. As a result, the question of what factors drive firm growth and how it affects a firm's profitability are important research questions.

From a market based perspective, firm growth can be differentiated along two dimensions: the product market dimension and the country market dimension (Hutzschenreuter, 2006). These

¹ We concur with the discussion in Hutzschenreuter (2006, p. 27 ff.) and assume a firm to follow a shareholder value approach.

² As financing decisions are not the focus of our discussion, we assume constant non equity claims.

³ Multiple methods exist to estimate the value of a firm. Here, the 'growing-perpetuity formula' is used since it is a succinct calculation showing the key drivers of firm value (Koller, Goedhart, & Wessels, 2005, p. 117).

two dimensions are the basis of two largely distinct research streams. Hutzschenreuter (2006) provides a detailed review of the extant empirical literature on performance implications of product diversification strategies and internationalization strategies. However, the results are inconclusive. In consequence, he suggests that a dynamic perspective focusing on the development of the firm in a period of time and the expansion steps undertaken is necessary to further our understanding of product expansion and international expansion respectively. As managing a single expansion step, e.g., a direct investment in a foreign country, is a complex task (Mishina et al., 2004), a focus on a period of expansion considers the amount of complexity added by an expansion program potentially comprising multiple steps in that period. Thus, the complexity in an expansion period is driven by the number of expansion steps to be managed in that period. However, complexity is also driven by the distance of the expansion steps to the activities in a firm's existing product and country portfolio. Hence important sources of the complexity in a firm's expansion period are the added product scope and the added cultural distance (Hutzschenreuter & Guenther, 2008; Hutzschenreuter & Voll, 2008). Only few empirical studies exist that have included both directions of expansion in one study (Kumar, 2009; Meyer, 2006; Nachum, 2004). However, both are part of a firm's overall growth strategy. Moreover, the task of making and implementing expansion decisions into new product and international markets and the associated challenges are very similar. Thus, addressing both directions in one study may enable a more comprehensive understanding of firm growth and its effects.

However studying firm growth without considering the management that is responsible for making and implementing growth decisions neglects a crucial aspect of the growth of firms. The management of a firm plays a central role in most theories of the firm (for an overview see Hutzschenreuter, 2006) and also in the theory of the growth of the firm (Penrose, 1959). It is the task of the management to make and implement expansion decisions and to handle the complexity in a firm's expansion process. On the corporate level, it is the firm's top

management team (TMT) that is responsible for coordinating expansion (e.g., Barkema & Shvyrkov, 2007; Hambrick, Cho, & Ming-Jer, 1996; Mintzberg, 1971). Thus, the ability of the TMT to cope with the complexity of expansion may be a central factor influencing firm growth and its effects. A large body of research has informed us about factors that may affect the ability of teams (for extensive overviews see Kerr & Tindale, 2004; Stewart, 2006) and TMTs in particular (e.g., Carpenter, Geletkanycz, & Sanders, 2004; Hambrick & Mason, 1984). A vast amount of empirical research has shown that demographic characteristics of top managers may serve as suitable proxy for their cognitive bases and abilities (Finkelstein, Hambrick, & Cannella, 2009; Hambrick, 2007). However, little research has empirically investigated the role of characteristics of top managers in firms' expansion processes from a dynamic perspective.

Based on this reasoning, the research questions that the present study aims to address are:

- (1) What is the effect of complexity added in firms' expansion processes in the form of added product scope and added cultural distance on the profitability and further growth of firms?
- (2) How do characteristics of top management teams affect firms' growth rates and their ability to profitably cope with complexities of expansion?

1.2. Research approach

This study is a large scale empirical investigation of expansion processes of German firms. It is based on a panel dataset which has been collected at the Chair of Corporate Strategy and Governance of Prof. Hutzschenreuter. The dataset includes data on all expansion steps undertaken by 91 German firms listed on the HDAX as well as data on the TMTs of these firms between 1985 and 2007.

The present work comprises of three main segments which are based on three manuscripts of the joint authors Prof. Dr. Thomas Hutzschenreuter and Julian Horstkotte. Thus, throughout the paper, the first person plural is used. The manuscripts have been submitted to highly recognized academic and peer-reviewed journals and are under review at the date of

submission of this work. Our work builds upon and extends in a substantive fashion prior studies of the Chair that have focused on firm growth (e.g., Hutzschenreuter, 2006; Hutzschenreuter & Guenther, 2008, 2009; Hutzschenreuter, Voll, & Verbeke, 2011; Hutzschenreuter & Voll, 2008). With the aim to protect the anonymity of the authors during the review processes, we restricted the number of citations of prior works of Prof. Hutzschenreuter and his colleagues. Of course we brought this point to the journal editors' attention in the letters to the editors that were enclosed to the submitted manuscripts.

The second chapter of this study is based on a submission to the International Business Review. It deals with one particular direction of firm expansion: expansion into new international markets. In particular we investigate the direct effect of cultural distance added in an expansion period on firm profitability after that expansion period. We further investigate factors that may influence a TMT's ability to cope with the challenges of adding cultural distance and examine the moderating effect of TMT experiences on the direct relationship between added cultural distance per period of time and firm profitability.

Chapter three is based on a manuscript which has been submitted to the Strategic Management Journal. Compared to the second chapter, we address a different direction of firm expansion in this part of the study, namely expansion into new product markets. In particular we examine how product scope added in an expansion period affects a firm's profitability at the end of that period. In addition we investigate how task-related and bio-demographic faultlines in the TMT may affect its ability to cope with the complexities of expansion and thus moderate the relationship between added product scope and firm profitability.

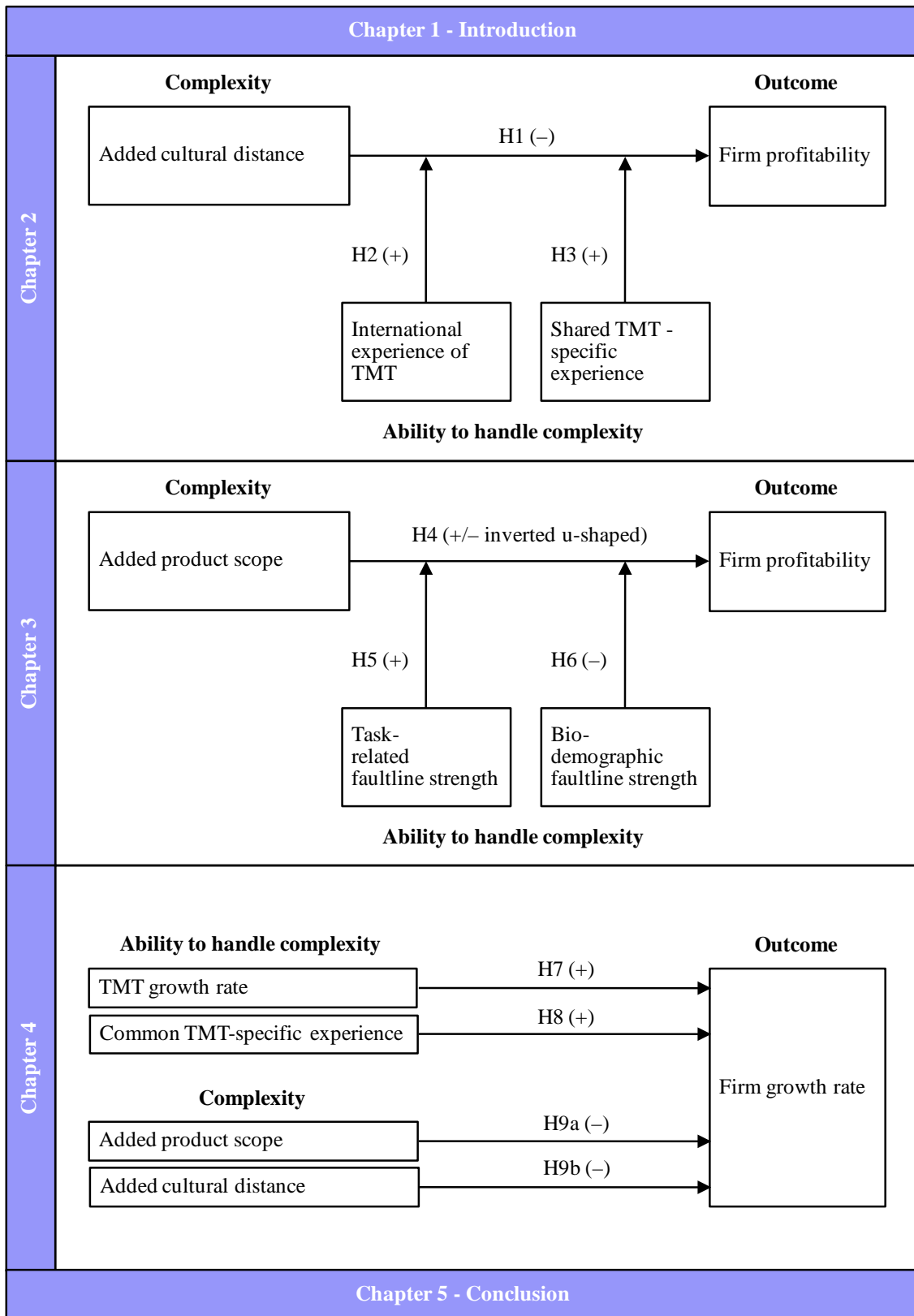
Chapter four is based on a submission to the European Management Journal. It includes both directions of expansion – product and international expansion – in one analysis. We investigate two subsequent time period and examine the effect of added product scope and added cultural distance in the first period on a firm's growth rate in the following second time

period. We incorporate the top management team in the analysis by studying the effect of the growth rate and the common team-specific experiences of the TMT in one period on the rate of growth of the firm in the subsequent period of time.

Finally we provide a brief summary and conclusion of the main findings of our investigation in the fifth chapter.

Figure 1-1 displays an overview of our research, the main variables, and the hypothesized and empirically investigated relationships between these variables.

Figure 1-1: Structure of the study



2. Performance effects of international expansion processes: The moderating role of top management team experiences⁴

2.1. Introduction

International business scholars have long been interested in the performance effect of international expansion. A large number of studies have investigated the impact of a firm's multinationality or degree of internationalization at a certain point in time on its profitability. However, empirical studies taking such a static perspective have yielded decidedly mixed results, including U-shaped, inverted U-shaped, S-shaped, and both positive and negative linear relationships (for recent overviews see Contractor, Kundu, & Chin-Chun, 2003; Hitt, Tihanyi, Miller, & Connelly, 2006; Li, 2007; Verbeke, Lei, & Goerzen, 2009). Little research has taken a dynamic perspective and investigated the impact of characteristics of the process of internationalization on the profitability of multinational enterprises (MNEs) (Vermeulen & Barkema, 2002). The process of internationalization, however, is important because expanding a firm's international scope is even more complex than managing an MNE in its current state (Mishina et al., 2004). When first entering a foreign country, firms face liabilities of newness, foreignness, or outsidership (Johanson & Vahlne, 1977, 2009). They need to adapt to the unfamiliar locations and integrate new foreign subsidiaries into their existing international operations (Meyer, Mudambi, & Narula, 2011). At the same time, firms are constrained in their ability to expand and successfully cope with complexity added in the internationalization process in a limited period of time (Penrose, 1959; Tan, 2003). For example, Vermeulen and Barkema (2002) and Wagner (2004) find that if firms expand too fast, i.e., undertake too many internationalization activities per period of time, their efficiency will suffer. Besides the mere number of expansion steps, the added complexity, and hence the additional costs of expanding internationally vary with the distance between newly entered

⁴ This chapter is based on a preliminary version of: Hutzschenreuter, T., & Horstkotte, J., Performance effects of international expansion processes: The moderating role of top management team experiences *International Business Review*, 22(1), 259-277.

markets and markets where the firm already has a presence (Ghemawat, 2001), with cultural distance being recognized as important source of complexity (e.g., Gomez-Mejia & Palich, 1997; Verbeke et al., 2009; Yu, Subramaniam, & Cannella, 2009).

In this paper, we take a dynamic perspective and specifically focus on change. We investigate time periods and the cultural distance added by international expansion steps undertaken in those periods to address our first research question: What is the impact of complexity in the form of the amount of cultural distance added in a period of international expansion on the profitability of the expanding MNE?

However, we believe that a central contingency factor in the empirical analysis of performance effects of internationalization has been largely neglected: the firm's management. It is highly relevant as complexity added in the international expansion process comes with additional information processing requirements for the managers (Penrose, 1959). We believe that, in particular, a firm's top management team can make a difference since coordinating change and making strategic decisions, like expansion into foreign countries, is usually the task of the strategic apex of the organization (e.g., Barkema & Shvyrkov, 2007; Hambrick, Cho, & Ming-Jer, 1996; Mintzberg, 1971). Experience of the top management team affects its knowledge and its information processing ability, and as such its performance as a unit (Hambrick & Mason, 1984; Kor, 2003; Stewart, 2006), and as a consequence, its ability to reap the benefits and cope with the costs of international expansion. In this way, top managers' experience may moderate the performance effect of international expansion processes. Nonetheless, the role of top managers in dealing with change has received limited empirical attention in this context. This is especially surprising as multiple studies have made arguments based on managerial resources and limitations, which are key to Penrose's theory of the growth of the firm (1959), and yet often do not include this aspect in the empirical analysis. As Hennart's review (2007) concludes, the 'literature underplays the role of management'. In this paper, we directly address this issue with our second research question:

How can experiences of a firm's top management team members make a difference in coping with the added complexity in a period of international expansion and moderate the relationship between added cultural distance and firm profitability?

2.2. Theoretical background and hypotheses

2.2.1. Complexity in international expansion processes

Theoretical rationales for both benefits and costs of international expansion abound. Potential benefits may accrue from influencing market forces (Kogut, 1985), reducing transaction costs (Buckley & Casson, 1976; Hennart, 1977, 1982), learning (Barkema & Vermeulen, 1998), or transferring and exploiting firm- and subsidiary-specific advantages internationally (Rugman & Verbeke, 2001; Verbeke, 2009). On the other hand, firms are exposed to additional complexity in the international expansion process (Vermeulen & Barkema, 2002). While managing an MNE in its current state already is a complex task, managing its expansion is even more so (Mishina et al., 2004). Environmental complexity increases for a firm when it enters foreign markets and faces liabilities of foreignness and outsidership (Johanson & Vahlne, 2009). Adaptation to local settings and coordination with existing activities are sources of additional internal complexity but usually are required if the firm is to survive and compete in foreign markets (Benito, 2005; Zaheer, 1995). Yet, not every expansion step adds the same amount of complexity. The added complexity of each step varies with the distance between a newly entered market and markets where the firm already has a presence (Ghemawat, 2001; Gomez-Mejia & Palich, 1997). In an internationalization period, a firm often undertakes multiple expansion steps. Thus, the added complexity that a firm needs to cope with in a certain period of international expansion, and hence the additional costs of expanding internationally are driven by both the number of expansion steps into foreign markets in that period and their distance to the firm's existing portfolio.

2.2.2. Managerial role in international expansion processes

International expansion is a corporate-level strategy for which a parent firm's top management is responsible (Tan & Mahoney, 2005). Given its role as the internal and external information processing center, a top management team (TMT) is in a unique position to understand, make, and relate complex expansion decisions (Mintzberg, 1971). Expansion into foreign environments is a strategic task that typically involves most if not all TMT members and that usually requires consensus, especially when it comes to decisions on direct investments in foreign geographic markets (Barkema & Shvyrkov, 2007; Hambrick, Cho, & Ming-Jer, 1996). As a result, the TMT is seen as the most suitable information processing mechanism to deal with the additional complexities of internationalization (Egelhoff, 1991). From an information processing perspective, a TMT requires information in order to make and implement expansion decisions. While its members already possess certain information gained through prior learning and experience, information processing as a team is required. That is, members need to share their information with others, gather new information, and attend to, interpret, and integrate information as a team (Hinsz, Tindale, & Vollrath, 1997). As a consequence, the added complexity of international expansion comes with information processing requirements for the TMT. The ability to process large amounts of information, however, is both valuable and rare (Sanders & Carpenter, 1998) and the information processing ability of a TMT and its development per unit of time are limited (Penrose, 1959). Taken together, TMTs differ both in the information processing requirements they face in international expansion processes and in their ability to handle them. For example, firms add different amounts of distance along their international expansion paths. As a source of complexity added distance strains firms' managerial resources. It requires the processing of information and consumes a substantial amount of TMT time and effort, and thus may decrease firm profitability. While TMTs are limited in their ability to handle complexities from added distance, this negative effect of internationalization may be mitigated by an

enhanced ability to process information. An important factor that may influence a TMT's ability and group performance is its experience. Thus, TMT experience may help to successfully cope with the complexity arising from distance in the international expansion process.

2.2.3. Increased managerial strain from added cultural distance in international expansion processes

A firm's top management team is strained by the complexity of international expansion. Extensive research has shown that a particularly important source of complexity in the international expansion process is the cultural distance between newly entered markets and markets in which a firm is already active (e.g., Gomez-Mejia & Palich, 1997; Yu et al., 2009). For example, it is substantially different whether a firm that has, so far, been active solely in Germany undertakes an expansion step into the Austrian, Danish, or the French market. The associated added cultural distance differs markedly and so do the cost of market entry, the effort required to adapt, and the ability to transfer firm-specific advantages (Tihanyi, Griffith, & Russell, 2005).

Market entry into culturally distant settings increases the complexity in dealing with the environment as TMTs need to address a larger number of external elements and issues (Scott, 1992). Compared to domestic expansion, management requires more information in order to cope with added environmental complexity. Moreover, the ability to apply already possessed information decreases with cultural distance and management's unfamiliarity with foreign market. TMTs need to process additional information to understand local preferences and customer behavior, to comprehend the nature of the networks of competitors and suppliers, to gain knowledge about the particularities of the local work force, and to deal with other external conditions that are afflicted by the local culture. In addition, the greater the cultural distance, the more difficult and costly it is to obtain and interpret comprehensive and accurate information about the environment and the strategic context (Roth & O'Donnell, 1996).

It is unlikely that expansion into a new foreign and culturally distant market will be successful without modification of routines (Doz & Prahalad, 1991). Scholars agree that to a certain extent adaptation is necessary to survive and be successful in a new context (e.g., Sapienza, Autio, George, & Zahra, 2006; Zaheer, 1995). A firm needs to ‘calibrate itself to a foreign national culture’ (Barkema, Bell, & Pennings, 1996). Differences between markets provide the impetus to reconfigure organizational routines and business strategies in order to create a better fit between characteristics of subsidiaries and external conditions (e.g., Bartlett & Ghoshal, 1989; Lim, Acito, & Rusetski, 2006). High managerial attention and effort is needed when top management perceives a need to actively adapt in order to respond to a new environment. Managers need to process information to understand underlying causal relationships and the context of the new market so as to decide on local adaptation. Yet, the TMT also needs to integrate newly established entities into the MNE’s multinational network of subsidiaries. Internal routines need to be adapted to coordinate and control activities within and between subsidiaries. Otherwise, administrative diseconomies might arise when expanding into new environments (Calvo & Wellisz, 1978; Coase, 1952; Singh, Tucker, & House, 1986). Adjustment and governance costs can be considerable (Barkema et al., 1996; Tomassen & Benito, 2009) and have been shown to contribute to foreign market entry failure (Mitchell, Shaver, & Yeung, 1994). Gomez-Mejia and Palich argue that cultural distance requires coordinated adaptation to national contexts and more complex organizational control systems. They conclude that ‘as cultural distance increases, the challenges for the organizational control system increase proportionately’ (Gomez-Mejia & Palich, 1997). To offset costs of market entry, a firm may transfer firm- and subsidiary-specific advantages between headquarters, newly established, and already existing subsidiaries (Phene & Almeida, 2008; Verbeke, 2009). However, it is exactly these resources and organizational capabilities that lead to sustainable competitive advantage that also tend to be ‘sticky’, i.e., particularly difficult to transfer (Szulanski, 1996). This is primarily due to causal ambiguity,

i.e., an incomplete understanding by top management of how resources affect performance (Barney, 1991). In an international context, cultural ambiguity may impede still further understanding (Robertson & Swan, 2003). While ambiguity hampers competitor imitation, it also increases the strain on the MNE's top managers. They may be able to reduce ambiguity by processing new information that allows them to better understand causal relationships, but the effort can be expensive as it requires high managerial effort. In line with this logic, researchers have stressed that the transfer of advantages usually entails a substantial tacit component (e.g., Teece, 1977). However, tacit knowledge is predominantly built on experience in the specific market context in which the firm is already active. As culturally distant target markets differ, TMTs face irreducible uncertainty about whether the firm's tacit knowledge can be applied to a culturally unfamiliar and incompletely understood context (e.g., Inkpen, 2008; Lippman & Rumelt, 1982; Szulanski, 1996). Accordingly, the higher the cultural distance between the markets in which the firm is presently active and that which it wishes to enter, the more difficult it is for TMTs to transfer and apply tacit knowledge to this new market. Not surprisingly, knowledge transfer expectations are frequently not met (Gupta & Govindarajan, 2000).

An expansion step into a culturally distant country comes with more complexity and information processing requirements than a further step into a market where the firm has an established presence and already has gained substantial knowledge. Thus, it is not the distance from the country that is newly entered to the MNE's home country, but to that country in the MNE's network of affiliates that the entered country is closest to (Verbeke et al., 2009). Yet, firms often engage in expansion programs that involve multiple steps. The complexity and information processing requirements that a TMT faces along an expansion process is driven by the cultural distance that is added by each and every international expansion step in that process. Hence, managerial strain is driven by added cultural distance in the expansion

process, i.e., by the cumulative cultural distance of all the international expansion steps taken in a given period of time (Hutzschenreuter & Voll, 2008).

2.2.4. Managerial limitations in the ability to handle added cultural distance in international expansion processes

Added cultural distance in the international expansion process increases complexity and a substantial amount of valuable managerial resources is expended in managing the additional complexity. These resources are needed to process information. However, their availability is limited (Vermeulen & Barkema, 2002). Boundedly rational TMT members are limited in their ability to absorb, evaluate, and act upon complex information per unit of time (Cyert & March, 1963). For example, time compression diseconomies hamper learning within a given period of time (Dierickx & Cool, 1989). As teams require firm and team-specific knowledge to work efficiently, firms are constrained in increasing the number of TMT members to process more information. Knowledge about the abilities, skills, and personalities of fellow team members is a sine qua non for working together as a team. Yet, such knowledge is often highly tacit and can only be learned through a time-consuming process of shared experience. It takes time to develop and integrate new managers. Thus, the amount of experienced managerial resources available constrains the complexity that a firm can handle. Moreover, as new managers need to be recruited and trained by experienced top managers, developing and integrating additional managers temporarily occupies the capacity of existing TMT members (Penrose, 1959). As a result, dynamic adjustment costs arise that further limit a TMT's information processing ability per unit of time (Tan & Mahoney, 2005).

The limited amount of new information that a top management team is able to handle may further increase the costs of coping with added cultural distance in a period of expansion. If too much cultural distance is added in too short a short period of time information requirements surpass the capacity of a TMT to process new information, what Teece has called the 'congestion factor' (Teece, 1980). As managers become overwhelmed and unable

to sufficiently familiarize themselves with foreign markets, the quality of decisions suffers. This results in poor adaptation of structures, systems, and processes that may substantially diminish the benefits of international expansion. When the TMTs ability to process information is overstretched the TMT may even neglect the management of existing business operations damaging both the performance of existing subsidiaries and that of newly established ones. Hence firms that add too much cultural distance in an expansion period will experience lower profitability. Taken together we hypothesize:

Hypothesis 1: Everything else constant, the amount of added cultural distance per period of time will negatively affect firm profitability.

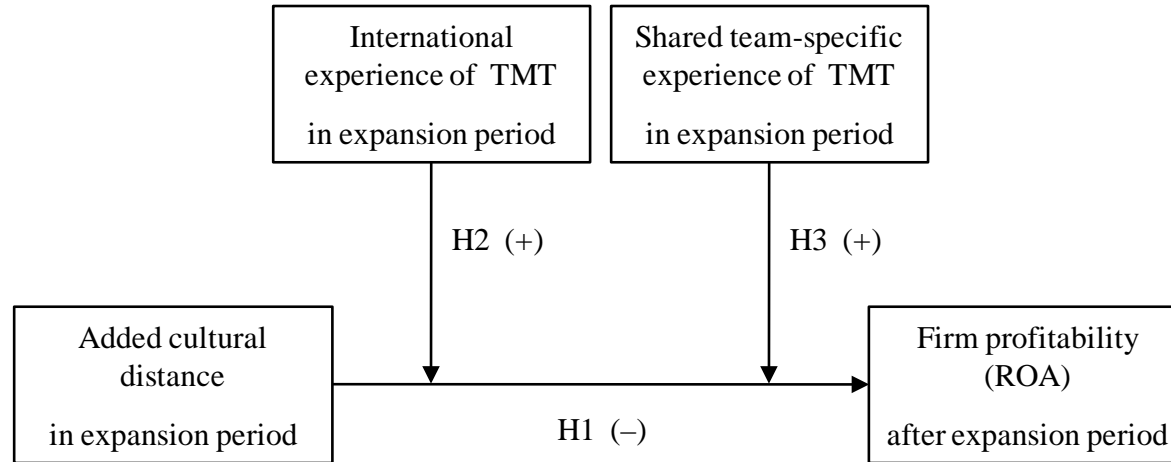
2.2.5. TMT experiences as influencing factors of managerial ability to handle added cultural distance in international expansion

Firms are limited in their ability to cope with added cultural distance in a given period of time due to the limitations of top management teams to process information. However, teams may differ in information processing ability. Different teams may experience different limitations. Thus, the relationship between added cultural distance and firm profitability is moderated by factors that influence a TMT's information processing ability. An extensive body of social psychology research informs us about factors that potentially affect the performance and the decision making ability of teams (for extensive overviews see Kerr & Tindale, 2004; Stewart, 2006), and specifically in TMTs (e.g., Carpenter et al., 2004; Hambrick & Mason, 1984). A particularly important factor that influences information processing has been argued to be the extent of prior relevant experience that TMT members bring to the task (Finkelstein et al., 2009). Through experience executives gain tacit and explicit knowledge, form unique skills and competencies, and build networks of external ties. The cognitive bases, values, and perceptions of executives are shaped by their experience (Hambrick & Mason, 1984). In this study, we focus on top management teams' international experiences and their members'

shared team-specific experiences. Taking a resource based perspective, Carpenter, Sanders, and Gregersen (2001) argue that international experience of top managers is an intangible resource that is valuable, rare and difficult to transfer and thus a source of competitive advantage. They also recognize that top managers are embedded in a socially complex top management team. To work efficiently in such a team, managers require shared experiences in working with each other in that team (Penrose, 1959). Several empirical studies have focused on top managerial experiences and found an association between top managerial international experience at a certain point in time and a firm's degree of internationality or multinationality at that point in time (Herrmann & Datta, 2005; Sambharya, 1996) or with a two year lag (Carpenter & Fredrickson, 2001; Tihanyi, Ellstrand, Daily, & Dalton, 2000). Shared experience on a particular team has been argued to affect a firm's annual sales growth (Kor, 2003). In this study, we take a different approach. As underlying relationship, we investigate how added cultural distance in a period of expansion affects a firm's profitability. In addition, we study how international experience and shared team-specific experience of a top management team in that period of expansion may help to cope with the added distance and moderate this relationship (see Figure 2-1).

Prior experience creates value when it can be applied to a specific task, so executives who deal with complexity from added cultural distance may especially benefit from international experience, i.e., personal and professional experience in different cultural settings (Meyer, 2006). TMTs with substantial international experience are more likely to possess deeper knowledge of foreign environments and cultures (Lee & Park, 2008) and may be more aware of cultural differences and ambiguities. Murtha et al. (1998) write about a 'global mindset' of managers that develops by learning from international experiences and overcoming national biases. It is consistent with the geocentric state of mind described by Perlmutter (1969) and with what Bartlett and Ghoshal (1989) term transnational mentality. A global mindset is considered by many to be crucial for coordinating international activities and balancing global

Figure 2-1: Research model



integration and local responsiveness and thus ultimately for the success of international expansion (Adler & Bartholomew, 1992).

Internationally experienced TMTs may also benefit from a network of international contacts that facilitates acquisition and access to information about distant markets (Herrmann & Datta, 2005). Lee and Park (2008) suggest that high TMT international exposure and relational capital in foreign markets provide reputational information to institutions and potential partner firms, thus mitigating liabilities of outsidership (Johanson & Vahlne, 2009). Moreover, living and working in foreign settings shapes the cognitive orientation, values, and perspectives of managers, and alerts them to the potential opportunities and challenges of culturally distant countries (Tihanyi et al., 2000). TMTs with prior experience in working abroad may already have detailed knowledge of the contributions of foreign subsidiaries to overall firm performance and of coordination issues with other units (Daily, Certo, & Dalton, 2000). This knowledge is useful for the initiation, planning, and implementation of international expansion. Accordingly Sambharya (1996) concludes that a TMT's international experience may reduce the level of uncertainty.

Taken together, we argue that international experience enhances the collective ability of a top management team to absorb and process complex information related to internationalization. Therefore, it enables TMTs to better cope with cultural distance added per unit of time in the international expansion process. Following this logic, we hypothesize:

Hypothesis 2: Everything else constant, greater international experience on the part of top management team members will positively moderate the relationship between added cultural distance per period of time and firm profitability.

By definition the members of a TMT do not work independently of one another but as a team. They interact in a group process (Steiner, 1972). Thus, in addition to the international experiences of its individual members, a team's information processing ability is influenced

by member interaction and their cooperation. Therefore, interrelationships between members and ability to work together as a team are important factors that influence a TMT's ability to handle complexity (Richardson, 2002). While individual managers may have general team-working skills, each TMT is unique. Thus, generic team experience is no substitute for experience within a specific team (Kor, 2003). Managers with high team-specific experience are a difficult to imitate resource (Kor, Mahoney, & Michael, 2007) as it takes time to acquire mostly tacit knowledge about other team members and to build social relationships within the team (Pelled, 1996). Such managers are able to render services that are uniquely valuable for the team (Penrose, 1959). Correspondingly, Prescott and Visscher (1980) conclude that teams whose members fit well together can be considered organizational capital.

Shared team-specific working experience may contribute to information processing in different ways. Managers with high tenure overlap on a TMT have spent a lot of time working together. They are likely to have initiated, planned, and implemented multiple strategic decisions as a team, and in the process probably gained detailed knowledge of the skills, limitations, mental models, and habits of their fellow team members. This may lead to better communication and information-sharing (Huber & Lewis, 2010). Collaboration can be enhanced as managers adapt to each other, develop routines in decision making, and simply learn to get along. Thus, shared team specific experience can save time and result in faster joint processing of information and decision making (Eisenhardt & Schoonhoven, 1990). Knowledge about how other team members have behaved in past situations can nurture the development of trusting relationships (McAllister, 1995), which in turn can improve collaboration (Dirks & Ferrin, 2001). Thus, TMTs with high team-specific experience are more likely to be better able to cope with the inherent complexity and uncertainty of expansion to culturally distant markets (Kor & Mahoney, 2000).

The longer that TMT members have worked together the less likely they are to fall back on stereotypes or make assumptions about each other based on social demographic traits like age,

race, or gender. This can weaken the likelihood and intensity of emotional conflicts that disturb constructive information processing. With an increasing overlapping tenure, top managers gain a better understanding of job related characteristics that are less visible such as specific skills and expertise (Pelled, 1996), allowing the TMT to focus on firm issues, like internationalization, rather than on group issues (Eisenhardt & Schoonhoven, 1990).

Taken together, we argue that shared team-specific experience and a better understanding between TMT members enhances information processing ability compared to teams with no such experience. Thus, experienced teams are better able to handle the information processing requirements of dealing with the complexities of added cultural distance when expanding internationally. Therefore, we hypothesize:

Hypothesis 3: Everything else constant, greater shared team-specific experience among top management team members will positively moderate the relationship between added cultural distance per period of time and firm profitability.

2.3. Methods

2.3.1. Sample and data

We tested our hypotheses using cross-sectional time-series data on the expansion path of select German firms. We derived our sample from the HDAX index of the German stock exchange that is comprised of the companies with the highest market capitalization in Germany. Following Vermeulen and Barkema (2002), we excluded financial institutions, real estate firms, retailers, purely financial holdings, and cross-listed non German firms. We ended up with 135 companies that were listed on the HDAX at one point in time since its inception. We acquired data on these firms' top management teams and their international expansions. We tried to collect data for a period ranging from 1985 to 2007. Given our research setting in which we analyze the process of firm expansion we required complete data for a minimum number of consecutive years per firm. Through the elaborate process outlined below, we were

able to gather sufficient data for the entire set of variables for 80 firms for at least six consecutive years.

We started our data collection by obtaining the annual reports of the sample firms and compiling additional information by contacting the firms directly and by using public archives. Based on information on expansion steps in the annual reports and using the list of affiliates in the report appendices, we gathered data on all of the subsidiaries that had been established during the period of analysis. To exclude purely financial investments, we included newly established subsidiaries only if the parent firm held a stake of at least 50 percent after the investment and had no, or a minority stake, before. Furthermore, we identified all subsidiaries that existed at the beginning of the period of analysis as well as those divested. Thus, we were able to determine the complete portfolio of subsidiaries for each year a firm is included in our panel. This data collection approach was necessary as such detailed data on expansion steps are not available from any commercial database in Germany. We also collected demographic data on the members of the firms' top management teams. Demographic data may serve as reasonable indicator for psychological constructs and information processing of top managers and teams (Hambrick & Mason, 1984). The use of such data is very common in management research (e.g., Barkema & Shvyrkov, 2007; Kor, 2006; Rivas, 2011) and, as noted by Michel and Hambrick (Michel & Hambrick, 1992), is advantageous as this data is clear-cut and objective. Since no comprehensive database on such characteristics existed, we collected the data from multiple data sources in a time-consuming process. First, we decided who should be considered a member of the TMT (Wiersema & Bantel, 1992). In the German governance system, the board of directors is two-tiered with a management board (Vorstand), and a separate supervisory board. Members of the Vorstand represent the firm. They are legally and collectively responsible for managing the firm with the CEO acting as *primus inter pares*. Hence, we equate Vorstand with top management team and identified from the firms' annual reports all executive directors that were on the Vorstand

for the respective years of our investigation. The resulting list of executives was used in the next step to gather demographic data as well as data on the career path of each manager. The Hübner's Who is Who and Lexis Nexis online databases were important sources of information. Furthermore, we accessed several encyclopaedias, like Sutter's International Red Series Who's Who in Germany, Wer ist Wer? Das Deutsche Who's Who, IBP Who's Who in Germany, Who's Who in European Business and Industry, and the Munzinger online archive. Next, we searched the archives and databases of well-respected newspapers and magazines. These included the archive of the Frankfurter Allgemeine Zeitung and the Spiegel as well as BusinessWeek's Executive Profile section and ManagerMagazin. In a later stage we again contacted firms directly in an attempt to close the remaining gaps in the data set and to test the reliability of already collected data. Firm archives were of great help. Finally, when we were not able to obtain all of the relevant information, but were able to find a way to reach an executive, we attempted to make direct contact. Often those executives responded right away. In line with prior upper-echelons research (cf. Jensen & Zajac, 2004; Westphal & Zajac, 1997), firm-year observations were excluded from the analysis if TMT related data were unavailable for more than one quarter of the top executives of a respective team.

If we excluded firms from our analysis because they were unsuccessful or did not survive, a survivorship bias would occur. In contrast to other studies with a similar study approach, we attempted to avoid survivor bias by including non-surviving firms in our sample. In addition, we gathered data on several financial variables, including our dependent variable, firm performance, from Thomson Reuters Datastream database. We did this not only for firms that we included in the analysis but also for those that we excluded. Following Carpenter & Fredrickson (2001), we then compared the firms we included to those excluded using a means test. This test revealed that the firms included were not significantly different with respect to number of employees, total assets, revenues, or market capitalization. More importantly, they did not perform significantly better than firms that were excluded, indicating that survivorship

does not lead to a bias in our results. Furthermore, it affirms that our sample is constructed independently of the dependent variable included in the study, thus avoiding problems associated with sample selection bias (Allison, 2002; Jensen & Zajac, 2004; Little & Rubin, 2002).

As the structure of our dataset is unbalanced, we applied an additional statistical method to determine whether sample selection is an issue in our analysis. Wooldridge (2002) argues that in a fixed effects context, sample selection poses a problem only when selection is related to the idiosyncratic error term in the model. He describes a simple test for this assumption, which was applied for example by Berrone and Gomez-Mejia (2009). As originally suggested by Nijman and Verbeek (1992), we tested the assumption by adding a binary selection indicator with a one year lag to our model. The selection indicator is coded one if a firm is included in our analyses in a particular year and zero otherwise. Thus, it models the presence or absence of firms in each year of our analysis. Estimation of our fixed effects model, including the one year lagged selection indicator, revealed that this indicator was not significant. Accordingly, we conclude that sample selection does not lead to bias (Wooldridge, 2002).

2.3.2. Variables

Our research empirically studies the performance effect of international expansion processes of firms and how it is influenced by top management team experience. Consequently, we investigate the effect of managerial and growth-related characteristics of a time period on firm performance after the period. We calculated our independent and control variables as average values over the respective period unless specified otherwise. Following multiple studies on firm expansion (Weinzimmer, Nystrom, & Freeman, 1998), we chose a time frame of five years as the time horizon of TMT strategic planning is typically that long (Grant, 2003).

2.3.2.1. Dependent variable

The dependent variable in this study is firm performance. We used an accounting-based measure and measured firm performance using the firms' return on assets (ROA) (Hitt, Hoskisson, & Kim, 1997; Venkatraman & Ramanujam, 1986). The variable is calculated as a three-year moving average in order to reduce distortions that may result from changes in accounting practices (Carpenter & Sanders, 2002). ROA is a common and widely accepted measure of firm performance in management and diversification research (Gomez-Mejia & Palich, 1997; Kim, Hwang, & Burgers, 1989), and thus allows comparison with numerous other studies (e.g., Carpenter, 2002; Carpenter et al., 2001). It is particularly appropriate in the context of our study as it reflects the relative efficiency of the use of a firm's assets and the synergies gained through international expansion (Kim et al., 1989). In contrast to other accounting based measures, e.g., return on equity, ROA has the advantage that it controls for differences in financial structure (Bettis & Mahajan, 1985). Moreover, our model predicts realized performance, while market-based measures reflect shareholder expectations about the future.

2.3.2.2. Independent variables

We infer that there are challenges arising from international expansion and that a firm and its management need to cope with cultural distance added to a firm's existing country portfolio. We calculated cultural distance between two countries based on the four original dimensions and scores of Hofstede (1980). Applying the Kogut-Singh index we averaged the differences in cultural dimensions between two countries and additionally controlled for the variance in each dimension (Kogut & Singh, 1988). This approach has been used extensively in international business research (e.g., Chen & Hu, 2002; Gomez-Mejia & Palich, 1997; Indro & Richards, 2007; Roth & O'Donnell, 1996; Yu et al., 2009).

To determine the cultural distance that is added to a particular firm in a given period of time, we first calculated the cultural distance between the country into which the firm expands and

each country where the firm already has an affiliate before expansion. Thus, the number of countries in the firm's country portfolio equals the number of cultural distances we computed for each expansion step. The smallest of these distances reflects the cultural distance that is *added* by that particular expansion step. Therefore, the added cultural distance of a single expansion step is its distance to the closest existing subsidiary. We focused on expansion steps as they constitute a direct measure of change that captures actual activities undertaken by manager to expand into new geographic areas. Next, we summed the added cultural distances of all expansion steps in the period of time that is of interest in order to measure the level of added cultural distance to which a firm and its management is exposed in that period, hence the variable's name: *added cultural distance per period of time*.

The variable *TMT international experience* reflects the experiences that executives have had in an international context such as growing up abroad or by studying or working outside of one's own country. Experiences of these kinds can shape the skills and mental models of executives as well as their networks of personal and professional ties. Hambrick and Mason (1984) argue that such experiences have an impact on organizational outcomes. Accordingly, we measure TMT international experience as the percentage of TMT members born outside of Germany (Black, 1997), educated outside of Germany (Tihanyi et al., 2000), and/or who have had work experience outside of Germany (Carpenter et al., 2001; Sambharya, 1996).

Following Lee and Park (2008), we summed the values and divided by three to form a composite index that captures the TMT's background and experiences more completely than relying on a single measure.

To capture TMT cross understanding, that is how well team members understand the mental models, skills and knowledge, limitations and idiosyncratic habits of fellow members, we measured the *shared team-specific experience* of TMT members. We do not try to capture team experience in general, but experience *specific* to the particular teams we are investigating, i.e., a team's joint managerial experience in making and implementing

investment decisions (Kor, 2003). Following Carroll and Harrison (1998), we average the sum of the overlapping tenure across all dyads of the team as a proxy for the shared TMT-specific experience of all current executives.

2.3.2.3. *Control variables*

The variable *TMT size* captures the quantity of managerial resources. Following, Halebian and Finkelstein (1993), we measure TMT size using the total number of executives on the firm's Vorstand. Data were extracted from annual reports. *TMT age* has been shown to affect team information processing (Taylor, 1975). Thus, we included the average age of the members of the TMT as a control variable. In addition, *TMT educational level* may be used as an indicator for the quality of managerial resources (Talke, Salomo, & Rost, 2010; Wally & Becerra, 2001; Wiersema & Bantel, 1992). We measured educational level using state-approved German educational degrees (Kultusministerkonferenz, 2005). We included the average educational level of the TMT.

Furthermore, we added the variable *cultural diversity*. This variable reflects cultural differences between a firm's subsidiaries at a certain point in time and thus the complexity with which managers have to cope when managing a multinational portfolio of activities. Based on the concept of cultural distances as described above, we calculated this variable as the sum of the cultural distances across all dyads of a firm's network of subsidiaries divided by the total number of pairs. This calculation shares similarities to the WAR (weighted average relatedness) concept in the product diversification literature (Teece, Rumelt, Dosi, & Winter, 1994). To control for curvilinear effects we also included the squared term (e.g., Hitt et al., 1997).

We included the control variable *total ownership*. A firm may take over full control when establishing a foreign subsidiary or may engage in an equity alliance with a partner. Partners may bring location-specific knowledge and relationships (Hennart, 1988; Lane, Salk, & Lyles, 2001; Yamin & Golesorkhi, 2010), however, partnerships need to be coordinated and

controlled, increasing the strain on managerial resources (Chang & Rosenzweig, 2001). We controlled for this effect by including the percentage of total international expansion steps that were wholly-owned. Investments in foreign markets can be undertaken via acquisitions or Greenfield investments. Acquiring an existing resource bundle may pose different challenges for the firm than building a subsidiary from scratch might. Thus, the mode of entry into foreign markets may influence the performance of expansion programs. To control for this, we calculated the variable *acquisition* as a percentage of international expansion steps implemented by acquisition in the period of analysis. If a firm held a minority stake in a subsidiary prior to making an investment that resulted in a majority stake, it may have acquired valuable knowledge about the subsidiary. As this may potentially affect the performance of expansion steps, we calculated the variable *prior minority* as a percentage of international expansion steps taken while the firm held a minority stake.

We included the variable *firm size* to control for information processing requirements for a TMT that may result from the size of a firm's operations (Henderson & Fredrickson, 1996). It was measured as natural logarithm of firm sales (e.g., Carpenter & Sanders, 2004).

2.4. Analysis

Before testing our hypotheses, we performed a range of specification tests. Since our dataset is comprised of observations of multiple firms at different points in time, our estimation method needs to take into account the specific panel character of our data. As confirmed by a Hausman test, we used a fixed firm effects model for our analysis (Wooldridge, 2002). Such models are preferred in panel data analysis (Cannella, Park, & Lee, 2008) and have an advantage in that they control for constant unobserved heterogeneity across firms that may explain differences in the dependent variable (e.g., Greene, 2008). They are considered to be conservative as significant effects can only be observed based on changes in independent variables within a particular firm and so there is a reduced risk of getting spurious results due to problematic error terms in the context of cross sectional studies.

Following Greene (2008), we tested for heteroskedasticity by calculating a modified Wald statistic for groupwise heteroskedasticity in fixed effects regression models. The test statistic rejected the null hypothesis indicating that the error variance is specific to the cross sectional units. Furthermore a test for autocorrelation in panel data as discussed by Woolridge (2002) and Drukker (2003) suggests that autocorrelation does not affect our results. In this context, an ordinary least squares fixed effects model with Huber–White corrected standard errors (White, 1980) has been applied in management research, by Anderson and Reeb (2004) for example. Alternatively, the Arellano estimator in fixed effect models (Arellano, 1987; Kezdi, 2003; Kristensen & Wawro, 2007) can be used. It is robust to arbitrary heteroskedasticity and autocorrelation and has been applied by Delmas, Russo, and Montes-Sancho (2007) and McCann and Vroom (2010). We tested both estimation approaches which yield virtually identical results. The results displayed in Table 2-2 are based on the Arellano robust estimator. In addition, contemporaneous correlation, which is present if residuals of units observed in different time periods are correlated, might pose a serious issue (Beck & Katz, 1995). To control for contemporaneous correlation (Certo & Semadeni, 2006) and for potential time effects in our model (Greene, 2008), we used time dummy variables.

We tested for multicollinearity by analyzing the correlation coefficients. The descriptive statistics in Table 2-1 show mean values, standard deviations, and correlations among the dependent, independent, and control variables.

Given our use of a fixed effects model, we calculated the within firm correlation coefficients (for a similar approach, see McCann & Vroom, 2010). As Tsui, Ashford, St.Clair and Xin (1995) write, ‘there is no definite criterion for the level of correlation that constitutes a serious multicollinearity problem. The general rule of thumb is that it should not exceed 0.75.’ Other authors indicate critical thresholds of 0.8 (Kennedy, 1979) and 0.6 (Foo, Sin, & Yiong, 2006). None of the within firm correlation coefficients in Table 2-1 exceeds 0.6 indicating that multicollinearity is not a problem. As Barkema and Shvyrkov (2007) point out, firm size and

Table 2-1: Descriptive statistics for analysis of international expansion

			1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
	mean	s.d.												
1. Return on assets	0.081	0.074	1.00											
2. Added cultural distance	2.456	2.599	-0.09	1.00										
3. TMT international experience	0.178	0.138	0.09	-0.16	1.00									
4. Shared TMT-specific experience	4.168	1.594	0.07	-0.03	-0.04	1.00								
5. TMT size	6.098	2.710	-0.09	0.08	-0.39	-0.18	1.00							
6. TMT age	52.810	3.794	0.03	-0.03	-0.01	0.43	0.14	1.00						
7. TMT educational level	6.268	0.558	-0.07	-0.02	-0.22	0.12	0.00	-0.05	1.00					
8. Cultural diversity	0.722	0.318	0.06	0.18	0.33	-0.09	-0.18	-0.03	-0.05	1.00				
9. Total ownership	0.697	0.276	0.06	-0.06	0.03	0.05	-0.11	-0.12	-0.08	-0.04	1.00			
10. Acquisition	0.521	0.317	0.07	-0.07	0.26	0.06	-0.15	-0.02	0.04	0.03	0.01	1.00		
11. Prior minority	0.035	0.114	-0.11	-0.11	-0.04	-0.13	0.09	0.05	0.19	0.00	-0.39	0.23	1.00	
12. Firm size	15.124	1.788	0.02	-0.07	0.39	0.01	-0.10	0.07	-0.06	0.53	0.20	0.08	-0.13	1.00

All correlations with an absolute value larger than 0.084 are significant at the level $p < 0.05$.

Mean values and standard deviations are overall values of non-centered variables. Centering has no impact on standard errors and correlation coefficients. TMT and diversity variables are average values of the period.

Correlation coefficients are within firm correlations. Given our use of a fixed effects model, we calculated correlations after subtracting for each variable the mean value of the respective firm from the value of the variable.

TMT size may be highly correlated as larger firms tend to have larger TMTs. Thus, we tested both models including and excluding TMT size. Results were virtually identical. Furthermore, we examined variance inflation factors. For all variables, they are lower than 3 and thus considerably smaller than the generally accepted critical value of 10 (Tan & Tan, 2005). This further indicates that multicollinearity does not significantly affect our results. Based on suggestions made by Aiken and West (1991), we mean-centered all variables that were used to test interaction effects in order to mitigate possible collinearity specific to interaction terms.

2.5. Results

Table 2-2 shows the results from the regression analysis used to test our hypotheses. Our dependent variable is firm performance measured as a three-year moving average of return on assets after a period of expansion. Model 1 shows the results of regressing firm performance on the control variables only. In model 2 we include added cultural distance per period of time to test for a direct relationship with performance without interactions. The full model, model 3, is used to test our hypotheses. It includes all the control and independent variables and is thus less likely to suffer from omitted variables bias compared to the other models (Echambadi, Campbell, & Agarwal, 2006).

The underlying relationship of our study is the link between added cultural distance per period of time and firm performance following that particular period. Our results show that the relationship is negative and significant and thus supports Hypothesis 1. In Hypothesis 2 we argued that TMT international experience positively moderates this relationship. Consistently, the interaction of added cultural distance and TMT international experience is positive and significant in model 3 with a coefficient of 0.013 ($p < 0.10$). To allow for better interpretation of the interaction effect we plotted the interaction (Figure 2-2) and computed post hoc statistical tests (Aiken & West, 1991).

First we calculated the base case using the mean value of all relevant variables. In this case the simple slope is -0.0034 ($p < 0.01$). As the simple slope of the regression line is conditional

Table 2-2: Results of robust fixed effects regression of firm performance^a on added cultural distance

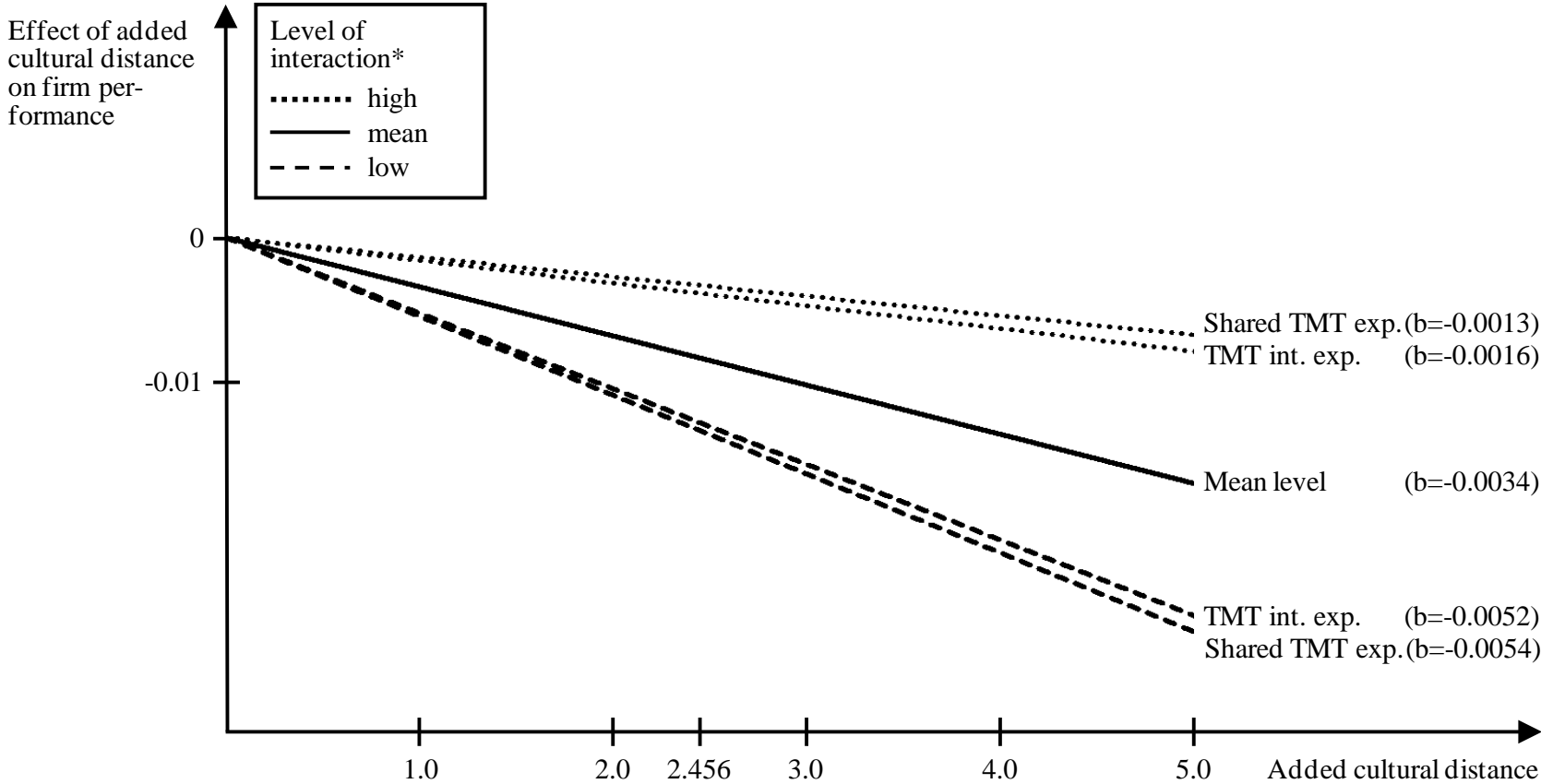
	Model 1		Model 2		Model 3	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Added cultural distance			-0.004	(0.001) **	-0.003	(0.001) **
Added cultural distance x TMT international experience					0.013	(0.008) +
Added cultural distance x Shared TMT-specific experience					0.001	(0.001) *
TMT international experience	0.054	(0.053)	0.029	(0.054)	0.039	(0.053)
Shared TMT-specific experience	0.002	(0.003)	0.003	(0.003)	0.002	(0.003)
TMT size	-0.001	(0.002)	-0.001	(0.002)	-0.001	(0.002)
TMT age	0.001	(0.002)	0.001	(0.002)	0.001	(0.002)
TMT educational level	-0.011	(0.017)	-0.014	(0.016)	-0.017	(0.016)
Cultural diversity	0.064	(0.063)	0.111	(0.056) *	0.116	(0.053) *
Cultural diversity squared	0.092	(0.091)	0.116	(0.079)	0.126	(0.069) +
Total ownership	0.008	(0.015)	0.006	(0.014)	0.004	(0.014)
Acquisition	0.018	(0.013)	0.020	(0.012) +	0.022	(0.012) +
Prior minority	-0.036	(0.018) *	-0.047	(0.018) **	-0.056	(0.017) **
Firm size	-0.005	(0.011)	-0.007	(0.012)	-0.012	(0.012)
R ²	0.079		0.105		0.117	
F	6.090	***	5.700	***	8.830	***

N=531

*** p<0.001; ** p<0.01; * p<0.05; + p<0.1

^a Model with Arellano robust standard errors. Time dummies are omitted.

Figure 2-2: Plot of interaction effects



*simple slopes are calculated with one interaction variable changed at a time and all other variables held constant at the mean value

on the interaction term, we analyzed how changes in TMT international experience affect the slope. Using the mean value of all other variables we estimated the effect of added cultural distance per period of time on firm performance for two levels of TMT international experience – a high level (one standard deviation above the mean) and a low level (one standard deviation below the mean) (for a similar approach see Chung-Leung et al., 2008; Zhou & Poppo, 2010). Figure 2-2 displays the plot of the interaction. When the international experience of the TMT is low, the negative effect of added cultural distance is stronger ($b=-0.0052$, $p<0.001$) than when there is an average level of international experience ($b=-0.0034$, $p<0.01$). However, TMTs with a high level of international experience do not experience a significant negative effect of added cultural distance ($b=-0.0016$, $p>0.10$). This result illustrates the positive interactive effect of TMT international experience on the negative relationship between added cultural distance and firm profitability.

Hypothesis 3 argues that teams with higher shared team-specific experience are, *ceteris paribus*, better able to cope with international expansion. It posits a positive moderation of the relationship between added cultural distance per unit of time and firm performance. Table 2-2 shows that the interaction term of shared TMT-specific experience and added cultural distance is positive and significant. Thus, Hypothesis 3 is supported. As described above, we decomposed and plotted the interaction. The results indicate that firm performance is negatively, yet not significantly, influenced by cultural distance added per period when shared TMT-specific experience is high ($b=-0.0013$, $p>0.10$), but when shared TMT-specific experience is low the negative effect is intensified ($b=-0.0054$, $p<0.01$).

As we wrote in our introduction, there has been a thorough discussion in the international business literature about the costs and benefits associated with expansion into foreign countries. Consequently, we tested for non-linear effect of added cultural distance. We could not detect significant relationships or identify a positive influence of added cultural distance. To further test the robustness of our results we used different lags for our dependent variable.

When we calculated firm profitability for the last year of the expansion period, we found highly significant relationships between added cultural distance and the interactions of shared TMT-specific experience. The coefficient of the interaction term of TMT international experience and added cultural distance is positive yet its significance is slightly reduced. The result of the regression of firm performance measured one year after the expansion period is displayed in Table 2-2. When we used a lag of two or three years, the significance of the interaction effect of TMT international experience and added cultural distance increased, indicating its long term effect. At the same time, significance level of the shared TMT-specific experience slightly decreased.

2.6. Discussion

Firms increasingly internationalize and frequently expand into new and unfamiliar countries (Barkema & Shvyrkov, 2007). The associated complexity with such international expansion poses a challenge for managers responsible for coordinating international expansion. In this paper, we take a dynamic perspective and particularly focus on the changes in firms' international scope and address two research questions relevant to both researchers and top managers: How does international expansion, and in particular the cultural distance added in an expansion period, affect the profitability of the expanding MNE? and How can experiences of the TMT help in coping with a firm's international expansion and moderate the relationship between added cultural distance and firm profitability?

Our research shows that the amount of cultural distance added in an international expansion period negatively affects firm profitability. Cultural distance added in the international expansion process is an important source of complexity with which top management teams who make and implement decisions to expand internationally need to cope. Focusing on added cultural distance as one source of complexity, our study contributes to the literature by addressing a central characteristic of internationalization steps. We argue that steps into new and distant countries entail greater complexity and are more of a strain on managerial

resources than expansion steps into familiar settings where the firm is already present. Thus, we differentiate between single expansion steps based on the cultural distance between the newly entered country and that country in the MNE's network of affiliates that it is closest to, which is not necessarily the MNE's home country. Moreover, we focus on expansion programs and not individual steps by focusing on the cultural distance added in periods of international expansion.

The distinctive contribution of our study is the finding that the experiences of a top management team moderate the relationship between added cultural distance and firm profitability. That is, specific TMT experiences can help a firm to more successfully cope with international expansion. In this study, we focused on two types of experience, TMT international experience and shared TMT-specific experience, and showed that they exert a positive significant interactive effect on the profitability impact of a firm's internationalization process. Our results complement other works that found an association between top managers' international experience and a firm's multinationality at points in time (Carpenter & Fredrickson, 2001; Herrmann & Datta, 2005; Sambharya, 1996; Tihanyi et al., 2000). Our study reveals that international experience of TMTs positively interacts with the amount of cultural distance added in periods of time. Thus extensive international experience of the TMT may mitigate the negative effect of added cultural distance on firm profitability. This suggests that international experience particularly helps in dealing with complexities in the international expansion process. Kor (2006) investigated the effect of shared team-specific experience on R&D investment strategy. She argues that TMTs with a high level of team-specific experience cope well with uncertainty of exploring new opportunities and thus invest more intensely in R&D than teams without such experience. Our results also suggest that a high level of team-specific shared experience enhances the ability to deal with uncertainty and also improves the ability to successfully manage complexities and uncertainty inherent in the international expansion processes. Taken together, our study indicates that research

investigating international expansion processes based on information processing theory should take into account both the amount of information to be processed and ability to process it.

In addition to implications for research on expansion processes, our results may also have relevance for researchers investigating the impact of multinationality on the performance of multinational enterprises. Despite a broad range of empirical studies, a consistent picture has not yet emerged (e.g., Gongming, Lee, Ji, & Zhengming, 2008; Lu & Beamish, 2004) as both positive and negative relationships between multinationality and firm performance have been found. The contradictory findings have motivated international business scholars to explore a variety of non-linear relationships, including U-shaped, inverted U-shaped, and S-shaped forms (for an overview see Contractor et al., 2003). Given the diversity of findings, Hennart (2007) has suggested that theoretically relevant factors may have been omitted in the analyses. Our results indicate that it is not only the level of multinationality at a certain point in time that affects firm performance but also the process of how this level was achieved over a period of time. They suggest further that the plurality of results might be explained by differences in the ability of top management teams to cope with the complexities of multinationality.

Our findings may also help managers to initiate, plan, and implement international expansions. The negative performance effect of added cultural distance per period of time stems from the additional information processing requirements facing top management. Our results suggest that experience of a TMT is critical to its ability to process information as a team. As management teams differ, every TMT should carefully assess whether there is a fit between the requirements and the ability to process information before deciding on which international expansion projects to undertake. Our results are also directly relevant for CEOs and the supervisory boards that nominate or appoint top managers. For example, our results show that the negative effect of added cultural distance can be greatly mitigated by appointing

a TMT with an amount of international experience or with shared team-specific experience that is one standard deviation above the mean.

2.7. Limitations and further research

This study, like every other, is not free of limitations. Our research is limited by the operational definition of a top management team. Different approaches have been used to decide which managers to include in the definition of a TMT, e.g., asking the CEO of a firm to identify the TMT members (e.g., Bantel & Jackson, 1989), or including all managers above the vice-presidential level (e.g., Michel & Hambrick, 1992). In our study, we included all members of the 'Vorstand', the management board of German corporations. German law requires that these persons who are legally and collectively responsible for the management of the corporation be listed in the firm's annual report. We believe the management board of German firms closely resembles the definition of a TMT as group with 'the overall responsibility for the organization' (Mintzberg, 1979). On average, our definition led to the inclusion of 6.10 members per team with a standard deviation of 2.71. This is comparable to other studies: the average size of the TMT in Michel and Hambrick (1992) was 6.18 and its standard deviation 2.68 while Bantel and Jackson (1989) included 6.30 members with a standard deviation of 1.64. Given the longitudinal nature of our study and the associated issues with the gathering of historical data, we used observable characteristics of TMTs as indicators for psychological constructs and information processing capabilities (e.g., Cheng, Chan, & Leung, 2011; Hambrick & Mason, 1984; Rivas, 2011). Observable data based on archival sources are reliable and objective. Nevertheless, future studies might complement this approach by using surveys or some other means to more directly measure team dimensions, like processes, communication, or conflict.

In our study, we differentiated between international expansion steps according to the cultural distance they added to a firm's existing country portfolio. In line with existing research, we argued that cultural distance is a primary source of complexity (Gomez-Mejia & Palich,

1997). However, further research could consider as well other factors that potentially increase complexity for the TMT, for instance environmental turbulence (Luo & Peng, 1999) or geographical, economic, or institutional differences, as well as their interrelationships (e.g., Estrin, Baghdasaryan, & Meyer, 2009; Ghemawat, 2001; Meyer, Estrin, Bhaumik, & Peng, 2009; Slangen & Beugelsdijk, 2010).

Another limitation of our study concerns the timing and size of single expansion steps. We were able to determine the year of each expansion step using the annual reports of the respective firms. However, we could not determine the exact date. Thus, it was not possible to keep track of the exact sequence of international expansion steps within a particular year.

From a learning perspective, this information would have been interesting since firms may be able to learn from previous internationalization (Johanson & Vahlne, 1977). Furthermore, it was not possible to capture the magnitude of expansion steps. While larger expansion steps may be associated with higher complexity and require more managerial attention, every expansion step, independent of its size, needs to be initiated, planned, and implemented and thus puts a strain on management.

In this study, we examine the interactive effect of top management teams on the performance of the internationalization expansion of German firms. However, it has been recognized that differences in societies or national systems may affect the influence that top managers are able to exert (e.g., Hambrick, 2007). For example, CEOs of American firms have a stronger impact on firm performance than CEOs of German or Japanese firms (Crossland & Hambrick, 2007). Accordingly, additional research might use samples from other countries to explore the specific influence of national contexts on our hypothesized relationships.

3. Performance effects of top management team demographic faultlines in the process of product diversification⁵

3.1. Introduction

A large body of research shows that product diversification can yield multiple benefits (e.g., Palich, Cardinal, & Miller, 2000). It can help firms realize economies of scope (e.g., Markides & Williamson, 1994; Rumelt, 1982), increase and exploit market power (e.g., Haveman, 1993; Scherer, 1980), and benefit from larger internal markets (e.g., Hill & Hoskisson, 1987; Stulz, 1990). However, it can also strain managerial resources. Managing a firm is a complex task, managing its expansion adds still more complexity (Mishina et al., 2004). An increase in product scope brings with it an increase in the amount of information processing required, especially for upper-level managers who make and implement scope change decisions. Expanding into a new product area is a path dependent process that builds on the firm's existing resources (Kim & Kogut, 1996). Experienced managers with intimate knowledge of the firm as an idiosyncratic resource bundle are needed to properly coordinate expansion (Kor, 2003). However, the availability of experienced managers is limited and cannot rapidly be increased (Tan & Mahoney, 2005). Thus, there is a limit to the increase in product scope and the attendant information processing needs per period of time that a firm is able to successfully cope with (Penrose, 1959). When the pace of a firm's expansion into new product areas is too fast, i.e., too much product scope is added per period of time, the coordinating abilities of its managers are exceeded and firm profitability will suffer (Vermeulen & Barkema, 2002). Yet few studies have taken such a dynamic perspective and focused on increases in product scope over time instead of the total level of product diversity at a point in time. Moreover, we know little about how managers may affect the limit to the ability of a firm to increase its product scope.

⁵ This chapter is based on a preliminary version of: Hutzschenreuter, T., & Horstkotte, J., Performance effects of top management team demographic faultlines in the process of product diversification *Strategic Management Journal*, 34(6), 704-726.

Many of the empirical studies carried out to date have failed to sufficiently consider differences in the ability of managers to process information, let alone what influence those differences have on the relationship between scope expansion per time period and firm performance. As responsibility for coordinating increases in product scope lies with the top management team (TMT), we address these issues by empirically investigating how a TMT's composition affects the performance implications of product expansion. In this paper, we adopt Lau and Murnighan's (1998) term *faultline* referring to a conceptual divide that may separate a TMT into subgroups and thus to the structure of diversity within a team.

Demographic faultlines have been shown to affect information processing and team outcomes (e.g., Bezrukova, Jehn, Zanutto, & Thatcher, 2009; Gibson & Vermeulen, 2003; Lau & Murnighan, 2005; Li & Hambrick, 2005; Molleman, 2005; Thatcher, Jehn, & Zanutto, 2003). We argue that demographic faultlines within a TMT impact its ability to process information and coordinate diversification, and thereby moderate the relationship between added product scope per time period and profitability. Based on the theoretical work of Milliken and Martins (1996), Jackson, May, and Whitney (1995), and Pelled (1996), we distinguish between two types of faultlines depending on the faultlines' underlying characteristics. We argue that task-related faultlines, differences in educational background and in length of organizational tenure, have a positive effect on information processing, task conflict, and learning, and thus may help the team to successfully handle adding new products in a given time period resulting in improved firm performance. On the other hand, bio-demographic faultlines, differences in age and nationality, can lead to friction within the team that disrupts information processing and coordination and thus may have a negative moderating effect.

3.2. Theoretical background and hypotheses

3.2.1. The product expansion process: A dynamic view of diversification

The resource based view (RBV) conceptualizes the firm as a bundle of resources (e.g., Barney, 1991; Wernerfelt, 1984). Those resources are directed and coordinated by top

managers motivated to exploit perceived market opportunities (Castanias & Helfat, 1991, 2001). One of the ways this can be done is by diversifying into new product areas that make use of existing, but unused or underutilized resources and capabilities (Penrose, 1959; Tanriverdi & Venkatraman, 2005; Teece, 1980). Thus, diversification can be seen as a path dependent process by which a firm can increase profitability by building on existing resources and capabilities (Kim & Kogut, 1996). To date, most studies investigating the phenomenon of diversification have taken a static perspective in that they examine the performance implications of the level of diversification at a certain point in time, i.e., they consider a snapshot of a the diversity within a firm's product portfolio. This approach has yielded conflicting findings (Datta, Rajagopalan, & Rasheed, 1991; Martin & Sayrak, 2003; Palich *et al.*, 2000). Some researchers have questioned whether further insights can be gained from analyzing diversification from a static perspective. Gary (2005) writes that that line of inquiry is 'exhausted', and joins Ramanujam and Varadarajan (1989) in calling for dynamic theories and empirical studies that take into account the dynamic nature of diversification. We answer such calls by examining how the amount of added product scope per time period affects performance.

3.2.2. Increasing product scope - gain and strain

Adding new products allows a firm to exploit economies of scope by transferring resources and capabilities to new product areas (Hill, Hitt, & Hoskisson, 1992; Markides, 1992; Markides & Williamson, 1994; Teece, 1980). By increasing their scope, firms can increase and exploit market power and cross subsidize businesses (Caves, 1981; Montgomery, 1985; Scherer, 1980), and can gain flexibility by shifting resources, like capital and labor, between business areas (Hill & Hoskisson, 1987). However, product expansion also increases complexity that can strain managerial resources, especially those of the TMT being responsible for coordinating expansion. The TMT is in a unique position as the firm's internal and external information processing center to become aware of opportunities, and to make,

relate and implement expansion decisions (Mintzberg, 1971). A firm's TMT evaluates perceived opportunities based on firm resources and capabilities and determines in which product areas to invest, on the size of investments, and on entry modes (Tan & Mahoney, 2005). When a TMT decides to establish a subsidiary in a new product area, it has to deal with a new external environment and needs to come to terms with an unfamiliar product, in an industry and market that is also unknown. To that end, top managers need to address industry specific environmental elements and issues (Scott, 1992), and to gain new knowledge about the specific traits and business logics of the product areas added to the firm portfolio (Prahalad & Bettis, 1986). These are time-consuming and complex tasks, as are transferring, sometimes adapting, existing resources and routines and developing new ones to deal with specific requirements of a new product (Mishina *et al.*, 2004; Szulanski, 1996).

In addition, the TMT of the parent firm needs to embed the new subsidiary in the firm's internal environment, that is, undertake the task of incorporating it into the firm's network of already existing subsidiaries. As internal organizational systems tend to differ across industries (Finkelstein & Haleblian, 2002), entering new product areas may require the TMT to adapt or develop systems to reward, monitor, control, and coordinate employees (Markman & Gartner, 2002). The TMT may also need to make changes in firm structures in order to avoid administrative diseconomies and to control losses (Calvo & Wellisz, 1978; Hill & Hoskisson, 1987; Hoskisson, Hitt, & Hill, 1991). Thus, while every diversification step is associated with some degree of additional complexity, the amount of complexity is likely to differ and so the extent to which managerial resources will be taxed will vary.

The less an expansion step is related to the firm's existing business portfolio, the more complexity is added by that step and the more effort is required to deal with new market conditions and internal adaptations (Penrose, 1959). It is not simply the parent firm's primary industry that matters, but how much similarity there is between a new product and the most-closely related product already in its portfolio. Thus, an increase in product scope has to do

not only with adding new products, but also to the extent those products are related to ones with which the TMT is already familiar. The less similarity there is, the more information the TMT will need to process, making it more difficult and lengthier for the firm to reap the benefits of expansion (Kor & Leblebici, 2005; Park, 2003; Rumelt, 1982).

As firms usually engage in expansion programs that involve a series of steps, the amount of information that must be processed in a given period and correspondingly the amount of strain on managerial resources is caused by multiple steps. If undertaken in parallel they may simultaneously strain parent managers. Even if one step is taken at a time, the demand for information processing will build and 'the history of a firm's strategic moves will matter a great deal to the operational effectiveness of their subsequent moves' (Tan & Mahoney, 2005, p. 114). Thus, we do not investigate in this study diversification steps in isolation, but in combination. We argue that the information processing requirements with which a TMT must contend are driven by added product scope per period of time and implicit in that are the number of new products, and how closely they are related to the firm's existing product portfolio, of all of the product expansion steps in that period (Hutzschenreuter & Guenther, 2008).

3.2.3. Limits on the ability to handle added product scope

According to Penrose (1959, pp. 46, 52, 76) successful firm expansion requires managers with firm-specific, sometimes tacit, knowledge of resources, capabilities and routines, and such managers are most effective when they have experience working together. In their paper on Penrose's contribution to the RBV, Kor and Mahoney (2000) underline that the path-dependent nature of the diversification process makes experienced managers vitally important, and Kor (2003) later writes in looking at top management team competence, that managers with experience-based tacit knowledge of firm resources who know one another's skills, limitations and habits are able to build on the firm's idiosyncratic resources bundle by matching its material, human or intangible resources with new growth opportunities. This

kind of experience and teamwork is needed as well in coordinating diversification (Kor & Leblebici, 2005), as it requires a unique understanding of the specific relationships between headquarters and subsidiaries (Tan & Mahoney, 2005). Thus, the availability of experienced managers facilitates the coordination of interdependencies between subsidiaries and the integration of newly established subsidiaries. Taken together, a significant body of work indicates that the expansion process depends on the availability of unique managerial resources.

The availability of such resources is not unlimited, and they cannot readily be increased. Obviously, firm and team specific-experience is not available on the open market, but must be developed in-house. This is done through face-to-face interaction and in sharing team experiences (e.g., Hitt, Bierman, Shimizu, & Kochhar, 2001; Lane & Lubatkin, 1998). Not only does this take time, but in the interim it occupies the attention of managers already on the team (Kor & Leblebici, 2005). This means that if a firm diversifies too rapidly, that is, adds more product scope per period of time than it can properly absorb and develop new managerial resources required for handling the increased information processing requirements of that expanded scope, 'the efficiency of the firm will suffer' (Penrose, 1959, p.47). Dierickx and Cool (1989) add that firms that have a high level of added product scope per time period may suffer from time compression diseconomies. Eisenhardt and Martin (2000) emphasize that diversification requires learning and the creation of new knowledge, and that this takes time. Vermeulen and Barkema (2002) warn that diversification at too rapid a pace does not allow sufficient time for learning from previous expansion steps.

How do firms cope? Adding too many managers in a relatively short period dilutes the kind of inter-team experience required to properly manage the firm's diversification. On the other hand, taking on too few may mean that however properly developed and integrated they become, expansion into new product areas will exceed the team's combined cognitive abilities (Teece, 1980). In either case, the result will be over-extended managers, coordination

bottlenecks, less control, poorly-adapted structures and systems, and ultimately a decrease in firm profitability (Kor & Leblebici, 2005; Levitt et al., 1999). Managers may try to cope with excessive demand by reducing the amount of attention they give to individual tasks, or by so prioritizing tasks that they concentrate on some and neglect others (Gary, 2005). The result can be that they do not become sufficiently familiar with new product areas and industries and so make ill-informed expansion decisions which may prove hard to reverse (Tan, 2003).

Overburdened management teams may not only be unable to reap the benefits of increased product scope, but may neglect existing business operations, causing those too to suffer. Thus, too much diversification in a given time period will exceed managers' ability to properly handle the attendant increased information processing needs and this will again negatively affect firm profitability.

In summary, everything else constant, we would expect the amount of added product scope per time period to have a curvilinear effect on firm profitability such that an increase in the number of new products in that period will be positively related to firm profitability, but beyond a certain threshold, will have a negative effect on it.

Hypothesis 4: Everything else constant, the relationship between added product scope per time period and firm profitability is inverted U-shaped.

3.2.4. The influence of faultlines on the ability to handle added product scope

We have seen why firms are motivated to increase product scope, and that top managers need knowledge about their firm's resources and one another in order to identify appropriate targets and successfully coordinate the expansion process. We have also seen that the attendant increase in information processing stresses managerial resources, and what the negative consequences of that will be. Limits on the ability of firms to profitably diversify are universal. The impact of those limits hinges on the ability of a firm's TMT to properly handle the information processing demands associated with added scope. That is, how well do

members of the TMT gather, share, and attend to relevant information, then jointly analyze and integrate it into the diversification process (Gibson, 2001; Hinsz et al., 1997; van Knippenberg, De Dreu, & Homan, 2004). Information processing is negatively influenced by stereotypic and affective perceptions of fellow team members in that they may cause a biased opinion of the value of the information they share (Brewer, 1979; Tajfel, 1982). This may well result in emotional conflict, diminished group cohesion, and diversion of managerial attention away from the task at hand (Jehn, 1995).

A substantial body of research shows that diversity among the members of work groups and management teams is a central factor affecting information processing and eventually performance (e.g., Barsade, Ward, Turner, & Sonnenfeld, 2000; Carpenter, 2002; Carpenter et al., 2004; Hambrick & Mason, 1984; Jehn, 1995; Pelled, Eisenhardt, & Xin, 1999). Broadly defined, diversity is the degree to which members in a team differ from one another (Jackson, Joshi, & Erhardt, 2003). Research that considers diversity within TMTs has traditionally focused on diversity indexes based on single characteristics, that is, they have examined the dispersion of individual members along one characteristic independently from others (e.g., see Joshi & Roh, 2009 for an overview). However, individuals have multiple attributes on which they may differ and the diversity along multiple characteristics may interact and jointly influence team outcomes (see Harrison & Klein, 2007). Yet how can we consider diversity on multiple characteristics and their interactions within a team? Lau and Murnighan (1998) introduced a group faultline perspective. Faultlines indicate the separation of a team into subgroups based on one or more characteristics. For instance, a gender faultline yields a male subgroup and a female subgroup. If one were to consider multiple characteristics of group members based on their profiles, the faultlines would be stronger and more salient the higher the alignment of differences between members (Thatcher *et al.*, 2003). For example, if all of the male members of a team were over 60 years of age and German and the female members were all young and from outside Germany, the resultant two subgroups would be made up of

persons whose characteristics align perfectly, i.e., the faultline dividing the two groups would be strong. In contrast, if the team had over and under 60 year-olds, males and females, Germans and non-Germans in many different combinations, the distinctions would be less clear-cut, thus the faultline strength would be weaker. While faultline strength indicates the degree to which multiple characteristics divide a team in the same way, strong faultlines are also related to variety within the team as they imply heterogeneity across subgroups (Harrison & Klein, 2007).

The faultline perspective is conceptually very different from taking into account multiple dimensions 'by adding or averaging diversity indexes' of single characteristics to 'assess overall within-unit diversity', in part because measuring diversity in that way does not take into account the interactive effect of different characteristics (Harrison & Klein, 2007, p. 1215). Thus, overall within-unit diversity, per definition, does not reflect the alignment of differences within a team. As the examples above demonstrate, a measure of overall within-unit diversity may be equally high, independent of whether a team is clearly separated into distinct subgroups or not. As a result, Harrison and Klein (2007, p. 1216) conclude that 'the construct of faultline strength is far more precise and focused'. Bezrukova, Thatcher and Jehn (2007, p.58) analyze several theories of group composition and reason that the group faultlines concept, which they label the 'alignment approach', provides 'a more comprehensive explanation of group processes and performance' than diversity indexes based on single characteristics. This can be seen clearly in Lau and Murnighan's (2005) findings that show that considerably more of the variance in team members' evaluation of team processes and of their feelings towards each other can be explained by ethnicity and gender-based faultlines than by ethnic and gender-related differences considered independently as single attributes. Several researchers have also explicitly linked faultline strength to team information processing capabilities (e.g., Bezrukova et al., 2009; Dahlin, Weingart, & Hinds, 2005; Gibson & Vermeulen, 2003). For all of these reasons, we believe that the concept of

group faultlines is particularly suited to our study of the limits of the ability of firms to handle the increased demand for information processing associated with increasing product scope per time period.

While the faultline concept holds some promise in our context, its application to research on team effectiveness has been relatively limited (Mathieu, Maynard, Rapp, & Gilson, 2008), especially in large-scale quantitative research (Li & Hambrick, 2005), and the results have been mixed (Joshi & Roh, 2009; van Knippenberg & Schippers, 2007). Indeed, while several studies have found that faultlines exert negative effects on team functionality (e.g., Barkema & Shvyrkov, 2007; Li & Hambrick, 2005; Molleman, 2005), others have found their influence to be positive, with some even suggesting that faultlines may serve as ‘healthy divides’ (Bezrukova et al., 2009; Cramton & Hinds, 2005; Gibson & Vermeulen, 2003; Thatcher et al., 2003). One possible explanation for such seemingly contradictory results may lie in their operationalization. Many researchers have measured a single faultline based on many different kinds of characteristics (e.g., Thatcher *et al.*, 2003). However, the more kinds of characteristics used, the more difficult it is to determine whether an observed effect is due to one, some, or all of them in combination (van Knippenberg, Dawson, West, & Homan, 2011). In addition to kinds of characteristics, different types of characteristics, i.e., task-related and bio-demographic characteristics, have been associated with different effects (e.g., Jackson *et al.*, 1995; Milliken & Martins, 1996; Pelled, 1996). These distinctions have been supported by recent meta-analyses which show diverging effects of task-related and bio-demographic diversity on team performance (Bell, Villado, Lukasik, Belau, & Briggs, 2011; Horwitz & Horwitz, 2007; Joshi & Roh, 2009). Some studies do not combine different types of characteristics in a single faultline measure as we described above, but do explicitly distinguish between different types of faultlines (e.g., Bezrukova *et al.*, 2009; Molleman, 2005). Such an approach is in line with Lau and Murnighan’s (1998) contention that multiple faultlines may exist within a single team, and also in keeping with social identity theories

according to which managers may see themselves as members of multiple groups at the same time (Amiot, de la Sablonniere, Terry, & Smith, 2007; Tajfel & Turner, 1979). In this study we look at two types of TMT faultlines, task-related and bio-demographic faultlines.

3.2.5. The influence of task-related faultlines

Task-related faultlines are based on acquired characteristics that serve as indicators of knowledge and perspectives relevant to particular tasks (e.g., Hambrick & Mason, 1984; Jackson *et al.*, 1995). The task-relatedness of a characteristic depends on the task at hand. In this study we do not focus on all of the responsibilities of TMTs (e.g., Mintzberg, 1973), but specifically on the task of expanding into new product areas. Two characteristics that we believe are germane to the task of increasing product scope are organizational tenure and educational background. As we have seen, entering new product areas is a path dependent process that builds on existing resources (Penrose, 1959). Top managers who have been with the firm for a long time will have garnered through in-house experience explicit and tacit knowledge of the firm's unique combination of resources (Kor, 2003). On the other hand, a negative aspect of long tenure is that with time individuals can become so committed to a certain course of action that their minds are closed to new possibilities and external information (Finkelstein & Hambrick, 1990; Hambrick, 1991; Miller, 1991). In fact, one argument in favor of naming top managers from outside the firm or who are relatively new to it is that they can bring extraorganizational knowledge and perspectives that may help broaden the TMT's identification of profitable new product areas (e.g., Carpenter & Fredrickson, 2001; Kor *et al.*, 2007; Milliken & Martins, 1996).

The second task-related characteristic we mentioned above is educational background (e.g., Barkema & Shvyrkov, 2007; van Knippenberg *et al.*, 2004; Williams & O'Reilly III, 1998). The formal education of top managers, including fields of study and kinds of degrees earned, not only plays an important part in shaping their professional knowledge, skills, and abilities, but also their evaluation of new product opportunities (Amason, Shrader, & Tompson, 2006;

Carpenter, 2002; Hitt & Tyler, 1991; Wiersema & Bantel, 1992). For example, managers who have studied engineering or science may emphasize the technological or manufacturing aspects of product expansion, while managers who studied law may look at the legal implications of taking on a particular product, and managers who studied business administration may focus on organizational implications.

When task-related characteristics of some members of a TMT align in the same or similar way, a task-related subgroup is likely to emerge within the team. By definition, team members within a subgroup share similar task-related backgrounds and thus are likely to have similar knowledge, perspectives, and mental models (Finkelstein et al., 2009). At the same time, there is variation in backgrounds across subgroups, and this means that a broader range of information will be available to the team than were it to be made up of members with entirely homogeneous backgrounds. Yet, it is not the availability of knowledge and perspectives per se that is beneficial in performing a task. For the benefits of diversity to materialize diverse information actually need to be processed and considered in decision making (Klein & Harrison, 2007; van Knippenberg et al., 2004). Strong task-related faultlines may contribute to information processing simply because they signal like mindedness. Stasser, Taylor and Hanna (1989) found that, especially in small groups, information is shared more freely when members of the group have reason to believe that at least one other member holds the same point of view. Thus, team members tend to express their opinion more freely in discussions if they believe that they have natural allies in the members of their subgroup who will be supportive, perhaps who can even be counted on to help win over others on the team (Gibson & Vermeulen, 2003). It is not possible for a TMT to attend to and give equal consideration to every idea and piece of information brought up (Klein & Harrison, 2007), as attending to too many different viewpoints leads to information overload (Barkema & Shvyrkov, 2007; Dahlin *et al.*, 2005). The attention of the team is focused on selected issues and the more members that are likely to share and support an idea, the more its value is validated (Hinsz *et al.*, 1997).

Thus, task-related information is less likely to be overlooked if held by members of a subgroup within a TMT.

Moreover, it has been suggested that the increased salience of task-related differences in strong faultline settings may also highlight the potential associated with knowledge diversity (Phillips & Loyd, 2006; Phillips, Mannix, Neale, & Gruenfeld, 2004). When TMT members recognize and respect the expertise and contributions of fellow team members who are not in their own subgroup, there will be a more positive attitude toward task-related diversity overall. As a result, the team is more likely to value and use the diverse knowledge and competencies of all its members in the product expansion process (Bezrukova *et al.*, 2009; Cramton & Hinds, 2005; Homan, Van Knippenberg, van Kleef, & De Dreu, 2007; Molleman, 2005).

Strong task-related faultlines are reflective of marked differences in task-related knowledge and perspectives and may encourage discussion within the team. While there may be no natural meeting of the minds between subgroups, this does not mean that strong faultlines are necessarily negative. Indeed, task conflict, which specifically reflects disagreements between members of different subgroups on task issues, can positively influence information processing (Amason, 1996; Pelled, 1996; Pelled *et al.*, 1999). When members of a team come at a task from different directions more information gathering is done, more possibilities end up being explored, and more strategies considered. To integrate different perspectives team members need to reevaluate their own position, comprehend opposing arguments, and develop a deeper understanding of the expansion decision, possible issues and alternative solutions. Debate, constructive criticism, and challenging other members' opinions can play a valuable part in hammering out joint decisions. In line, task-related conflict has been shown to be positively associated with a TMT's decision-making quality and cognitive task performance (e.g., Certo, Lester, Dalton, & Dalton, 2006; Olson, Bao, & Parayitam, 2007; Schweiger, Sandberg, & Rechner, 1989).

Task-related faultlines are especially beneficial in coping with the information processing requirements associated with highly complex tasks, such as managing product diversification (Jehn, Northcraft, & Neale, 1999). While it may not be necessary when performing relatively simple or routine tasks to have an exchange of opinions or engage in debate (Jehn, 1995), performing complex tasks, especially those with high uncertainty, may call for extensive information processing and constructive debate centered on diverse perspectives, multiple issues, and alternative solutions. Taken together, we argue that TMTs with strong task-related faultlines will enjoy information processing benefits and thus be better able to cope with the increased demand for information processing associated with the complex task of expansion into new product areas. Following this logic, we hypothesize:

Hypothesis 5: Everything else constant, task-related faultline strength within TMTs will positively moderate the relationship between added product scope per time period and firm profitability.

3.2.6. The influence of bio-demographic faultlines

As we have said, faultline strength has an influence on information processing and ultimately on the performance of TMTs and firms. While strong task-related faultlines are beneficial in some circumstances, research suggests that the separation of a team into subgroups based on bio-demographic characteristics can have negative effects (e.g., Earley & Mosakowski, 2000; Homan et al., 2008; Jehn & Bezrukova, 2010; Lau & Murnighan, 2005; Molleman, 2005). Bio-demographic characteristics are innate attributes that are immediately cognitively accessible, pervasive, and hardly alterable (Milliken & Martins, 1996). For the most part researchers have considered age, gender, and nationality/ethnicity (Joshi & Roh, 2009; Williams & O'Reilly III, 1998). Due to their high visibility, these characteristics are frequently noticed and considered in many different situations over a manager's lifetime (Bell et al., 2011; Van Knippenberg & Dijksterhuis, 2000). Social psychology research has shown

that managers' perceptions of other team members and the cognitive and affective responses towards them are shaped by the latter's bio-demographic characteristics (Fiske & Neuberg, 1990). Most importantly, they are often associated with well learned and widely-held stereotypic beliefs. When these general social stereotypes are activated, team members would perceive other members and use and weigh the information they contribute with a bias (Tajfel, 1982). Activation is more likely in strong bio-demographic faultline settings. The alignment of multiple bio-demographic characteristics in the same way increases the salience of differences between members (Lau & Murnighan, 1998) and triggers multiple stereotypes at the same time. As a result, strong bio-demographic faultlines intensify biased perceptions of other TMT members and their contributions which negatively influences information exchange and processing (Falkenberg, 1990; van Knippenberg et al., 2004).

Moreover, bio-demographic differences may trigger affective responses. As individuals strive for a positive self image, they render stereotypes associated with own bio-demographic characteristics overly positive which may lead to a halo-effect. In contrast, stereotypes concerning dissimilarities are often negatively afflicted (Judd & Park, 1993; Posthuma & Campion, 2009; Tajfel & Turner, 1986; Williams, 2001). The intensity of positive or negative affect about others can be diluted if multiple characteristics are cross-cutting, that is, if some of the characteristics of the members of different subgroups are similar and others dissimilar (e.g., Hogg & Terry, 2000). In a strong faultline setting, however, characteristics are in alignment, affection reinforced, and subgroup separations distinct and salient. In that case feelings of mistrust and hostility toward members of other subgroups can develop and escalate (Li & Hambrick, 2005; Pearsall, Ellis, & Evans, 2008), to the point of emotional conflict, that is, disagreements over personal issues that are unrelated to the task (e.g., Amason, 1996; Jehn, 1997; Pinkley, 1990). When the situation gets to this point it diverts attention away from task-related issues (Jehn, 1995), making it particularly difficult to process complex information (Simons & Peterson, 2000). Members of the team become less willing to share information at

large, and intergroup information exchange diminishes (Sawyer, Houlette, & Yeagley, 2006).

In such circumstances processing of new or particularly complex information may be hindered by increased stress and anxiety associated with emotional conflict (Simons & Peterson, 2000).

In summary, a strong bio-demographic faultline in a TMT can trigger stereotyping that increases bias and can lead to emotional conflict that taxes the limited attention of the TMT and undermines the sharing of information within the team. Consequently, strong bio-demographic faultlines have a negative influence on a TMT's ability to successfully cope with the increased demand for information processing arising from an increase in product scope in a given time period. Thus, we hypothesize:

Hypothesis 6: Everything else constant, bio-demographic faultline strength within TMTs will negatively moderate the relationship between added product scope per time period and firm profitability.

3.3. Methods

3.3.1. Sample and data

We derived the sample for our analysis from the HDAX index of the German stock exchange. This index is comprised of the companies with the highest market capitalization in Germany. Following Vermeulen and Barkema (2002), we excluded financial institutions, real estate firms, retailers, purely financial holdings, and cross-listed non German firms. This resulted in a list of 135 companies that had been listed on the HDAX since its inception. We then collected data on the top management teams and the expansion steps made by these firms from 1985 to 2007. Since we analyze the process of firm expansion we require complete data for a minimum number of consecutive years per firm. Through the elaborate process outlined below, we were able to gather sufficient data for the entire set of variables for at least six consecutive years for 61 firms. Fourteen of these had their primary industry code in basic

materials and utilities, eight in consumer goods and services, four in pharmaceuticals and healthcare, nine in information technology and telecommunications, eleven in manufacturing of machinery and equipment, five in automotive, and ten in other industrial industries. Their average revenues were €10.05 bn. (median: €3.58 bn.) and their average number of employees was 47,336 (median: 17,448).

From the firms' annual reports we obtained the list of all subsidiaries at the start of our period of analysis, and identified all new subsidiaries established as well as those divested during the subsequent 23 years. As a result, we can determine the complete portfolio of subsidiaries for the firms for each year they are included in our panel. To exclude purely financial investments, we included newly established subsidiaries only if the parent firm's stake was at least 50 percent after the investment and if the firm had had no stake, or a minority one, before. We chose this time-consuming approach since data on expansion steps are not available from commercial databases.

We also collected demographic data on the firms' top management teams. Demographic data may serve as reasonable indicator for psychological constructs and information processing of top managers and teams (Hambrick & Mason, 1984). The use of such data is clear-cut and objective (Michel & Hambrick, 1992) and very common in management research (e.g., Barkema & Shvyrykov, 2007; Kor, 2006). The German governance system is two-tiered, with a management board (Vorstand) and a separate supervisory board. Members of the Vorstand represent the firm and are legally and collectively responsible for managing the firm with the CEO acting as *primus inter pares*. Hence, we equate Vorstand with top management team.

From the firms' annual reports we obtained the list of all executive directors that were on the Vorstand for the respective years of our investigation and gathered demographic data as well as data on the career path of these managers. Sources for these data were Hübner's Who is Who, Lexis Nexis online databases, Sutter's International Red Series Who's Who in Germany, Wer ist Wer? Das Deutsche Who's Who, IBP Who's Who in Germany, Who's

Who in European Business and Industry, and the Munzinger online archive. We also searched the archives and databases of well-respected newspapers and magazines, including the Frankfurter Allgemeine Zeitung, Der Spiegel, BusinessWeek's Executive Profile section, and ManagerMagazin. We contacted firms and executives directly to close any remaining data gaps and to check the reliability of our data. Firm-year observations were excluded from the analysis if TMT related data were unavailable for more than one quarter of the top executives of a respective team (cf. Jensen & Zajac, 2004; Westphal & Zajac, 1997).

This may have led to a survivorship bias if the firms which were excluded were on average less successful. To avoid such a bias, we included non-surviving firms in our sample.

Following Carpenter and Fredrickson (2001), we also compared the firms we included to those we excluded using a means test based on data collected from Thomson Reuters Datastream. This test revealed that the firms included did not perform significantly better than those excluded, and hence that survivorship does not bias our results and that our sample does not suffer from sample selection bias (Allison, 2002; Jensen & Zajac, 2004; Little & Rubin, 2002). We used an additional statistical method to determine whether sample selection is an issue in our analysis. Wooldridge (2002) argues that in a fixed effects context, sample selection poses a problem only when selection is related to the idiosyncratic error term in the model. We tested this assumption by performing a test suggested by Nijman and Verbeek (1992) and applied by Berrone and Gomez-Mejia (2009) for example. This test lets us conclude that sample selection does not lead to bias (Wooldridge, 2002).

3.3.2. Variables

We empirically study how product expansion processes affect firm performance and how this relationship is moderated by faultlines in top management teams. Accordingly, we measure managerial and growth related characteristics in a given time period and analyze their effect on firm performance at the end of that period. Independent and control variables are calculated as average values over the respective period unless specified otherwise. In line with

Weinzimmer, Nystrom, and Freeman (1998), we chose a time frame for an expansion period of five years since strategic planning time horizons are typically that long (Grant, 2003).

3.3.2.1. Dependent variable

Our dependent variable is *firm performance*. We measured firm performance using the firms' return on assets (ROA) (Hitt et al., 1997; Venkatraman & Ramanujam, 1986). We calculated the three-year moving average in order to reduce effects of balance sheet policy (Carpenter & Sanders, 2002). ROA is commonly used in diversification research (Gomez-Mejia & Palich, 1997; Kim et al., 1989) and is particularly appropriate in our context as it reflects the relative efficiency of the use of a firm's assets and the synergies gained through expansion (Kim et al., 1989). In contrast to other accounting based measures, e.g., return on equity, ROA has the advantage that it controls for differences in financial structure (Bettis & Mahajan, 1985). We chose an accounting over a market-based measure of performance because our model predicts realized performance, while market-based measures reflect shareholder expectations about the future.

3.3.2.2. Independent variables

We argue that expansion into new industries or product segments is a significant source of complexity. Our measure of *added product scope per time period* captures the number and relatedness of the firm's expansion steps by the number and the products of newly created subsidiaries. We compare the industries the firm enters with those in which it is active at the beginning of the year. Expansion into less related industries is associated with higher levels of complexity. In line with Hutzschenreuter and Guenther (2008), we measure product relatedness based on four digit industry codes and compare the industry code of an expansion step to that industry code of the firm's business portfolio that it is closest to before expansion. Following the approach of Halebian and Finkelstein (1999), we applied a weighting scheme to assess the degree of relatedness between the two industry codes based on discrete values. We assumed product scope to be the same when two industries share the same four-digit

industry code. No scope is *added* if the firm adds a product within an industry code in which it is already active. Consequently, we assigned a zero in such cases. A three-digit level match results in a diversification score of one, a two-digit level match is coded two, and a one-digit level match is coded three. We assigned a four if there was no match at all. In this way the score is reflective of the product scope that is actually *added* by a particular expansion step and the associated complexity. We assigned scores for all expansion steps in the five-year period. Because firms had more time to cope with the complexity of an expansion step that took place at the beginning of our five year expansion period, we discounted the product diversification scores of expansion steps taken in earlier years of the expansion period. The discount is 70% for the first year and increases linearly to 100% in the last year. Finally we totalled the scores for all of the steps undertaken in a five year expansion period to yield a measure that reflects the level of added product scope to which the firm was exposed during the respective period. Since we assume a curvilinear relationship, we included this total score and its squared term.

Our TMT *faultline strength* variable does not focus on a *single* demographic attribute but takes into consideration how multiple demographic characteristics and their alignment may divide a team into subgroups. We calculated task-related faultline strength along the following characteristics: organizational tenure, measured in years; educational specialization, coded using Hambrick, Cho, and Chen's (1996) categories; and level of formal education, measured using the state-approved degrees in the German educational system (Kultusministerkonferenz, 2005). We measured bio-demographic faultline strength by age and nationality. We coded nationality as a dichotomous variable, German or non-German, employing an approach widely used in upper echelons research (e.g., Hambrick, Cho, & Ming-Jer, 1996). We considered the possibility of using gender as a bio-demographic attribute, but decided against doing this as the number of women on the TMTs of our sample firms is negligible.

We measured task-related and bio-demographic faultline strength using the algorithm developed by Thatcher et al. (2003), derived from multivariate statistical clustering analysis (e.g., Jobson, 1992; Sharma, 1996), and applied by other researchers studying faultlines (e.g., Bezrukova *et al.*, 2009; Molleman, 2005). As we have discussed, task-related and bio-demographic faultlines may divide a TMT into two subgroups and there are several possible ways in which that might be done. For each possible pair of subgroupings, we calculated the strength of the respective faultlines that divide them by measuring the ratio of the variance of the relevant characteristics between the subgroups over the total variance in the entire team⁶. The ratio can take on values between zero and one with a higher value indicating a stronger faultline. The maximum value over all possible splits is our variable faultline strength. We followed prior empirical research and considered TMTs with more than three members in our analysis in line with the theoretical logic of faultlines which divide groups into two subgroups comprised of at least two members, (e.g., Bezrukova *et al.*, 2009; Goodman, 1986; Lau & Murnighan, 2005).

3.3.2.3. Control variables

The variable TMT *faultline distance* measures the difference between subgroups (e.g., Molleman, 2005; Thatcher, Bezrukova, & Jehn, 2004). We include the variables ‘task-related faultline distance’ and ‘bio-demographic faultline distance’ as control variables, each of which is measured along the strongest faultline split by calculating the Euclidean distance between the average values of the considered attributes of the potential subgroups (see Bezrukova *et al.*, 2009). We also control for *TMT size* as a way to capture the quantity of managerial resources. Following Haleblan and Finkelstein (1993), we measure TMT size using the number of executives on the firm’s Vorstand, which we obtained from the annual reports of the firms in our sample.

⁶ For an excellent and detailed explanation and discussion of the measurement of faultlines see Thatcher et al. (2003).

In addition to the complexity arising from expansion into new product areas, complexity also arises from expansion into new geographic areas. We controlled for this effect by including the variable *internationalization steps*, i.e., the number of expansion steps in the period of analysis that were undertaken outside the existing geographic scope of the firm. We include as well the variable *cultural diversity*. It reflects the complexity of handling a multinational portfolio of business activities at a certain point in time. We computed cultural diversity by calculating the sum of the cultural distances across all dyads of a firm's network of subsidiaries divided by the total number of pairs (Hutzschenreuter & Voll, 2008). In addition, we added the squared term of cultural diversity to control for curvilinear effects (e.g., Hitt *et al.*, 1997). By analogy, we controlled for a possible effect of *product diversity* on performance (Chatterjee & Wernerfelt, 1991; Palich *et al.*, 2000) as the breadth of the business areas in which a firm is active at a given point in time increases the complexity with which managers must cope. The Berry-Herfindahl index (Berry, 1971), and the entropy measure described by Palepu (1985) are often used by researchers (Hitt *et al.*, 1997; Mahoney, 1992; Tallman & Li, 1996). Both measures led to virtually identical results so we used the Berry-index (Berry, 1971).

The resources that must be dedicated to expanding need not be borne alone, but may be shared through equity alliances with partner firms. In this way expanding firms may tap location-specific knowledge and also benefit from relationships developed by partners (Hennart, 1988). At the same time such partnerships need to be coordinated and controlled and this increases the strain on managerial resources (Chang & Rosenzweig, 2001). We controlled for this effect by including the variable *level of ownership* which we calculated as the average percentage of ownership of expansion steps during the period of expansion. Those expansion steps might be undertaken through acquisitions or greenfield investments.

Acquiring an existing resource bundle may pose different challenges for the firm than building a subsidiary from scratch (Hennart, 2009). Thus, the mode of entry into product areas

may influence expansion performance. To control for this we calculated the variable *acquisition* as a percentage of the expansion steps made by acquisitions during the period of analysis. A firm that held a minority stake in a subsidiary prior to making an investment that resulted in a majority stake may have acquired valuable knowledge about the subsidiary. As having this kind of knowledge could potentially affect the performance of a subsequent expansion step, we calculated the variable *minority* as a percentage of the steps undertaken where the firm already held a minority stake.

Prior research has found financial slack to be a significant factor in explaining expansions (Weinzimmer *et al.*, 1998). We entered the variable *slack* to measure this effect. Our proxy for financial slack is the firm's current ratio, calculated with data from Thomson Reuters Datastream (e.g., Cho & Hambrick, 2006; Herold, Jayaraman, & Narayanaswamy, 2006). Finally, we included *firm size* as a control variable since it affects a TMT's information processing requirements (Henderson & Fredrickson, 1996). We measured firm size as natural logarithm of firm sales (e.g., Carpenter & Sanders, 2004).

3.4. Analysis

The descriptive statistics in Table 3-1 show mean values, standard deviations, and correlations among variables.

We tested for multicollinearity by analyzing the correlation coefficients. However, 'there is no definite criterion for the level of correlation that constitutes a serious multicollinearity problem. The general rule of thumb is that it should not exceed 0.75.' (Tsui, Ashford, St. Clair, & Xin, 1995). None of the correlation coefficients in Table 3-1 exceeds 0.75 indicating that multicollinearity is not a problem. However, correlation between firm size and TMT size is rather high, an observation also made by Barkema and Shvyrkov (2007). Carpenter, Geletkanycz and Sanders (2004) argue that it is imperative to include TMT size as control variable when studying diversity in TMTs. Thus, to lay to rest any concerns that our results might be driven by multicollinearity we also tested our models excluding firm size as control

Table 3-1: Descriptive statistics for analysis of product expansion

	mean	s.d.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Return on assets	0.081	0.075	1.00														
2. Added product scope per time period	4.794	5.759	0.00	1.00													
3. Task-related faultline strength	0.540	0.114	0.04	-0.08	1.00												
4. Bio-demographic faultline strength	0.679	0.108	0.03	0.00	0.07	1.00											
5. Task-related faultline distance	2.530	5.753	-0.02	-0.06	-0.09	0.03	1.00										
6. Bio-demographic faultline distance	1.006	0.285	-0.11 *	0.00	0.12 *	0.10 *	-0.07	1.00									
7. TMT size	6.567	1.973	0.02	0.02	-0.29 ***	-0.05	-0.03	0.00	1.00								
8. Cultural diversity	0.759	0.296	0.27 ***	-0.11 *	0.12 *	-0.14 **	0.05	0.08	0.06	1.00							
9. Internationalization steps	4.676	4.335	0.24 ***	0.05	0.08	0.03	-0.04	0.03	-0.03	0.25 ***	1.00						
10. Product diversity	0.689	0.211	-0.10	0.09	-0.27 ***	-0.10	0.09	-0.28 ***	0.39 ***	-0.29 ***	-0.24 ***	1.00					
11. Level of ownership	0.907	0.070	0.12 *	0.06	0.20 ***	0.04	-0.08	0.08	-0.03	0.13 *	0.23 ***	-0.11 *	1.00				
12. Acquisition	0.449	0.263	0.18 ***	0.14 **	-0.09	0.01	0.09	0.00	0.05	0.06	-0.08	0.17 ***	-0.07	1.00			
13. Minority	0.043	0.073	0.00	-0.09	-0.10 *	0.09	-0.04	-0.20 ***	-0.05	-0.14 **	-0.17 **	0.14 **	-0.32 ***	0.13 *	1.00		
14. Slack	1.932	0.881	0.32 ***	-0.03	0.06	0.00	0.03	-0.11 *	-0.01	0.13 *	0.08	-0.02	0.05	-0.02	-0.07	1.00	
15. Firm size ^a	15.552	1.507	0.05	-0.02	-0.16 **	-0.04	-0.05	-0.09	0.70 ***	-0.01	-0.13 *	0.39 ***	-0.03	0.11 *	0.01	-0.32 ***	1.00

*** p<0.001; ** p<0.01; * p<0.05

Mean values and standard deviations are for non-centered variables; centering has no impact on standard errors and correlation coefficients.

Mean values and standard deviations of variable 2, 9, 11, 12, and 13 refer to the entire period. Values of other variables are averages.

^a logarithm of sales in tsd. €

variable. Results were virtually identical. Moreover, variance inflation factors are considerably lower than the generally accepted critical value of 10 for all variables (Tan & Tan, 2005). This further indicates that our results are not driven by multicollinearity. To mitigate possible collinearity specific to interaction terms, we mean-centered all variables that were used to test interaction effects (Aiken & West, 1991).

A Hausman test suggested using a fixed firm effects model (Wooldridge, 2002). Such models have the advantage of controlling for constant unobserved heterogeneity across firms that may explain differences in the dependent variable (e.g., Greene, 2008). Consequently, they are preferred when analyzing panel data (Cannella et al., 2008). They are considered to be conservative since only changes in independent variables within a particular firm may result in significant effects. Hence, they reduce the risk of getting spurious results due to problematic error terms in the context of cross sectional studies.

Following Greene (2008), we tested for heteroskedasticity by calculating a modified Wald statistic for groupwise heteroskedasticity in fixed effects regression models which indicated that the error variance is specific to the cross sectional units. Furthermore a test for autocorrelation in panel data (Drukker, 2003; Wooldridge, 2002) suggests that autocorrelation may affect our results. There are two approaches for dealing with these issues, depending on the specific panel structure (e.g., Beck & Katz, 1995; Hansen, 2007). Certo and Semadeni (2006) suggest using ordinary least squares fixed effects method with Huber–White corrected standard errors (White, 1980), an approach used by Anderson and Reeb (2004) for example. Kristensen and Wawro (2007) and Kezdi (2003) suggest using the Arellano estimator in fixed effect models (Arellano, 1987) which is robust to arbitrary heteroskedasticity and autocorrelation and has been applied by Delmas, Russo, and Montes-Sancho (2007) and McCann and Vroom (2010). We used both approaches, and obtained virtually identical results. Table 3-2 displays the results with Arellano robust standard errors. We controlled for

contemporaneous correlation (Certo & Semadeni, 2006) and for potential time effects (Greene, 2008) by using time dummy variables.

3.5. Results

Table 3-2 shows the results from the regression analysis used to test our hypotheses. Our dependent variable is firm performance measured as a three-year moving average of return on assets at the end of the period of expansion. Model 1 shows the results of regressing firm performance on control variables only. In model 2 we include the variable *added product scope in a given time period*. Model 3, the full model, is used to test our hypotheses. It includes all of our control and independent variables and so is less likely than the other models to suffer from any omitted variables bias (Echambadi et al., 2006).

The underlying relationship of our study is the link between added product scope per time period and firm performance at the end of that particular period. In Hypothesis 4 we proposed an inverted U-shaped relationship and thus included both the simple and squared term of added product scope. Our results in Model 3 show that the coefficient of the linear term is significantly positive and that the squared term is significantly negative. This corroborates our hypothesized curvilinear relationship between added product scope per time period and performance. Our results are also robust to other operationalizations of added product scope, specifically, those based on the relatedness measures of Fan and Lang (2000) and Robins and Wiersema (1995). In Hypothesis 5 we argued that task-related faultline strength positively moderates the relationship between added product scope and firm performance. This hypothesis is supported since Model 3 shows that the coefficient of the interaction of added product scope per time period and task-related faultline strength is positive and significant. To allow for a better interpretation of the interaction effect we plotted the interaction (Figure 3-1) and computed post hoc statistical tests based on the analysis with Arellano robust standard errors (Aiken & West, 1991).

Table 3-2: Results of fixed effects regression of firm performance on added product scope with Arellano robust standard errors^a

	Model 1		Model 2		Model 3	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Added product scope per time period			0.002 (0.001) *		0.002 (0.001) *	
Added product scope per time period squared ^b			-0.073 (0.030) *		-0.077 (0.035) *	
Added product scope per time period x Task-related faultline strength					0.008 (0.005) +	
Added product scope per time period x Bio-demographic faultline strength					-0.011 (0.004) *	
Task-related faultline strength	-0.057 (0.057)		-0.071 (0.055)		-0.057 (0.055)	
Bio-demographic faultline strength	-0.060 (0.037)		-0.046 (0.037)		-0.065 (0.035) +	
Task-related faultline distance ^b	0.415 (0.489)		0.449 (0.479)		0.778 (0.449) +	
Bio-demographic faultline distance	-0.009 (0.013)		-0.016 (0.013)		-0.012 (0.012)	
TMT size	-0.004 (0.003) +		-0.005 (0.003) +		-0.005 (0.003) +	
Cultural diversity	0.076 (0.053)		0.074 (0.048)		0.090 (0.050) +	
Cultural diversity squared	0.111 (0.069)		0.091 (0.064)		0.134 (0.062) *	
Internationalization steps	-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001) +	
Product diversity	-0.109 (0.136)		-0.148 (0.140)		-0.140 (0.130)	
Product diversity squared	0.055 (0.292)		-0.021 (0.302)		0.027 (0.286)	
Level of ownership	0.068 (0.038) +		0.064 (0.037) +		0.073 (0.037) *	
Acquisition	0.002 (0.003)		0.001 (0.003)		0.000 (0.003)	
Minority	0.064 (0.032) *		0.068 (0.033) *		0.073 (0.031) *	
Slack	0.010 (0.011)		0.011 (0.011)		0.012 (0.011)	
Firm size	0.012 (0.013)		0.012 (0.013)		0.009 (0.014)	
R ²	0.127		0.143		0.161	
F	53.150 ***		36.700 ***		30.300 ***	

N=376

*** p<0.001; ** p<0.01; * p<0.05; + p<0.1

^a Dummies are omitted.

^b Parameter estimates and standard errors are multiplied by 10³.

First, we calculated the base case using the mean value of all relevant variables. In this case, with a mean value of additional product scope of 4.79, the simple slope is 0.0024 ($p < 0.05$). As the simple slope of the regression line is conditional on the interaction term, we analyzed how changes in task-related faultline strength affect the slope. With this in mind we calculated as well the simple slopes for a high level of task-related faultline strength (mean value plus one standard deviation) and a low level (mean value minus one standard deviation) (for a similar approach see Zhang & Li, 2010; Zhou & Wu, 2010). Our results reveal that the simple slope is 0.0033 ($p < 0.05$) for a high and 0.0014 ($p > 0.05$) for a low level of task-related faultline strength. This result illustrates the positive interactive effect of task-related faultline strength on the relationship between additional product scope and firm profitability. If task-related faultline strength is lower by one standard deviation compared to the average team the simple slope is still positive at the mean value of additional product scope. The simple slope is zero at an additional product scope of 9.32 above the mean with the curvilinear relationship between additional product scope and performance reaching its maximum. At values higher than this, performance starts to diminish.

Consistent with Hypothesis 6, the coefficient of the interaction between bio-demographic faultline strength and added product scope is negative (-0.011) and significant ($p < 0.05$) in Model 3. Using the mean value of all other variables, we estimated the effect of added product scope per time period on firm performance for two levels of bio-demographic faultline strength – a high level (one s.d. above the mean) and a low level (one s.d. below the mean). Figure 3-2 displays the plot of the interaction. When there are weak bio-demographic faultlines in the TMT, the simple slope of added product scope is larger ($b = 0.0036$, $p < 0.001$) than at the average level of bio-demographic faultlines ($b = 0.0024$, $p < 0.05$). However, when bio-demographic faultlines are strong, the simple slope is not significant for firms that add the mean amount of product scope ($b = 0.0012$, $p > 0.05$). The maximum of the curvilinear relationship is reached at an added product scope of 12.39 when the bio-demographic faultline

Figure 3-1: Plot of interaction effect of task-related faultline strength

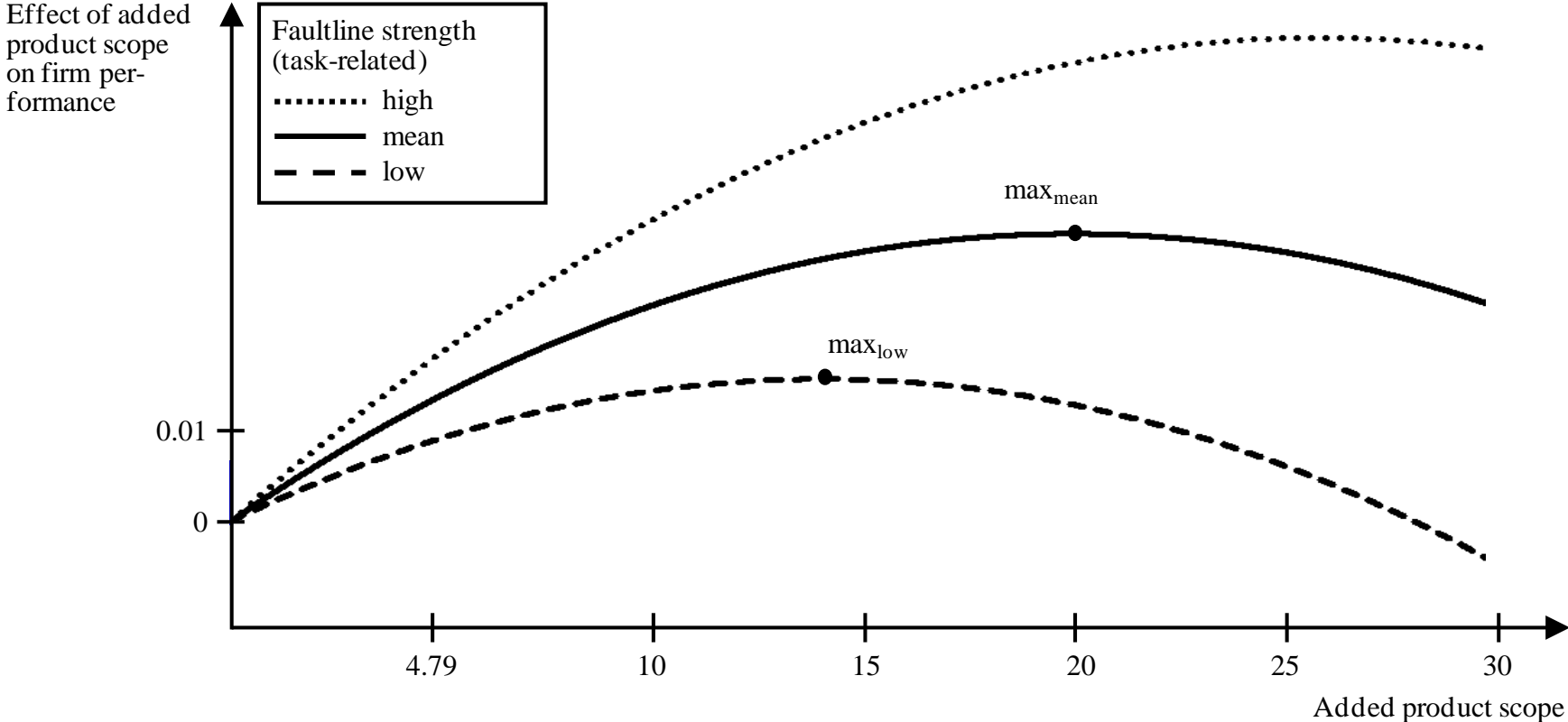
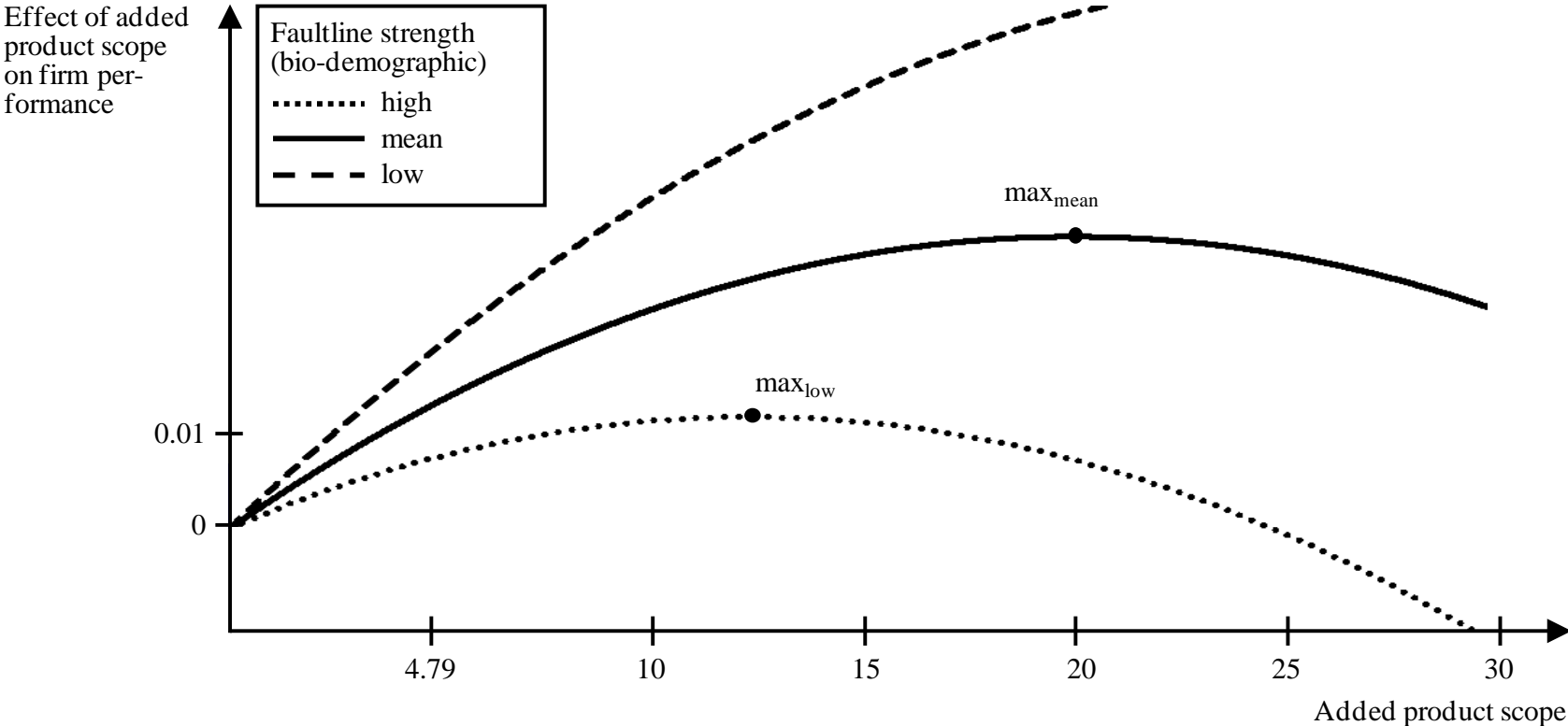


Figure 3-2: Plot of interaction effect of bio-demographic faultline strength



is strong. Average firms that add more product scope per time period experience diminishing performance. We also perform a robustness test in which we combine task-related and bio-demographic characteristics into a single faultline and find it insignificant. This further corroborates that task-related and bio-demographic faultlines have opposing effects that may offset each other when combined into a single measure.

3.6. Discussion

In this paper we investigate the impact of product scope expansion on firm profitability. We contribute to the extant literature by examining increases in product scope in a given time period rather than the level of product diversity at a point in time. While other researchers have written about the importance of adopting a dynamic approach given the nature of diversification, few have carried through (Gary, 2005; Ramanujam & Varadarajan, 1989). We also consider the impact of product expansion programs rather than isolated diversification steps, a distinction already made by Schipper and Thompson (1983) in their investigation of acquisition activity. We argue that the ability of firms to profitably increase product scope in a given time period is limited. Successful product diversification calls for matching firm resources and opportunities in new product areas and coordinating the integration of new products into the existing product mix. Such a degree of familiarity with the firm's resources and product mix is required that long in-firm managerial experience is a sine qua non (Tan, 2003). But, the availability of experienced managerial resources is inelastic in the short to medium term, making them a seriously binding constraint on product scope expansion (Kor & Leblebici, 2005). Our empirical results show that if the rate at which a firm increases its product scope, taking into consideration both the number and degree of relatedness of new products in a given time period, is too high, firm profitability suffers. This finding is in line with the Penrose effect which states that firms that expand too quickly will be unable to properly handle the increased demand for managerial resources related to the complexity of the expansion process and so will experience a slowdown in growth in the subsequent period

(Tan, 2003; Tan & Mahoney, 2005). Moreover, an excessive rate of expansion will not allow top managers sufficient time to become familiar with new products or to learn from subsequent expansion steps (Tan, 2003; Vermeulen & Barkema, 2002).

We identify specific factors that influence the limits of the ability of firms to increase product scope in a given time period, namely task-related and bio-demographic faultlines. Our distinctive contribution is that we investigate how faultlines within a TMT affect its ability to coordinate product expansion successfully and to handle the associated information processing requirements. We show that different types of TMT faultlines moderate the relationship between additional product scope and firm profitability in different ways. Most researchers who have studied faultlines do not explicitly distinguish between different types. However, we contend that our results corroborate our belief that the effect of demographic faultlines depends on its attributes. It is important then for researchers to examine which attributes are used to operationalize faultlines when interpreting findings across studies. Bezrukova and colleagues (2009) propose that faultline strength based on level of education and tenure increases group performance. We too look at the educational background and at the length of organizational tenure of TMT members as these characteristics indicate members' knowledge and perspectives and so how they are likely to approach the task of managing product expansion. We find a significant positive moderating effect of task-related faultline strength on the relationship between the amount of product scope added per time period and firm performance, suggesting that task-related faultline strength helps TMTs to cope with the complexity of expanding into new product areas. Hence, our study makes an important contribution to the TMT literature by empirically showing that, in certain contexts, task-related faultlines may indeed serve as 'healthy divides' (Gibson & Vermeulen, 2003). When such faultlines prompt task-related debate they affect team information processing and this may positively influence task performance.

When Li and Hambrick (2005) looked at the TMTs of joint ventures, they found that TMTs with faultlines based on the bio-demographic characteristics of age, gender, and ethnicity, and also on length of team tenure experienced emotional conflicts that negatively affected joint venture performance. Our results too indicate that strong bio-demographic faultlines, which we measure looking at age and nationality, can disrupt information processing within TMTs and decrease their ability to cope with complexities. We believe that this is because their strong association with widely shared general stereotypes introduces bias and triggers interpersonal conflict that diverts limited managerial attention away from the task at hand. In line with this, our hypothesis that bio-demographic faultline strength negatively moderates the link between additional product scope and performance is confirmed.

Our finding of different effects of faultline strength based on different characteristics has important implications for faultline research as it highlights the importance of careful and context-specific selection of characteristics when operationalizing faultlines. We stress that measuring a single faultline based on characteristics that reflect very different aspects of individuals may hinder interpretation of its effect. Moreover, the more characteristics are combined in a single faultline measure the more difficult it is to determine whether an observed effect is driven by a combination of all characteristics or just a subset.

Our empirical results may also be viewed from a dynamic capabilities perspective. A firm's dynamic capabilities determine its ability to adapt, integrate, or reconfigure its resources base to achieve new forms of competitive advantage (Teece, Pisano, & Shuen, 1997). Our study highlights the constraints on the rate at which a firm is able to change its resource base. Thus, our findings suggest that top management team faultlines affect a firm's dynamic capability to quickly adapt to changes in the environment.

In addition to their implications for research on expansion processes, our results also have relevance for researchers investigating product diversity-performance links from a static perspective, a connection about which, despite a broad range of empirical studies, there is still

no consistent picture (e.g., Gary, 2005; Palich *et al.*, 2000). Our results indicate that it is not only the level of product diversity at a certain point in time that has an impact on firm performance, but also the process by which it is achieved. Moreover, our findings suggest that the conflicting findings of previous studies might be explained by differences in the ability of TMTs to cope with the complexities of the product diversification process. The managerial relevance of this is clear: When deciding when to initiate and implement expansions, TMTs should carefully weigh their information processing requirements against their current abilities. In order to do so it is crucial for the members of TMTs to fully appreciate their capabilities and also the sources of complexity and the information processing requirements of an expansion program. Diversity in the TMT, as measured by faultlines, exerts both positive and negative effects on information processing depending on its type. Our results thus suggest that hiring and promoting top managers whose characteristics increase task-related faultline strength can improve the ability of the team to handle expansions and in so doing improve firm performance. At the same time, an effort should be made to keep bio-demographic faultline strength weak. This does not mean that the TMT should necessarily be made up of persons who are entirely homogeneous in terms of age, nationality, or gender. Teams made up of persons with both similar and dissimilar characteristics may be equally effective. However, clear alignment of bio-demographic differences between groups of top managers should be avoided as this may harm team processes. This may be particularly relevant for the firms in our sample. In Germany, as in many other countries, the top management positions of major firms have long been overwhelmingly held by males. Now regulations aimed at increasing the number of females on the TMTs of German firms are under consideration. Gender is but one bio-demographic characteristic. This implies that as CEOs or supervisory boards appoint female top managers, one of the many things of which they should remain mindful is the bio-demographic characteristics of existing team members in an effort to avoid counterproductive faultlines.

3.7. Limitations and further research

We have written throughout this paper about the members of TMTs. Who are they? Bantel and Jackson (1989) asked CEOs to identify the kinds of managers who make up the TMTs at their firms, and Michel and Hambrick (1992) considered all managers above vice-president level to be TMT members. We include all of the members of the German firm equivalent of a management board, the Vorstand. This limits our research as we cannot entirely exclude the possibility of other members of the organization exerting a significant influence on TMT decision making. On the other hand, under German commercial law all of the members of the Vorstand must be listed in annual reports and so, unlike some other researchers, we have the advantage of being sure that our top managers are identified in a consistent manner. Perhaps even more importantly, Vorstand members are legally and collectively responsible for management of the corporation. According to Mintzberg (1979, p.24), the persons who make up the TMT are those who 'overall responsibility for the organization'. We are confident then that the Vorstand can be taken as the TMT. Our definition led to the inclusion of 6.57 members on average in a team with a standard deviation of 1.97. This is comparable to Bantel and Jackson's (1989) 6.30 members with a standard deviation of 1.64. We also used observable characteristics from archival sources to measure psychological constructs and information processing ability (Hambrick & Mason, 1984), first because they are reliable and objective, and second because this allowed us to gather historical data; crucial given the longitudinal nature of our study. Nevertheless, future studies might complement this kind of approach with data gleaned from surveys or case studies that might more directly measure team dimensions such as processes, communication, and conflict.

We posit that additional product scope is an important source of complexity, and so looked at each step in terms of the firm's product portfolio before it was undertaken. Adding product scope is not the only source of complexity for TMTs. Future research could consider other sources like changes in the business or technological environment (Luo & Peng, 1999),

undertaking a program of internationalization (Vermeulen & Barkema, 2002), rapid increases in firm size in general (Mishina *et al.*, 2004) or alternative dimensions of product relatedness, for example those based on similarity of knowledge base (Tanriverdi & Venkatraman, 2005). We especially call for further research that examines how the composition of teams may affect their ability to handle different sources of complexity. Another limitation of our study has to do with the timing of expansion steps. Because we relied on annual reports, we know the year of each expansion step but not its exact date and so cannot establish the exact sequence of expansion steps within a particular year. Moreover, we measured expansion steps by the number of subsidiaries established, but do not know their size. We would expect larger expansion steps to be associated with greater complexity. Yet, every expansion step, irrespective of its size, requires the processing of a minimum amount of information and thus managerial attention.

Our focus on German firms can also be seen as a limitation. There are several studies that show that a firm's institutional environment may affect the performance of its diversification efforts (Chakrabarti, Singh, & Mahmood, 2007), and others that show that a country's norms and its legal system influence what top managers are able to do (e.g., Hambrick, 2007). For example, CEOs of American firms have more latitude than those of German and Japanese firms and so American CEOs might be expected to have more of an impact on firm performance (Crossland & Hambrick, 2007). Future studies might look at the expansion steps of firms based in multiple countries to explore the specific influence of national contexts on our hypothesized relationships.

Our study indicates the importance of bringing together research done on corporate expansion and that done on top management teams. As TMTs make and implement corporate expansion decisions, they are a crucial contingency factor influencing the outcome of expansion. We believe that the impact of management on expansion processes is a promising area for future research. For example, we focus on added product scope, i.e., the number of new product

areas entered and their relatedness to existing products, to proxy for the attendant information processing requirements faced by TMTs. Firms may also expand into new geographic markets. Does the geographic, cultural or institutional distance between the locales in which the firm already does business and newly entered countries give TMTs a like amount of complexity with which to deal (Ghemawat, 2001; Meyer et al., 2009)? Future research might explore the effect of the characteristics of TMT members on international expansion processes and firm profitability. Further research might consider as well alternative outcome variables other than firm performance. For instance, a firm's future growth prospects are likely to be influenced by the ability of its TMT to handle current expansion projects.

In conclusion, our research suggests that a better understanding of the implications for firm profitability of expansion into new product areas requires a dynamic perspective on the role of top management teams. As such, this study is a step toward a more comprehensive investigation of the performance effect of corporate development processes.

4. Managerial services and complexity in a firm's expansion process: An empirical study of the impact on the growth of the firm⁷

4.1. Introduction

Corporate growth is a central objective of managers (Brush et al., 2000; Mishina et al., 2004). Firm expansion has been identified as an important driver of a firm's value creation (Koller et al., 2005). It has been argued to increase the attractiveness of the firm and thus to be critical for recruiting and retaining talent, and positioning the firm in capital markets and finding investors (Canals, 2001). The question of what factors drive the growth rate of a firm and which slows it down is consequently relevant both for managers and academics.

The seminal work of Penrose (1959), considered by some as 'one of the most influential books of the second half of the twentieth century bridging economics and management' (Kor & Mahoney, 2000, p. 109), informs us about these factors and highlights the crucial role of the management team in a firm's growth process. Specifically, Penrose (1959, p. 200) argues that the 'factors determining the availability of managerial services and the need for them in expansion will therefore determine the maximum rate of growth of the firm, where rate of growth is defined as the percentage rate at which the size of the firm increases per unit of time.' Taking a dynamic perspective, the so-called 'Penrose effect' suggests that the need for managerial services to grow fast in one period slows down a firm's growth rate in a subsequent period (Mahoney & Pandian, 1992). Conversely, this means that a substantial increase in available managerial services in one period will accelerate the firm's growth rate in a subsequent period.

A limited number of empirical studies have applied such a Penrosean perspective to study growth rates in consecutive time periods at the plant level (Shen, 1970), and within one particular market (Tan, 2003; Tan & Mahoney, 2005, 2007). While these studies have

⁷ This chapter is based on a preliminary version of: Hutzschenreuter, T., & Horstkotte, J., Managerial services and complexity in a firm's expansion process: An empirical study of the impact on the growth of the firm *European Management Journal*, 31(2), 137-151.

generated important insights, we believe there is need for further empirical research on the determinants of firms' growth rates. In particular, our study contributes to the literature and offers new insights in three important ways. First, we take a firm-level perspective and examine factors that influence the rate at which a parent firm is able to establish new subsidiaries within and across markets. Second, we consider both factors that increase the availability of managerial services and the need for them. Third, by studying the additional need for managerial services from expansion into both new product markets and new international markets, and their effect on subsequent firm growth, we address two important aspects of a firm's overall growth strategy in our analysis. Thus we contribute to the literature by combining insights from two largely distinct research streams that have investigated these directions of expansion separately and have limited their focus on expansion by only one of these means.

In particular, we argue that the more services become available from the top management team that makes and implements corporate expansion decisions, the higher the growth rate of the firm (Verbeke & Yuan, 2007). To this end we take a dynamic approach and examine how the growth rate of the top management team itself and its shared team-specific experience (Kor & Mahoney, 2004; Kor et al., 2007) in one period affect the growth rate of the firm in a subsequent period.

In addition, we analyze how complexity in the expansion process increases the need for top managerial services and thus slows down expansion. Both expansion into new product markets or into new countries are primary sources of complexity, in particular when such markets have little similarity to the markets in which the firm is already active. In both instances this makes the firm an outsider without a strong base (Kay, 2005; Meyer, 2006; Mishina et al., 2004; Verbeke & Yuan, 2007). Accordingly, in this study we examine how adding product scope or adding cultural distance to a firm's existing business portfolio during one period affects its rate of expansion in the subsequent period.

4.2. Theoretical background and hypotheses

4.2.1. Availability of managerial services in the expansion process

A resource based view of the firm (RBV) is central to Penrose's theory of the growth of the firm (Penrose, 1959). According to the RBV, firms can be conceptualized as bundles of resources (e.g., Barney, 1991; Peteraf, 1993; Wernerfelt, 1984). A resource can be used in different ways within the firm, i.e., it consists of a variety of potential services that it may provide to the firm. The service or set of services that a resource actually provides depends on its usage or combination with other resources (Penrose, 1959). It is the role of the management to put the resources to use and decide on their combination. As such the management of resources and the services they render is the key to competitive advantage (Kunc & Morecroft, 2010).

Management itself can be considered a resource of the firm. Managerial resources render services in the form of information processing and decision making (Kor & Mahoney, 2000). As managing the firm in its current state is a complex task these services are at least partly consumed for the administrative coordination of the firm's existing operations within its current scope. Because, firms learn and become more efficient in using their stock of resources, after a certain period of time, they will, *ceteris paribus*, end up with excess resources (Penrose, 1955; Pitelis, 2007). The potential services available from these unused resources motivates managers to seek opportunities to expand as they want to put these resources to productive use and to exploit economies of scale and scope (Penrose, 1959; Thompson & Wright, 2005). While these resources may also be disposed externally, they often entail a firm-specific component making their internal usage more valuable. Thus, seizing market opportunities by expanding the firm is an important managerial goal (Brush et al., 2000).

A firm's ability to grow depends on the managerial services available for expansion.

Managerial services are required as managing the growth of the firm is even more complex

than managing it in its current state. Managers' entrepreneurial imagination is needed to identify new investment opportunities and plan future expansion (Kor et al., 2007). Making and implementing expansion decisions requires information processing as it involves the replication, addition, and recombination of resources and routines (Mishina et al., 2004). In particular, the managerial services of the firm's top management team (TMT) are required. The parent firm's TMT is responsible for coordinating expansion, especially expansion via direct investments as part of the firm's corporate-level strategy. The TMT serves as the firm's internal and external information processing center and thus is in a unique position to understand, make, and relate complex expansion decisions (Mintzberg, 1971).

Penrose (1959, p. 200) argues that a firm's rate of expansion in one period depends on the rate at which its TMT increased its managerial services available for expansion in the previous period. She writes 'an increased rate of growth can be achieved only if the former [i.e., managerial services available for expansion] are increasing at a rate greater than the latter [i.e., managerial services required per dollar of expansion]'. However, individual TMT members are limited in their ability to absorb, evaluate, and act upon complex information (Cyert & March, 1963). Hence, the ability of existing TMT members to learn and develop new capabilities and thus to become more efficient and increase the managerial services they are able to render per unit of time is limited (Dierickx & Cool, 1989). A substantial increase in managerial services can be accomplished by adding managers to the number of managers that has been managing the firm so far. Additional top managers increase a TMT's managerial services available for expansion by bringing in new knowledge and additional information processing capacity and thus supporting the identification of growth opportunities and the coordination of expansion. Thus '[n]ew managerial recruits increase the growth potential of the firm' (Mahoney & Pandian, 1992, p. 366). Consequently, the rate at which a TMT grows in one period, *ceteris paribus*, positively affects the availability of managerial services for

expansion and thus the rate at which the firm can grow by making and implementing investment decisions and establishing new subsidiaries in a subsequent period.

Hypothesis 7: Everything else constant, the growth rate of the top management team in one period, will positively affect the rate of growth of the firm in a subsequent period.

The managerial services that a TMT can render are further affected by the common TMT-specific experience of its members (e.g., Kor, 2003; Kor & Mahoney, 2004). Penrose (1955, p. 538) emphasized that when top managers share working experiences ‘with a particular group of other men in a firm, they become individually and as a group more valuable to the firm because the range of services they can render is enhanced’. Moreover, common TMT-specific experience may enable managers to better cope with information processing requirements as a team and hence increase the team’s ability to handle its tasks (Hambrick, Finkelstein, & Mooney, 2005). Managers who have served on a specific TMT for a long time and have made extensive experiences in working together have detailed knowledge of the skills, limitations, mental models, and habits of each other. This may lead to better cooperation, information sharing and cross-understanding (Huber & Lewis, 2010). The ability to successfully collaborate is enhanced as managers adapt to each other, learn to get along, and develop decision-making routines. Common TMT-specific experience saves time that might have been spent in coordination and so information processing and decision making can be done more quickly (Eisenhardt & Schoonhoven, 1990). As a result, more time can be devoted to learning and developing new resources sine qua non for expansion in future periods. Moreover, the integration and development of added TMT members may be facilitated when experienced top managers can transfer the tacit knowledge they have gained on the team. Consequently, TMT-specific experience may reduce dynamic adjustment costs which constrain a firm’s growth rate (Tan & Mahoney, 2005).

When managers do not work together well as a team so that information processing demands surpass the team's abilities, this may negatively affect decision quality and lead to coordination bottlenecks, loss of control, and lower performance (Levitt et al., 1999). Over-extended managers can react by reducing the amount of attention they give to tasks or by focusing on some prioritized tasks and neglecting others (Gary, 2005). As a result, managers may make ill-informed decisions that may prove difficult to reverse (Tan, 2003) and require corrections in a future period that tax managerial resources and hamper further expansion. The information-processing benefits of common TMT-specific experience reduce the likelihood that the challenges that will inevitably arise will unexpectedly exceed a TMT's ability to process information leading to such negative consequences (Teece, 1980).

According to Penrose (1959, p. 47) when a firm 'expands its operations more rapidly than the individuals in the expanding organization can obtain the experience with each other and with the firm that is necessary for the effective operation of the group [...] a period of 'stagnation' may follow'. We argue similarly that a TMT with high common TMT-specific experience is better able to deal with information processing demands associated with executive tasks and also to assimilate new managers, leaving more managerial time for learning and developing resources that support growth in a subsequent period. Moreover, such teams have an increased ability to handle complexity, reducing the probability that the top managers will become overstretched, make errors, and so devote valuable time to making corrections, thus hampering growth. Following this logic, we hypothesize:

Hypothesis 8: Everything else constant, more team-specific experience shared among top management team members in one period, will positively affect the rate of growth of the firm in a subsequent period.

4.2.2. Need for managerial services in the expansion process

We have argued that a higher availability of managerial services for expansion in an expansion period may accelerate the rate at which a firm is able to grow in a subsequent period. In turn, a higher need for managerial services in the expansion process may slow down the rate at which a firm is able to make and implement expansion steps. Managing the firm at a point in time is a complex task. Managing its expansion over time even more so (Mishina et al., 2004). Dealing with the complexity added in an expansion period requires managerial services from a firm's top management team to manage the expansion and expanded scope of the firm (Barkema & Shvyrkov, 2007; Vermeulen & Barkema, 2002). This means that there will be, *ceteris paribus*, fewer managerial services available for further expansion in the following period (Penrose, 1959). While every expansion requires a certain amount of time from top managers during the planning and implementation periods, the amount of complexity associated with different expansion steps varies. Expansions that are within the current scope of a firm may be realized by replication of existing resources and routines (Mishina et al., 2004). A firm expanding in a market in which it is already active often has insider's advantages. It can rely on a trusted business network from within which it is better able to identify growth opportunities and that may help it to acquire or access resources and capabilities necessary for expansion (e.g., Johanson & Vahlne, 2009). Hence, 'expansion in market areas where the firm is already known and established will require less effort than expansion into markets new to the firm.' (Penrose, 1959, p. 209).

Firms expand into new markets by product and/or geographic diversification. Both means of expanding entail additional complexity. For the most part the extant literature focuses on one of these growth dimensions at a time. However, expansion into new product or geographic markets are both part of a firm's overall growth strategy and similar sources of complexity in a firm's expansion path (Kumar, 2009; Meyer, 2006; Nachum, 2004). Direct investments in new product or geographic markets entail similar tasks for the TMT and thus put a similar

strain on the firm's top management. Expanding a firm's product or geographic scope is challenging as it comes with additional environmental complexity due to the large number of external elements and issues with which top managers must contend (Scott, 1992). A firm's TMT must become familiar with a variety of traits in a newly entered market in order to overcome industry and country outsidership liabilities (Meyer, 2006). Moreover, a firm's resources and routines need to be adapted in order to address the specific requirements of the product or geographic market it is adding to its portfolio (e.g., Lim et al., 2006; Rondinelli, Rosen, & Drori, 2001). Complexity is further driven by the difficulty, and uncertainty, of transferring tacit knowledge that has been gained by the team from past experiences (e.g., Inkpen, 2008; Lippman & Rumelt, 1982; Szulanski, 1996). A new subsidiary must not only be embedded in its external environment, it must also be integrated into the firm's network of already existing subsidiaries. Adjustments in internal structures and systems are required in order to avoid administrative diseconomies (e.g., Calvo & Wellisz, 1978; Singh et al., 1986). Penrose (1959, p. 208) argues that 'in addition to the administrative task of planning the expansion itself, there is the task of maintaining the necessary integration with the rest of the firm and, at the same time, working out flexible administrative arrangements so that the execution of the expanded programme will not be handicapped by bureaucratic bottlenecks.' The less related the product and the more distant the market entered, the greater the challenge of managing an expansion step. Penrose (1959, p. 134) argues 'the further from its existing area of specialization it [a firm] goes, the greater the effort required of the firm to attain the necessary competence not only in dealing with present production and market conditions, but also in making the adaptations and innovations necessary to keep up with competition.'. Thus, expanding into a product market that is less related to a firm's current product portfolio, i.e., that adds more product scope, is associated with greater complexity. The less related the product, the more difficult it is for top managers to familiarize themselves with its industry-specific technologies, success factors, and business logic (Park, 2003). New business-specific

knowledge and capabilities need to be developed, existing resources and routines adapted to the new context, and synergetic links to existing businesses managed (e.g., Hill & Hoskisson, 1987; Markides & Williamson, 1996). Likewise, an expansion step that is more distant to a firm's country portfolio comes with more complexity. Culture is a crucial dimension of the distance between geographic markets (Ghemawat, 2001; Gomez-Mejia & Palich, 1997; Tihanyi et al., 2005). The greater the cultural distance the more difficult and costly it is to obtain and interpret comprehensive and accurate information about a new environment and to become familiar with it (Roth & O'Donnell, 1996). Cultural ambiguity may further impede the understanding in specific cultural settings (Robertson & Swan, 2003). It is challenging to calibrate a firm to an unfamiliar culture and to recombine existing resources with local resources (Barkema et al., 1996). Moreover, the extent to which adaptation is needed to fit a local context increases with the degree of cultural difference between a newly entered market and those already served. An expansion step that adds a high degree of product scope or of cultural distance thus entails more complexity than an expansion step within a market where a firm is already established (Verbeke & Yuan, 2007). Yet, the expansion programs of firms often involve multiple steps. Complexity in a given period of expansion is driven by the total amount of added product scope and added cultural distance contributed by all of the expansion steps undertaken in that period.

Dealing with the total amount of complexity in one expansion period consumes managerial time and effort and as a result less of these resources can be devoted to learning from the expansion and developing new capabilities and knowledge, and thus there are time compression diseconomies (Dierickx & Cool, 1989). Consequently, fewer additional services become available for expansion in a subsequent period. Time constraints may also hamper a TMT in its efforts to develop and integrate new managers, thus diminishing the pool of new managerial services available in subsequent periods to manage the firm's increased scope and to expand still further. Furthermore, the additional complexity from product scope and

cultural distance added in an expansion process increases the amount of managerial services required to manage the expanded firm scope in a subsequent period. As a result, *ceteris paribus*, less managerial services in that period will be available for further expansion. For these reasons the rate of growth is likely to decline following a highly complex expansion. Moreover, expansion that adds too much product scope or cultural distance in one period may overwhelm top managers. As we have said, when this happens top managers cope by either parceling out the time they devote to tasks across the board or by concentrating on selected tasks putting aside all others (Gary, 2005). Unfortunately, the first strategy leads to uninformed decision-making and the second one to a backlog that must be handled in a subsequent period, effectively putting the brakes on expansion during that period. In summary, we argue that complexity driven by additional product scope or additional cultural distance in one period has a negative effect on firm growth rate in subsequent periods. Following this logic, we hypothesize:

Hypothesis 9a: Everything else constant, the greater the additional product scope in an expansion period the lower the firm's growth rate in the subsequent period.

Hypothesis 9b: Everything else constant, the greater the additional cultural distance in an expansion period the lower the firm's growth rate in the subsequent period.

4.3. Methods

4.3.1. Sample and data

To test our hypotheses we used a sample that was derived from the HDAX index of the German stock exchange. The HDAX is made up of the German companies with the highest market capitalization. The sample was formed by excluding financial institutions, real estate firms, retailers, purely financial holdings, and cross-listed non German firms, and we were left with 135 companies that have been listed on the HDAX since its inception. We build on the dataset of (citation withheld to protect the anonymity of the authors during the review

process) and substantially extended it in terms of new variables on top management teams and the length of the window of our analysis. As in this study we analyze the process of firm expansion, only those firms for which we were able to gather data for all our variables over a minimum number of consecutive years are included in the sample. Our final sample includes 91 firms for which we were able to collect data over at least seven consecutive years between 1985 and 2007.

Data was collected by carefully reading the annual reports of the 91 firms in our sample. This review included looking at the list of affiliates found in each report's appendix. When not available from the annual report we obtained more detailed information on these affiliates from public archives and by direct contact with the firms. In this way we were able to gather data on all the expansion steps undertaken by our sample firms during the period of analysis spanning more than two decades. We defined an expansion step as investment of at least a fifty percent stake in a subsidiary in which the parent firm had previously held either a minority stake, or no stake at all. This allowed us to exclude purely financial investments made by the firms. We identified for each firm the subsidiaries at the beginning of our period of analysis and any divestitures year by year. This gave us for each year a firm is in our panel a portfolio of its majority owned subsidiaries. Combined with the collected information in which industry and country each subsidiary is active in, we were able to determine the product and country portfolio of the sample firms for each year.

In addition to building a picture of firm expansion we collected archival data on the top management teams of the firms. Archival data is often collected in management research (e.g., Barkema & Shvyrkov, 2007; Kor, 2006; Tihanyi et al., 2000), as it has the advantage of being clear-cut and objective (Michel & Hambrick, 1992). We did this by gathering data on each firm's 'Vorstand', the management board of German firms. Those who sit on the Vorstand represent the firm and are legally and collectively responsible for managing it. As the CEOs of German firms act as *primus inter pares*, we include them in our analysis. For our

purposes then, the CEO and every member of the Vorstand is a member of the top management team. In many cases we were able to readily get information on the executive directors who served on the Vorstand during our investigative window, including when they joined the Vorstand and when they left. If the information we sought, in particular the date of entry into the TMT, was not given in the annual report of a firm, we turned to sources like Hübner's Who is Who and media archives. If needed, in a later stage we attempted to close remaining gaps in the data set and to test the reliability of already collected data with direct firm contacts. In line with other upper-echelons research (cf. Jensen & Zajac, 2004, Westphal & Zajac, 1997), we excluded firm-year observations if we were not able to gather the TMT data needed on at least three-quarters of the top executives who had served on a respective team during our research window.

In contrast to other longitudinal studies, we included non-surviving firms in our sample. Furthermore, following Carpenter and Fredrickson (2001) we conducted a means test to compare the firms we included in our analysis to those we excluded based on data from the Thomson Reuters Datastream database. The means test revealed that the firms we included were not significantly different from those we excluded in terms of number of employees, total assets, revenues, and market capitalization. More importantly, firms included did not perform significantly better than firms excluded, indicating that there was no survivorship bias in our results. The structure of our dataset is unbalanced, therefore we applied an additional statistical method to determine if our sample selection might be a problem. According to Wooldridge (2002), sample selection only poses a problem in a fixed effects context when selection is related to the idiosyncratic error term in the model. We applied a test suggested by Nijman and Verbeek (1992) and subsequently used by Berrone and Gomez-Mejia (2009) among others. This test allowed us to confidently confirm the absence of a sample selection bias.

4.3.2. Variables

We aim in our research to empirically confirm the Penrose effect. Consequently, we investigate the effect of TMT characteristics and other determinants of growth in an initial three year time period, which we call the first period, on the growth of the firm in the subsequent three year time period, which we call the second period. Studying two consecutive three-year periods, we follow Tan and Mahoney's approach to investigate the expansion process of Japanese firms in US industries (Tan & Mahoney, 2005). While the dependent variable of our study reflects the growth rate of the second period, we calculated our independent and control variables as average values over the first period unless specified otherwise.

4.3.2.1. Dependent variable

The dependent variable in this study is *firm growth rate*. We measured a firm's growth rate by the number of its expansion steps in the second period over the number of its subsidiaries at the beginning of that period. As our dependent variable is positively skewed, we performed a logarithmic transformation (e.g., Chatterji, 2009) which arguably has become the norm in such cases (Russell & Dean, 2000).

4.3.2.2. Independent variables

We used the variable *TMT growth rate* to measure the rate at which a firm adds managerial resources. German corporate governance legislation does not specify a maximum number of management board members. So we looked at the make up of each firm's TMT and compared how many executives joined the Vorstand and how many stepped down in the first period of analysis. We divided that difference by the number of members on the Vorstand at the beginning of the first period. As already observed by Barkema and Shvyrkov (2007) larger firms usually have larger TMTs in order to handle the complex task of managing larger firms. Thus, the growth rate of the TMT may serve as a proxy for the additional capacity available for coping with complexities of the expansion process.

We also included a variable *common TMT-specific experience*. That variable captures TMT members' cross understanding, that is, how well team members understand the mental models, skills and knowledge, and limitations and idiosyncratic habits of their fellow members. Following Carroll and Harrison (1998), we calculated this variable by summing the overlapping tenure across all dyads of executives on the TMT and dividing the sum by the total number of dyads. Thus, this ratio is independent from the size of the TMT and serves as a proxy for common TMT-specific experience. In this way, we model experiences *specific* to particular TMTs not general TMT or team experience as we investigate TMT joint managerial experience in making and implementing investment decisions together as a team (Kor, 2003).

We have argued that one challenge posed to top management teams by international expansion is how to cope with the amount of cultural distance between an existing country portfolio and a newly entered market. We calculated the cultural distance between two countries based on the four original dimensions and scores of Hofstede (1980). Using the formula proposed by Kogut and Singh (1988), we averaged the differences in cultural dimensions between two countries while controlling for the variance in each dimension. This approach has been used extensively in international business research (e.g., Gomez-Mejia & Palich, 1997; Roth & O'Donnell, 1996). To determine the amount of cultural distance added in a given period of time, we first calculated the cultural distance between each country in which the firm was already active before expansion and the country into which the firm expanded. Thus, the number of countries in the firm's country portfolio is equal to the number of cultural distances we computed for each expansion step. The smallest of these distances reflects the cultural distance added by that particular expansion step. Therefore, the amount of cultural distance added in a single expansion step is its distance to the closest existing subsidiary. Next, we summed the added cultural distance of all expansion steps in the relevant period of time in order to measure the level of added cultural distance to which a firm and its

management is exposed in that period, hence the variable's name: *added cultural distance per period of time*.

We argue that complexity also arises from expansion into new industries or market segments. Our measure of *added product scope per period of time* builds on the relatedness of industries. The way in which we constructed this variable is analogous to the way we measured added cultural distance. We used four-digit industrial classification WZ codes, i.e., the German classification system for industries analogous to SIC codes, to determine the fit between a newly entered industry and the industries already in a firm's portfolio. Expansion into less related industries is associated with higher complexity. If a firm enters an industry that shares the same four-digit code as an industry in which it is already active indicating that the two industries are relatively closely related, the level of complexity is at its lowest.

Assuming a linear relationship in relatedness, and hence complexity, over different matches of industry code, we assigned a one for matches at the three-digit level, a two for matches at the two digit level, a three for matches at the one-digit level, and a four when there was no match at all. In this way we assigned an added complexity score to each individual expansion step. That score reflects the product scope that is actually added by that particular expansion step. Finally, we summed all the scores of all the expansion steps in the first time period. The total reflects the level of added product scope in the respective period.

4.3.2.3. Control variables

Our variables, added cultural distance and added product scope, capture the complexity with which TMTs must contend when their firms expands into new geographic and product areas. This is not to say that expansion within the same geographic area or industry is without complexity (Mishina et al., 2004). For this reason, we controlled for the total *number of expansion steps* in the first period irrespective of country or industry.

Further, we included another variable, *cultural diversity*. This variable reflects cultural differences between subsidiaries of the same firm at a certain point in time and thus the

complexity with which managers must cope when managing a multinational portfolio of activities. We calculated cultural diversity at the beginning of the first time period to ensure that the cultural distance added in the first period has no effect on this variable. Based on the concept of cultural distance as described above, we summed measurements of cultural distance across all dyads of a firm's network of subsidiaries and divided the sum by the total number of pairs. In a parallel fashion, we controlled for a possible effect of *product diversity* at the beginning of the first period (Chatterjee & Wernerfelt, 1991; Palich et al., 2000) as the breadth of the business areas in which a firm is active at a certain point in time increases the complexity with which its managers must cope. We used the entropy measure described by Palepu (1985) and applied by Hitt et al. (1997) based on the number of subsidiaries within different industry codes.

In addition, we controlled for *firm size* using sales and included additional control variables that refer to the expansion undertaken in the first period. We calculated the variable *prior minority* to control for a possible effect of prior minority stakes on taking majority stakes later. We computed this variable as percentage of expansion steps in the first period where the firm already held a minority stake before gaining majority control. We included the variable *acquisitions* to control for investment modes and calculated the percentage of expansion steps in the first period implemented by acquisition. Further, we included a control variable *total ownership*. It may matter whether a firm enters a market by establishing a new subsidiary having full control over it or by engaging in an equity alliance with a partner. We controlled for this effect by including the ratio of fully-owned expansion steps over the total number of expansion steps in the first period.

A firm's *profitability* is likely to have an effect on its potential to grow. We controlled for this effect by including return on assets at the beginning of the second period as a control variable. Likewise, we controlled for a firm's *capital structure*, calculated as total liabilities over total assets. Prior research suggests that financial slack may influence growth rate (Weinzimmer et

al., 1998). Accordingly, we entered the variable *slack*. We obtained data from Thomson Reuters Datastream in order to calculate the current ratio as a proxy for financial slack at the beginning of the second period (e.g., Cho & Hambrick, 2006; Herold et al., 2006).

4.4. Analysis

We used a fixed firm effects model to test our hypotheses, confirmed by a Hausman test (Wooldridge, 2002). Fixed effects models are preferred in panel data analysis (Cannella et al., 2008) as they control for constant unobserved heterogeneity across firms (e.g., Greene, 2008). Moreover, they are considered to be conservative as significant effects can only be observed based on changes in independent variables within a particular firm.

Table 4-1 displays the descriptive statistics. As we use a fixed effects model, we followed the approach of McCann and Vroom (2010) and calculated the within firm correlation coefficients. Table 4-1 shows that none of the correlation coefficients exceeds the value 0.6 indicating that our results are not driven by multicollinearity (Foo et al., 2006; Kennedy, 1979; Tsui et al., 1995).

We also calculated variance inflation factors. They are lower than 2.5 for all of our variables thus considerably smaller than the generally accepted critical value of 10 (Tan & Tan, 2005) so it is reasonable to conclude that multicollinearity is not a problem in our analysis.

A modified Wald statistic for groupwise heteroskedasticity in fixed effects regression models indicated the need for a heteroskedasticity robust estimator (Greene, 2008). Furthermore a test for autocorrelation in panel data (Drukker, 2003; Wooldridge, 2002) suggests that autocorrelation may affect our results. Two viable approaches for dealing with these issues in the specific present panel structure, are discussed in the time-series cross-sectional methodological literature (e.g., Beck & Katz, 1995; Hansen, 2007). First, Certo and Semadeni (2006) suggest the ordinary least squares fixed effects method with Huber–White corrected standard errors (White, 1980) which has been applied in management research by Anderson and Reeb (2004) for example. In contrast, Kristensen and Wawro (2007) consider the

Table 4-1: Descriptive statistics

	mean	s.d.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Firm growth rate in second period ^a	-1.747	0.935	1.00														
2. TMT growth rate	0.043	0.376	0.06	1.00													
3. Common TMT-specific experience ^b	3.515	1.713	0.13	-0.24	1.00												
4. Added product scope	3.498	5.908	-0.05	0.12	-0.05	1.00											
5. Added cultural distance	1.639	2.183	-0.13	-0.04	-0.01	0.17	1.00										
6. Expansion steps	13.663	15.332	-0.14	0.13	-0.11	0.42	0.46	1.00									
7. Cultural diversity	0.673	0.356	-0.21	-0.06	0.03	-0.05	-0.26	-0.11	1.00								
8. Product diversity	1.606	0.780	-0.18	-0.11	0.03	-0.39	0.00	-0.07	0.06	1.00							
9. Minority	0.045	0.120	0.04	-0.08	0.06	-0.07	-0.06	-0.09	0.04	0.01	1.00						
10. Acquisition	0.507	0.309	-0.06	0.03	0.15	0.00	-0.02	0.04	0.06	0.05	0.24	1.00					
11. Total ownership	0.717	0.245	-0.02	0.05	-0.05	0.04	0.06	0.08	-0.01	0.03	-0.29	-0.08	1.00				
12. Firm size ^{b,c}	7.533	12.767	-0.20	-0.03	-0.07	-0.20	-0.06	-0.06	0.21	0.21	-0.01	0.00	-0.03	1.00			
13. Profitability	0.074	0.090	0.10	0.06	0.09	0.04	-0.08	-0.06	0.05	-0.08	0.01	-0.04	0.05	-0.01	1.00		
14. Capital structure	0.645	0.159	-0.13	-0.03	-0.14	0.01	0.12	0.08	0.01	0.01	0.08	-0.06	-0.03	0.09	-0.19	1.00	
15. Slack	2.161	1.151	0.20	0.04	0.15	0.08	-0.05	-0.12	-0.19	-0.12	-0.02	-0.08	0.02	-0.21	0.19	-0.40	1.00

Correlation coefficients with an absolute value of 0.07 or above are significant at a level of $p < 0.05$.

Correlation coefficients are within firm correlations. Since we use a fixed effects model in the regression, we calculated correlations after subtracting for each variable the mean value of the respective firm from the value of the variable.

Mean values and standard deviations are overall values.

^a Logarithm

^b Mean values and standard deviations are average values of the period

^c In bn. €

Arellano robust estimator in fixed effect models (Arellano, 1987) a preferred estimator. For instance, it has been applied by Delmas, Russo, and Montes-Sancho (2007) and found to be robust to arbitrary heteroskedasticity and autocorrelation. We estimated our model with both estimators and obtained virtually identical results. In Table 4-2 we display the more conservative results with Arellano robust standard errors. In addition, we included time dummies to control for contemporaneous correlation (Beck & Katz, 1995; Certo & Semadeni, 2006) and for potential time effects (Greene, 2008).

4.5. Results

Table 4-2 shows the results from the regression analysis used to test our hypotheses. Our dependent variable is firm growth rate in a subsequent period of analysis. Model 1 shows the results of regressing firm growth rate on control variables only. In model 2 we add our top management variables. In model 3, we add further the variables measuring added product scope and added cultural distance. The full model, model 4, is used to test our hypotheses. It includes all control and independent variables and is thus less likely to suffer from omitted variables bias than the other models (Echambadi et al., 2006).

We posit in Hypothesis 7 that there is a positive relationship between the rate at which managerial resources are added in one period of time and a firm's rate of growth in a subsequent period. We find, consistent with this hypothesis, that the coefficient of the variable TMT growth rate is positive with a coefficient of 0.182 ($p < 0.05$) in model 4. Thus Hypothesis 7 is corroborated. In Hypothesis 8 we argue that more common TMT-specific experience among top managers in one period will, *ceteris paribus*, lead to an increase in the firm's rate of growth in a subsequent period. Table 4-2 shows that the coefficient of the team-specific experience variable is positive and significant in all models in which it was tested. Thus, Hypothesis 8 is supported. Consistent with Hypothesis 9a, the added product scope variable is negative and significant with a coefficient of -0.019 ($p < 0.01$) in model 4. Thus, the hypothesized negative influence of the amount of added product scope in one period on a

Table 4-2: Results of Arellano robust fixed effects regression of firm growth rate^a

	Model 1		Model 2		Model 3		Model 4	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
TMT growth rate			0.192 (0.083) *				0.182 (0.084) *	
Common TMT-specific experience			0.082 (0.031) **				0.085 (0.030) **	
Added product scope					-0.019 (0.007) **		-0.019 (0.007) **	
Added cultural distance					-0.054 (0.022) *		-0.054 (0.022) *	
Expansion steps	-0.012 (0.004) **		-0.012 (0.004) **		-0.005 (0.004)		-0.005 (0.004)	
Cultural diversity	-0.946 (0.557) +		-0.946 (0.538) +		-1.088 (0.548) *		-1.087 (0.528) *	
Product diversity	-0.636 (0.348) +		-0.622 (0.339) +		-0.837 (0.366) *		-0.828 (0.358) *	
Minority	0.204 (0.365)		0.235 (0.358)		0.164 (0.354)		0.192 (0.346)	
Acquisition	-0.107 (0.137)		-0.196 (0.132)		-0.116 (0.137)		-0.206 (0.132)	
Total ownership	-0.057 (0.245)		-0.048 (0.242)		-0.046 (0.247)		-0.036 (0.244)	
Firm size ^b	-0.016 (0.008) *		-0.014 (0.008) +		-0.019 (0.008) *		-0.017 (0.008) *	
Profitability	0.757 (0.416) +		0.609 (0.384)		0.761 (0.415) +		0.613 (0.374)	
Capital structure	-1.208 (0.680) +		-1.120 (0.692)		-1.074 (0.673)		-0.984 (0.686)	
Slack	0.009 (0.050)		-0.012 (0.051)		0.022 (0.048)		0.000 (0.048)	
R ²	0.189		0.207		0.210		0.229	
F	9.050 ***		9.320 ***		9.740 ***		9.780 ***	

N=870

*** p<0.001; ** p<0.01; * p<0.05; + p<0.1

^a Model estimated with Arellano robust standard errors. Time dummies are omitted.^b Parameter estimates and standard errors are multiplied by 10⁶.

firm's expansion rate in the following period receives support. Our Hypothesis 9b proposes that the amount of additional cultural distance with which a firm's TMT must cope in one period of time will reduce the rate of expansion in a subsequent one. Consistent with this hypothesis, we find that the effect of the added cultural distance variable is highly significant in all models in which it is included, i.e., in model 3 and 4. The coefficient of -0.054 in the full model implies that increasing additional cultural distance by one unit reduces the average firm's growth rate by 0.054 in the subsequent period.

In addition to the complexity arising from entering new geographic and product areas, we also tested the effect of expansion in general, i.e., without considering the specific kind of expansion. To that end, we included the number of expansion steps undertaken by firms in the first period as control variable. Interestingly, in model 1 the variable is negative and highly significant indicating that the complexity of expansion has a negative effect on subsequent expansions. However, when controlling for additional product scope and then additional cultural distance as done in model 3 and 4, the effect is no longer significant. This supports our assumption that additional cultural distance and additional product scope are the main drivers of complexity in the expansion process.

Managing a firm in its current state is itself a complex task that requires managerial services. The level of complexity of this task increases with the diversity of a firm's subsidiaries, and the higher the level of subsidiary diversity, the greater the strain on top managers and so the lower their ability to plan further expansion projects. In line with this logic, we find that cultural diversity and product diversity at the beginning of a three year period negatively influence the expansion rate in a subsequent period.

4.6. Discussion

Our study empirically investigates the dynamics of firm growth rates in the context of parent firms expanding within and across product markets as well as international markets. We build on Penrose's theory of the growth of the firm which emphasizes the role of management and

its limitations for firm growth. We too seek to draw attention to the role that top management teams play in the process of corporate expansion by integrating prior research on firm growth and top management teams. In so doing we attempt to empirically inform the debate on the Penrose effect. In line with Penrose's theory, we argue that 'management [is] both the accelerator and brake for the growth process' (Starbuck, 1965, p. 490). Studying two subsequent periods of time, we argue that an increased amount of available managerial services accelerates firm growth, whereas the need for managerial services from highly complex expansion in one period slows down firm growth in the subsequent period. Specifically, our empirical study shows the positive effect of the rate of growth of a firm's top management team and the team's shared experiences on the rate of growth of the firm. It further highlights the negative effect of complexity associated with an increase in product scope or in international scope in one period on firm growth in a subsequent period. The finding that increasing the size of its TMT in one period enables a firm to grow faster in a subsequent period provides important support for a key argument in Penrose's theory of the growth of the firm. At the same time, this study offers insights into the crucial role of top managerial experience in firm expansion. Tan (2003) demonstrated that a subsidiary's growth after entry was positively influenced by the use of experienced expatriates. Our research focuses on the corporate level and suggests that common TMT-specific experience increases its ability to process information and thus fosters corporate firm growth. In a like vein, Kor (2006) finds that TMTs with a high level of shared team-specific experience cope well with uncertainty and thus invest more intensely in R&D than teams without such experience. Likewise, we show that common TMT-specific experiences may spur investments in uncertain expansion projects and accelerate a firm's growth rate. Furthermore, Kor (2003) argues that shared team-specific experience may increase entrepreneurial firms' sales growth within an industry. Our research adds to her study by finding support for a direct relationship between common TMT-specific experience and the rate of growth of large German firms on

the corporate level and by focusing on expansion steps undertaken in already familiar as well as into new product and international markets.

We believe that our study has important implications for researchers investigating both the level of product or geographic diversification at any point of time, or its increase over time. In their seminal paper on international expansion, Vermeulen and Barkema (2002) found that, along with other factors, the diversity of industries and countries entered negatively affected firm profitability. We focus in this study on additional product scope and cultural distance as sources of complexity. We specifically argue that it is not the relatedness and distance to the core industry or home country that is relevant but that to the closest product or country in a firm's existing portfolio. We argue that expansion steps into unrelated products or culturally distant markets lead to more complexity and that they put more strain on managerial resources than steps into familiar industries and settings. Our results support this logic. We find that it is not simply the number of expansion steps that matter, but that it is the amount of product scope or cultural distance added in a certain, limited period of time that leads to lower growth rates. In addition, our study may contribute to the body of research on the effects of product and cultural diversity on performance. A broad range of empirical studies have found a variety of relationships between diversity and performance (for overviews see Contractor et al., 2003; Palich et al., 2000). The results of our study show that it is not only the level of diversity at a certain point in time that affects growth but also how much firm scope is added over a period of time. Moreover, as we jointly study dimensions of both product and geographic diversification and diversity, we bring together research that has hitherto for the most part been in two separate research streams, one focusing on diversification through increasing product scope and the other focusing on international expansion (Meyer, 2006; Tallman & Li, 1996). Yet, both dimensions are part of a firm's overall growth strategy and our research supports this argument by suggesting that the complexity associated with product and international expansion comes with similar challenges for the firm and by empirically

showing that added product scope and added cultural distance exert a similar influence on firm growth.

The managerial relevance of this study lies in our identification of the possibilities to increase managerial services that a TMT can render. Thus, it is directly relevant for CEOs or supervisory boards that nominate, or decide on, top managers. Our results show that adding top managerial resources and ensuring that the team shares a high level of TMT-specific experiences are important drivers of future growth. Our study also can inform TMT decisions on the timing of expansion projects. By identifying sources of complexity in an expansion period, a TMT can gauge the amount of complexity they are likely to face and so better assess the probable level of managerial services that will be needed. As a result, a TMT can better estimate what level of product scope and/or cultural distance might be taken on in a given period of time and what level might hamper further firm growth unless spread over a longer period of time. Moreover, our study emphasizes the importance of preparing for future growth by developing top managers and allowing the TMT sufficient time to develop into an effective team.

4.7. Limitations and further research

A central decision that researchers investigating top management teams must make is the operational definition of a top management team. Prior studies have, for example, asked CEOs to identify the TMT members of their firms (e.g., Bantel & Jackson, 1989), or included all of a firm's managers above the vice-presidential level (e.g., Michel & Hambrick, 1992). Thus, each study that includes TMTs is limited in some way or another by its underlying definition of who makes up the team. In our analysis, we decided to include all members of the Vorstand, the management board of German corporations. This definition has two advantages. First, a complete list of Vorstand members is available in the respective annual reports of all German firms. Second, the members of a firm's Vorstand are legally and collectively responsible for the management of that firm, and as such the management board

of German firms closely resembles the definition of a TMT as a group with ‘the overall responsibility for the organization’ (Mintzberg, 1979).

We examine the Penrose effect in the context of German firms. Societal differences affect the influence that top managers are able to exert (e.g., Hambrick, 2007). For example, the CEOs of American firms arguably have a stronger impact than the CEOs of German or Japanese firms do (Crossland & Hambrick, 2007). Researchers may want to test our hypotheses in other national contexts or across national contexts.

We distinguished between expansion steps that increase product scope and those that increase cultural distance over the existing business portfolio of a firm arguing that the complexity inherent in this added product scope or cultural distance puts a strain on managerial services. We believe that it would be worthwhile to further explore this by having managerial services as a dependent variable. In the future researchers might analyze the impact of other factors, such as environmental turbulence (Luo & Peng, 1999), or use other measures for product relatedness, perhaps focusing on customer or managerial knowledge (Tanriverdi & Venkatraman, 2005), and for geographic diversity, for example geographic, economic or institutional differences (e.g., Estrin et al., 2009; Ghemawat, 2001; Meyer et al., 2009; Slangen & Beugelsdijk, 2010).

One limitation of our study has to do with the timing of expansion steps. We were able to determine the year of each step from annual reports, but it was not always possible to determine exact dates. Thus, we could not track of the precise sequence of expansion steps within a particular year. While firms may be able to learn from previous expansions, they also require a certain amount of time to learn from an expansion step and to make use of that knowledge to plan subsequent steps. Moreover, we do not measure the size of each expansion step. While larger expansion steps may be associated with higher complexity and require more managerial attention, every expansion step, independent of its size, needs to be initiated, planned, and implemented and thus consumes managerial services.

In this study, we bring together research on expansion processes and research on top management teams. We focused on the growth rate of the TMT and used overlaps in the tenure of TMT members as proxy for experiences that members had as a team, elements central to Penrose's theory of the growth of the firm (Penrose, 1959). We see great potential for future research in further integrating these two hitherto mainly distinct research streams. For example, future research might study how managerial characteristics other than shared experiences, for example TMT diversity (Cannella et al., 2008), affect a firm's growth rate. We believe that the result could be a better and more complete understanding of the crucial ways in which managers affect expansion processes. We relied on observable characteristics of TMTs as indicators of their information processing capabilities (Hambrick & Mason, 1984). While observable data based on archival sources have the advantage of being reliable and objective, we believe that further research may complement our approach by using research methods that more directly observe the creation and use of managerial services.

5. Conclusion

We began our inquiry with the questions of how complexity added in an expansion process may affect firm profitability and the potential to grow further and how the ability of a firm's top management team to cope with additional complexity may affect the outcome of expansion. To that aim we empirically investigated expansion processes on a corporate level based on a panel dataset covering the expansion steps and top management teams of 91 of the largest listed German firms between 1985 and 2007. We believe our work makes two central contributions:

First, it contributes to the growing research stream on firms' expansion processes. We show that expansion into new international and/or product markets is an important source of complexity that a firm's management needs to cope with. This complexity increases, the less similar the newly entered international and/or product markets are to those markets that a firm is already familiar with. As such, the added product scope and added cultural distance per period of time are two central characteristics of a firm's expansion process that influence a firm's profitability and potential to grow further.

Second, we address the influence of top management teams in our empirical analysis of expansion processes. While prior studies have shown that top management teams matter (Finkelstein et al., 2009), this study focuses on the effect of top management teams in the specific context of firm growth. Thus, our study contributes to the extant literature by showing that top management teams can make a difference in dealing with change and complexities of expansion.

Our research also has clear managerial implications. It highlights the importance of taking into account both the complexity added in the expansion process as well as the ability to handle complexity when making expansion decisions. Too much expansion in too short a period of time may overstretch managers' abilities and be very harmful for a firm's

profitability and growth prospects. In addition, it shows: top management team characteristics are relevant. In particular they matter for handling change and complexities of expansion processes. Thus, they should be taken into account when appointing new managers as having the 'right' top management team may enable a firm to grow faster and more profitably.

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Affirmation – Statutory Declaration
According to § 10 No. 7 of the Doctoral Studies' Guide Lines
(As Amended on the 5th March 2008)

I hereby declare, that the

Dissertation

submitted to the Wissenschaftliche Hochschule für Unternehmensführung (WHU) -Otto-Beisheim-Hochschule- was produced independently and without the aid of sources other than those which have been indicated. All ideas and thoughts coming both directly and indirectly from outside sources have been noted as such.

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The following persons helped me gratuitous / non-gratuitous in the indicated way in selecting and evaluating the used materials:

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Further persons have not been involved in the preparation of the presented dissertation as regards contents or in substance. In particular, I have not drawn on the non-gratuitous help of placement or advisory services (doctoral counsels / PhD advisors or other persons). Nobody has received direct or indirect monetary benefits for services that are in connection with the contents of the presented dissertation.

The dissertation does not contain texts or (parts of) chapters that are subject of current or completed dissertation projects.

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