Consequences and Antecedents of Absorptive Capacity in a Cross-Cultural Context

ABSTRACT

Continuous innovation and global competition are among the key challenges business are currently facing, which makes absorptive capacity, a firm's ability to explore and exploit external knowledge, a highly relevant topic. While absorptive capacity's positive impact on performance has been shown, we not only confirm this effect around the world by analyzing data from 549 companies in Austria, Brazil, Germany, India, Singapore and the US, but also show that its strength is not moderated by national culture. The positive consequences of absorptive capacity raise the question of ways to foster these knowledge management processes, which has not yet been adequately answered. We therefore assess the role of three determinants of organizational structure, in supporting absorptive capacity and also analyze the moderating effect of national culture. We reveal that centralization hinders, while formalization and specialization support the development of absorptive capacity. Furthermore, we show that these determinants of organizational structure have a stronger impact on absorptive capacity if they match national cultural values of power distance and individualism. Overall, we thereby advance research on the consequences as well as the antecedents of absorptive capacity, and provide managers with mechanisms to support corporate knowledge absorption and innovation generation throughout the world.

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in a Cross-Cultural Context

INTRODUCTION

"Continuous innovation […] and an ability to compete proactively in global markets are the key skills that will determine corporate performance in the twenty-first century" (Morris et al., 2008, p. iv).

The above quote refers to several current phenomena in the business world that need to be taken into account by firms and their managers. Firstly, firms must be innovative and therefore constantly acquire and process new information, since we are experiencing radical technological developments and shorter product life cycles (Henderson and Clark, 1990). And secondly, firms must be able to successfully compete in the global market place, as business is becoming increasingly globalized and multicultural (Schoemaker, 2008). Managers must therefore recognize the need for enhanced knowledge management capabilities throughout the world.

Absorptive capacity (ACAP), as "the capabilities of the firm to innovate and, thus, to be dynamic" (Todorova and Durisin, 2007, p. 774), refers to these knowledge management processes. Over the past 20 years the concept has received increasing recognition in management research (Lewin et al., 2011) and has therefore prompted a multitude of theoretical as well as empirical publications (Volberda et al., 2010). Studies have shown that ACAP positively influences innovation (Tsai, 2001), financial performance (Lane et al., 2001), and intra- (Szulanski, 1996) as well as inter-organizational knowledge transfer (Lane and Lubatkin, 1998). However, an empirical evaluation of the impact of the globalized and multicultural business world on the consequences of ACAP has not been carried out to date (Greve et al., 2009). While ACAP has been studied as independent variable in several countries, none of the studies have yet

assessed whether ACAP's impact varies in different countries or cultures. It is, however, important for researchers as well as practitioners to know whether ACAP is equally important in fostering firm performance throughout the world.

Having fully understood ACAP's impact around the world, it is then vital to understand how ACAP can be fostered within the organization (Flatten et al., 2011b). Several researchers have studied antecedents pertaining to prior knowledge (e.g. Lane et al., 2001), managerial behavior (e.g. Lenox and King, 2004) and inter-organizational factors (e.g. Lane and Lubatkin, 1998). While intra-organizational influences of ACAP have also been studied (e.g. Jansen et al., 2005), further research on the impact of organizational structure is called for (Volberda et al., 2010), since a firm's organizational structure is known to affect processes of knowledge acquisition, distribution and application (Miller, 1987). Hereby, the influence of different countries or cultures must also be considered, since cultural values determine whether certain organizational structures and roles are culturally accepted or not (Lachman et al., 1994), and thereby influence the degree to which these structures support or restrain ACAP.

By analyzing the relationships between ACAP, performance, organizational structure and national culture, this study therefore aims to answer a number of academic questions: (1) Does the impact of ACAP on firm performance vary in different cultures? (2) How does a firm's organizational structure influence ACAP? (3) How does the relationship between organizational structure and ACAP vary across different national cultures? Data from 549 firms in six culturally diverse countries allows us to answer above questions and thereby advance research in several ways. Firstly, we reveal whether ACAP is equally significant in enhancing firm performance throughout the world. Secondly, we analyze how firms can foster the development of ACAP (Flatten et al., 2011b), specifically by revealing the influence of a firm's organizational structure (Volberda et al., 2010). Thirdly, the study assesses the moderating role of national culture, and

thereby furthers the academic understanding on the impact of environmental influences on ACAP (Brettel et al., 2011).

By revealing above relationships, our study also provides practitioners with valuable insights. We expose whether knowledge management capabilities are more important for firm success in some countries compared to others. Furthermore, we reveal through which mechanisms of organizational structure managers can positively influence their firms knowledge acquisition and processing. Finally, we uncover the contingency of national culture and thereby enable managers to optimally foster knowledge exploration and exploitation around the world.

THEORETICAL PREMISES

Absorptive capacity

The concept of ACAP was introduced by Cohen and Levinthal (1989) and refers to "the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends" (W. Cohen and Levinthal, 1990, p. 128). Many scholars have refined and reconceptualized ACAP over the past twenty years (e.g. Lewin et al., 2011; Zahra and George, 2002). One of the most prominent extensions is that of Zahra and George (2002) (Volberda et al., 2010), which describes ACAP as a four step process, and has been validated by a number of empirical studies (e.g. Brettel et al., 2011; Flatten et al., 2011b; Jansen et al., 2005). During the first step, acquisition, firms identify and take in external knowledge that is potentially relevant for them (Zahra and George, 2002). This knowledge is then analyzed and interpreted in the second step, assimilation (Zahra and George, 2002). In the third step, transformation, the newly acquired and analyzed knowledge is then combined with existing knowledge (Flatten et al., 2011b). Thereby organizational procedures and routines are revised and adapted to reflect the newly acquired knowledge (Zahra and George, 2002). The fourth and last process step, exploitation,

refers to the commercial application of the new knowledge (W. Cohen and Levinthal, 1989). All of these dimensions can exist separately, but must be developed jointly in order to augment firm performance (Zahra and George, 2002). Managers must ensure that the four dimensions are fostered and balanced in the organization (Denison et al., 1995). If this is guaranteed, ACAP can be seen "as a dynamic capability pertaining to knowledge creation and utilization that enhances a firm's ability to gain and sustain a competitive advantage" (Zahra and George, 2002, p. 185).

Performance

Following the above definition, ACAP is aimed at increasing firm performance through knowledge exploration and exploitation (Zahra and George, 2002). Numerous scholars have analyzed this relationship and thereby found a positive connection between ACAP and firm performance (e.g. Bergh and Lim, 2008). But although these studies have been conducted in the US (Liao et al., 2003), Germany (Lichtenthaler, 2009), Hungary (Lane et al., 2001), China (Shenkar and Li, 1999; Zhao and Anand, 2009) and Malaysia (Kumar et al., 2009), among others, they fail to compare ACAP's impact on performance in the different countries. It therefore remains unclear whether ACAP is equally important for firm performance throughout different cultures.

Organizational structure

The structure of an organization is defined via a wide range of factors, whereby centralization, formalization and specialization (also referred to as complexity by some authors (e.g. Hage, 1965)) are the most prominent in organizational research (e.g. Fry and Slocum, 1984; Hage and M. Aiken, 1967; Reimann, 1973). *Centralization* thereby refers to the degree to which decision-making authority is centralized within the organization and the degree to which members of the organization rely on the hierarchy of authority (Hage and M. Aiken, 1967). In centralized firms decisions are thus made solely by the management, and employees have little authority (Song and Thieme, 2006). *Formalization* describes the extent to which rules and

procedures are formalized and the extent to which the organization enforces them (Jaworski and Kohli, 1993). In situations of uncertainty, formalized firms therefore rely strongly on formal rules and regulations rather than negotiation or discussion (Song and Thieme, 2006). *Specialization* refers to the degree of formal differentiation between occupations and functional units, i.e. horizontal specialization, and between different hierarchical levels, i.e. vertical specialization (Marsden et al., 1994b). A specialized organization is therefore characterized by many different responsibilities and departments as well as many hierarchical levels (Price, 1997).

These organizational factors determine how members interact with one another and how information is acquired, processed and applied (Miller, 1987). Although organizational structure and ACAP have been studied with regard to one another, the selection of a case-study approach (Van Den Bosch et al., 1999), a single industry (Jansen et al., 2005; Lane and Lubatkin, 1998) or rudimentary scales (Vega-Jurado et al., 2008), leave previous results with limited validity. Moreover, since national cultures affect the effectiveness of organizational structure (Lachman et al., 1994), global and cross-cultural generalizability can only be achieved by studying the impact of national culture on the relationship between organizational structure and ACAP.

National culture

National culture is a highly complex phenomenon (Dwyer et al., 2005) that is well defined as "patterned ways of thinking, feeling and reacting […] and especially their attached values" (Kluckhohn, 1951, p. 86) among members of a country. These patterns and values are learned over time, instead of being inherited (Hofstede and Bond, 1988). While many frameworks exist in order to differentiate different cultures, Hofstede's (2001) dimensions of national culture, which capture the above described patterns and values, are the most widely accepted in international research (Engelen and Brettel, 2011). Of a multitude of cultural dimensions we focus on the three major ones – power distance, individualism and uncertainty avoidance

(Kemper et al., 2011) – to analyze the concept of national culture in this study. *Power distance* captures "the extent to which the less powerful person in a society accepts inequality in power and considers it as normal" (Hofstede, 1984, p. 390). While differences in power exist in all cultures, power distance refers to the degree of acceptance and expectation of unequally distributed power (Hofstede and Bond, 1988). The second cultural dimension, *individualism*, captures "the tendency of individuals primarily to look after themselves and their immediate family" (Franke et al., 1991, p. 166), and is opposed to collectivism, where group goals and close relationships are valued higher (Triandis, 2001). *Uncertainty avoidance*, as the third cultural dimension, refers to "the extent to which a society feels threatened by uncertain and ambiguous situations and tries to avoid these situations" (Hofstede, 1980, p. 45).

RESEARCH MODEL AND HYPOTHESIS DERIVATION

Research model

We integrate the constructs of organizational structure, ACAP, performance and national culture into one research model. Hereby, we first analyze the moderating impact of national culture on the relationship between ACAP and performance. We then assess the influence of three determinants of organizational structure on ACAP. Finally, we evaluate the degree to which national culture affects the relationship between organizational structure and ACAP. We control all relationships for influences of firm age, size and industry, since e.g. firm size may be associated with certain organizational determinants and may influence knowledge management capabilities (Matusik, 2005). The overall research model is displayed in figure 1.

Insert figure 1 about here

Hypothesis derivation

Consequences of ACAP

To date, researchers have not yet empirically tested the influence of national culture on the relationship between ACAP and performance. Several researchers have, however, studied the role of national culture in innovation activities (e.g. Jones and Davis, 2000; Shane, 1993), but have thereby produced contradicting findings. While Rosenbusch et al. (2011), for instance, see innovation's impact on performance moderated by individualism, Strenger (2011), for example, finds no impact of various cultural dimensions. Based on these inconsistent findings regarding the impact of national cultural values on the relationship between innovation and performance, we follow the explorative approach of Brettel et al. (2012) in proposing that the same applies to the relationship of ACAP and performance. We therefore hypothesize national culture to have no moderating role on the effect of ACAP on performance.

Hypothesis 1: The impact of ACAP on firm performance is not moderated by (a) power distance, (b) individualism or (c) uncertainty avoidance.

Antecedents of ACAP

A firm's organizational structure influences processes of knowledge acquisition, distribution and application (Miller, 1987), and thereby affects its ACAP. In analyzing the impact of organizational structure on ACAP, we begin with centralization, referring to the extent of power distribution within a firm (Thalmann and Brettel, 2012). A highly centralized organization is inefficient for knowledge acquisition, since the "receptors" of knowledge should be spread out across the organization instead of being centralized in one "gatekeeper" (W. Cohen and Levinthal, 1990, p. 132). Furthermore, employees in highly centralized companies cannot make decisions on their own, but need to ask their superiors for approval before they act (Hage and M. Aiken, 1967). Consequently communication and the flow of information are largely vertical, i.e.

between employees and their superiors (Price, 1997). However, horizontal communication, i.e. between employees and their peers as well as between departments, is of high relevance for the process of knowledge assimilation (Flatten et al., 2011a). Furthermore, centralization requires approval loops with a superior and thereby decelerates the flow of information throughout the organization (Covin and Slevin, 1988). Yet a quick dispersion of knowledge throughout the organization is also an important aspect of the process of knowledge assimilation (Flatten et al., 2011b). Another aspect of centralized firms is the absence of involvement of employees in decision making regarding e.g. the implementation of new policies and programs (Hage and M. Aiken, 1967). Yet the processes of knowledge transformation and exploitation require the development and refinement of organizational processes based on the new external knowledge (Zahra and George, 2002). These decisions cannot always be made by the management, since detailed information on routines is frequently held by the employees only, rendering centralized decision making obstructive for knowledge transformation and exploitation (Lewin et al., 2011). We therefore believe centralization to have a negative impact on ACAP.

Hypothesis 2a: Centralization is negatively related to ACAP.

Next we assess the relationship between formalization, defined as the degree to which employee behavior is guided by formal rules and regulations (Jaworski and Kohli, 1993), and ACAP. The roles and tasks of employees in highly formalized organizations are properly defined and documented (Reimann, 1974), leaving employees with little influence on how they perform their work (Hage and M. Aiken, 1967). Yet organizational creativity and flexibility are important factors for knowledge acquisition, as they enhance the receptiveness for external information (Lyles and Salk, 1996). The analysis and interpretation of the newly acquired knowledge, i.e. assimilation, also require adaptability (Lane et al., 2001), which is, however, hindered by high degrees of formalization. On the other hand, formalization may positively influence the process

of knowledge transformation, since clear guidelines and operating procedures may support the adaptation of routines to the previously assimilated knowledge (Zollo and Winter, 2002). Furthermore, the process of exploitation consists of simply implementing new knowledge, e.g. by creating prototypes (Flatten et al., 2011a). This process can be tied to clear operational objectives (Sun and M. Anderson, 2012), and can therefore easily be supported by clear rules and operating procedures. Overall, however, we believe the negative impact to outweigh the positive effects and hypothesize that formalization has a negative impact on ACAP.

Hypothesis 2b: Formalization is negatively related to ACAP.

Finally, we examine the consequences of specialization, referring to a firm's reliance on a formal division of roles and hierarchies (Marsden et al., 1994b), for ACAP. Employees in specialized firms have clear responsibilities and are specialized in their field (Pugh et al., 1968), which enables them to develop a certain expertise and knowledge stocks. Since people absorb information more easily if they have prior related knowledge (Reagans and McEvily, 2003), specialization supports knowledge acquisition. Furthermore, formal networks, e.g. (specialized) departments, support an intensified and educated communication of new ideas and information (Liao et al., 2003), thereby facilitating knowledge assimilation. On the other hand, specialization may impede the communication of new ideas throughout the organization due to departmental barriers (Lundstrom, 1976). In the process steps of knowledge transformation and knowledge exploitation, specialization is expected to have a positive impact. Prior knowledge gained through specialization not only facilitates the recombination of knowledge, but also supports its exploitation (W. Cohen and Levinthal, 1990). Overall, we therefore believe specialization to have a positive influence on ACAP.

Hypothesis 2c: Specialization is positively related to ACAP.

Next we assess the moderating influence of national culture on the relationship between organizational structure and ACAP. Research has shown that organizational structures and processes are more effective if they match local cultural values (Lachman et al., 1994). Following the approach of Engelen (2010) we therefore assess the congruence of national cultural values with aspects of organizational structure, to hypothesize whether the impact of the organizational structure on ACAP is rather amplified or lessened.

We begin by taking into account the cultural dimension of power distance, which is defined as the degree to which members of a culture understand and anticipate power to be unequally distributed (Hofstede, 1983), and applying it to the relationship between centralization and ACAP. In high power distance cultures each individual has its clear place in the organizational hierarchy, and distinct hierarchical differences are made (Hofstede, 1980). This is in accordance with centralized organizations, which are characterized by a strong hierarchy of authority and little participation in decision making (Hage and M. Aiken, 1967), leading to a clear difference in power of organizational members. Furthermore, superiors in high power distance cultures are entitled to certain rights and privileges (Hofstede, 1983), just as superiors holding the decision rights in centralized organizations (M. Aiken and Hage, 1968). With the values of high power distance cultures and centralized organizations being fully aligned (Hofstede, 1980), we expect the impact of centralization on ACAP to be amplified by a high power distance.

Next we assess the influence of power distance on the relationship between formalization and ACAP. Formalized organizations are characterized by a large number of rules and regulations that govern the way employees work and that are strictly enforced (M. Aiken and Hage, 1968). In order for employees to accept and work by these rules, they must first accept that their superiors have the authority to apply and enforce the rules. This is ensured in high power distance cultures, where the members accept hierarchical differences and acknowledge that

superiors have more power (Hofstede, 1983). Furthermore, leaders in high power distance cultures are even expected to display their power, which leads to latent conflict between superiors and subordinates (Hofstede, 1980). This is reflected in formalized organizations where superiors constantly observe and punish rule violations of their employees (Hall et al., 1967). Consequently, a high power distance supports the effectiveness of a formalized structure. We therefore expect the impact of formalization on ACAP to be amplified by a high power distance.

Finally we analyze the impact of power distance on the relationship between specialization and ACAP. Organizations that are horizontally or vertically specialized have a clear differentiation between a large number of functions/departments or hierarchical levels, respectively (Marsden et al., 1994b). Clearly a high degree of vertical specialization, i.e. a large number of hierarchical levels, (Smith et al., 2004) corresponds directly to high power distance cultures where hierarchical differences are expected and accepted (Franke et al., 1991). On the other hand, a high degree of horizontal specialization, i.e. a large number of departments and therefore functional experts (Kalleberg et al., 1994), may not be in line with the values of high power distance cultures. Due to high degrees of specialization, functional experts may have more knowledge and competency regarding a certain topic than their hierarchical superior. Yet the expert would not be able to take a lead on this topic, since the relationship between superiors and subordinates is considered as given and the legitimacy of power is not to be questioned in high power distance cultures (Hofstede, 1983). Overall, however, we believe power distance and specialization to have matching values, and, therefore, expect power distance to amplify the relationship between specialization and ACAP.

Hypothesis 3: The impact of (a) centralization, (b) formalization and (c) specialization on ACAP is larger when power distance is high.

Next we assess the moderating influence of individualism, which is characterized by a focus on the individual and its needs, instead of a focus on the group as in collectivistic cultures (Hofstede, 1980). Again, we firstly investigate the antecedent centralization. Highly centralized organizations are characterized by strong differences between individuals, since decision-making lies only with superiors and employees need to refer to the superior before acting (Hage and M. Aiken, 1967). This clear differentiation between superiors and subordinates is in line with the values of individualistic cultures, which cherish a leadership ideal and place an emphasis on individual achievement (Hofstede, 1983). On the other hand, members of individualistic cultures highly value individual initiative and autonomy (Hofstede, 1980), which contradicts centralized organizations, since employees constantly need to ask their superiors before acting (M. Aiken and Hage, 1968). Overall, however, the effectiveness of centralization is expected to be supported by a high degree of individualism (Engelen, 2010), leading us to believe that individualism has a positive moderating impact on the relationship between centralization and ACAP.

Next we study the impact of individualism on the relationship between formalization and ACAP. While members of individualistic cultures highly value individual initiative and believe in autonomous decisions (Hofstede, 1983), formalized organizations are governed by strict rules and regulations, which leave the employees with little room for autonomous behavior (Hage and M. Aiken, 1967). This better matches collectivistic cultures, where members expect order to be provided by the organization, and prefer to blend into the group by displaying standard behavior (Hofstede, 1980). With individualism and formalization having contradicting values, we expect the impact of formalization on ACAP to be negatively moderated by individualism.

Finally we assess the moderating role of individualism on the relationship between specialization and ACAP. Individualistic cultures support individual variety and independence and have a strong focus on fulfilling individual needs (Triandis, 2001). These cultural values

match the attributes of horizontally specialized organizations, which consist of many different occupations and departments (Marsden et al., 1994b), and, thereby, enable individuals to fulfill their individual needs and achieve variety by specializing in an area of their preference. Furthermore, individualistic cultures place an emphasis on individual achievement and therefore see leadership as a respectable duty (Hofstede, 1983). This cultural understanding is congruent with characteristics of vertically specialized organizations, which are distinguished by a large number of hierarchical levels (Kalleberg et al., 1994), thus appealing to the aim of employees in individualistic cultures to strive for achievement and career development. Since horizontal and vertical specialization are therefore more accepted in individualistic cultures, we expect the impact of specialization on ACAP to be positively moderated by individualism.

Hypothesis 4: The impact of (a) centralization and (c) specialization on ACAP is larger and the impact of (b) formalization on ACAP is smaller when individualism is high.

Next we assess the moderating influence of uncertainty avoidance, which reflects the extent to which members of a culture feel uncomfortable in or threatened by unclear situations (Hofstede, 1985). Members of high uncertainty avoidance cultures therefore try to avoid ambiguous situations (Hofstede, 1983). In centralized organizations employees do not participate in any major decisions and always need to refer to their superiors before acting (Hage and M. Aiken, 1967). Thereby the employees are not exposed to the uncertainty of decision-making, which is congruent with their national cultural values. Furthermore, members of high uncertainty avoidance cultures believe that subordinates are unqualified compared to superiors (Hofstede, 1980). They therefore are likely to accept and to flourish in centralized organizations where their superiors make the decisions. Hence we expect uncertainty avoidance to positively moderate the relationship between centralization and ACAP.

Next we analyze the influence of uncertainty avoidance on the effect of formalization on ACAP. Since cultures with high uncertainty avoidance do not tolerate ambiguous situations, they have a strong desire for formal rules and regulations (Hofstede, 1980). This need is perfectly served in highly formalized organizations, where a high importance is placed on rules (Hage, 1965). Firstly, the tasks and procedures in formalized organizations are highly codified, meaning that employees have many rules and standardized procedures to work by (Hage and M. Aiken, 1967), thereby eliminating any ambiguity. Secondly, the rules and their compliance is constantly being observed in formalized organizations (Hage and M. Aiken, 1969). This is also congruent with high uncertainty avoidance cultures, since their members do not tolerate deviant behavior (Hofstede, 1983). Formalized organizations therefore correspond to the needs of members from high uncertainty avoidance cultures (Hofstede, 1980), which is why we expect the influence of formalization on ACAP to be positively moderated by uncertainty avoidance.

Finally we assess the moderating impact of uncertainty avoidance on the relationship between specialization and ACAP. Since members of high uncertainty avoidance cultures have a strong preference for formal rules and regulations (Hofstede, 1980), they also appreciate clear structures that ensure stability and predictability (Hofstede, 1984). Specialized organizations, characterized by many different departments and occupations, as well as many hierarchical levels (Smith et al., 2004), have clear responsibilities and reporting lines. A high degree of specialization clearly responds to the need of high uncertainty avoidance cultures, since the departmentalization of a firm limits the possible tasks of an employee and thereby reduces ambiguity for the employee (Marsden et al., 1994a). Furthermore, members of high uncertainty avoidance cultures highly respect and trust experts (Hofstede, 1983). Horizontal specialization enables the development of experts by assigning employees to specific departments (Zahra, 1991), thereby corresponding to the expectations of high uncertainty avoidance cultures. Since

members of uncertainty avoidance cultures are comforted by organizational specialization, we expect uncertainty avoidance to positively moderate the impact of specialization on ACAP.

Hypothesis 5: The impact of (a) centralization, (b) formalization and (c) specialization on ACAP is larger when uncertainty avoidance is high.

METHODOLOGY

Sample

Our empirical analysis is based on survey data, which was generated in six different countries selected for their distinct national cultures (Hofstede, 2001). The countries' scores on power distance, individualism and uncertainty avoidance are displayed in table 1.

Insert table 1 about here

We conducted the survey as an online questionnaire between July and October 2012 with two reminder emails after roughly 3 and 6 weeks. We targeted CEOs, since they are seen as key informants for firm level constructs (Kumar et al., 1993), such as ACAP, organizational structure and firm performance. Overall, we were able to generate 549 responses from Austria (77), Brazil (144), Germany (115), India (118), Singapore (37) and the US (58). Details of the sample in terms of respondents and their companies can be seen in table 2.

Insert table 2 about here

General validity of the survey results was confirmed by testing for a number of empirical biases. We find that common method bias is not a problem in our data, since Harman's single factor test revealed no single factor that accounts for the majority of variance in the data (P. Podsakoff et al., 2003). Moreover, by showing that no structural differences exist between early

and late respondents as well as between respondents of different hierarchies, we assured that our data is not affected by non-response bias or informant bias (Armstrong and Overton, 1977).

Measures

In order to generate valid and comparable results, our study applies only proven measures to capture the different constructs. However, since reverse coded items have yielded controversial results (P. Podsakoff et al., 2003), we positively reformulated all reverse coded items. In creating the survey we avoided translation biases by professionally translating all constructs into the local language of the six countries and then back-translating them (Lane et al., 2001). All items are available from the author upon request.

Dependent variables: ACAP was captured using Flatten et al.'s (2011a) scale, and performance was assessed applying the scale of Vorhies and Morgan (2005).

Independent variables: Two of the determinants of organizational structure, namely centralization and formalization, were measured with scales of Hage and Aiken (1967), based on scales initially developed by Hall (1963), while the third, specialization, was assessed following the methodology proposed in the National Organizations Survey 1991 by Kalleberg et al. (1994).

Moderating variable: National culture was operationalized through Hofstede's (1980) dimensions power distance, individualism and uncertainty avoidance. The respective scores of the six countries were taken from Hofstede (2001) and are displayed in table 1.

Before calculating the various regression models we assured that all constructs met general measures of validity. Cronbach's alpha, composite reliability and average variance extracted (AVE) of all constructs attained or surpassed the generally accepted thresholds (Bagozzi et al., 1991). Moreover, we assured discriminant validity of the constructs by testing that the square root of the AVE of each construct was greater than its correlation with the other constructs (Fornell and Larcker, 1981). The above measures of validity are displayed in table 3.

Insert table 3 about here

Issues of multicollinearity in our data could be ruled out, as the variance inflation factors of the regression models were all within the commonly accepted range (Hair et al., 1995). This might in part be due to the fact that all regression models were based on mean-centered variables in order to reduce the risk of issues of multicollinearity (J. Cohen et al., 2003).

FINDINGS

Consequences of ACAP

In order to assess the moderating role of national culture on the relationship between ACAP and firm performance we created a three-step regression model. We first entered controls (step 1), then the independent variable ACAP and the moderators (step 2) and finally, following Chan et al. (2010) the interaction terms of the independent variable and the moderators (step 3). The results of step 3 reveal that none of the interaction terms of ACAP and the three cultural dimensions have a significant impact on performance. Power distance, individualism and power distance, therefore, don't moderate the impact of ACAP on performance, lending support to H1a, H1b and H1c. Table 4 displays these results.

Insert table 4 about here

Antecedents of ACAP

We assessed organizational structure as an antecedent of ACAP in a separate regression model. Due to length restrictions of the paper, the results of this regression model (adjusted R-square .18, F-value 6.89, $p < .01$) are described in the text, instead of creating a separate regression table. We thereby find that centralization is negatively related to ACAP ($\beta = -.40$, $p < .01$), supporting

H2a. Furthermore, specialization is positively related to ACAP ($\beta = .11$, $p < .01$), supporting H2c. Surprisingly, however, formalization is positively related to ACAP ($\beta = .08$, $p < .10$), forcing us to reject H2b.

Following the above described approach of testing the moderation hypotheses, we created another three-step regression model, of which the results are displayed in table 5. Power distance does not significantly affect the relationship between centralization and ACAP, forcing us to reject H3a. Furthermore, we must reject H3c, since power distance has a negative moderating impact on the relationship between specialization and ACAP ($\beta = -.08$, $p < .05$), rather than a positive one. However, power distance positively moderates the relationship between formalization and ACAP ($\beta = .07$, $p < .10$), enabling us to accept H3b. Next, we assess the results of individualism moderating the impact of organizational structure on ACAP. We must reject H4a and H4b, since we find no evidence that individualism affects the impact of centralization or formalization on ACAP. Yet, based on the positive moderating effect of individualism on the relationship between specialization and ACAP ($\beta = .06$, $p < .10$), we accept H4c. Regarding the third dimension of national culture, we see no significant moderating effects. Uncertainty avoidance does not moderate the relationship of centralization, formalization or specialization on ACAP, obliging us to reject H5a, H5b and H5c.

Insert table 5 about here

DISCUSSION

Interpretation and implications for research

Our study assesses consequences and antecedents of ACAP in an international context, by revealing the impact of ACAP on performance as well as the effect of a firm's organizational structure

on ACAP under the influence of national culture. We thereby answer several current calls for research on intraorganizational antecedents of ACAP (Volberda et al., 2010), as well as calls on the cultural effects on the development (García-Morales et al., 2008) and the consequences of ACAP (Greve et al., 2009). We thereby contribute to research in several ways.

Firstly, by jointly analyzing data from six different countries with distinct cultural values we are able to demonstrate that national culture does not moderate the relationship between ACAP and performance. We empirically prove the importance of knowledge exploration and exploitation across varying national cultures, and show that the positive impact of ACAP on firm performance is valid and robust throughout the world.

Secondly, we reveal a strong relationship between determinants of organizational structure and ACAP. As expected, centralized structures with a strong hierarchy of authority and centralized decision making (Hage and M. Aiken, 1967) negatively affect ACAP. Furthermore, following our hypothesis, specialized organizations with a large number of departments and functions positively affect the processes of exploring and exploiting knowledge. However, contrary to our expectations, formalized organizations, relying strongly on rules and procedures as well as their enforcement (Hage and M. Aiken, 1967), have a positive effect on ACAP. We try analyzing this effect by separately assessing the individual process steps of ACAP. Knowledge acquisition and assimilation clearly require employees to be flexible and creative (Lane et al., 2001; Lyles and Salk, 1996) and must therefore be hindered by formalization. However, knowledge transformation and exploitation are focused more on the implementation of knowledge and innovations, and may therefore be supported by detailed operating procedures (Ettlie et al., 1984). This logic follows Zaltman et al. (1973) who find that formalization hinders the development of innovations, i.e. knowledge exploration, but supports the implementation of innovations, i.e. knowledge exploitation. Apparently, formalization's positive impact on knowledge exploitation outweighs the negative impact on knowledge exploration, thereby having an overall positive effect on ACAP.

Thirdly, by studying the impact of organizational structure on ACAP cross-culturally, we are able to further interpret the results. By employing national culture as a moderator to above relationship, we reveal how the impact of centralization, formalization and specialization varies across different countries. Particularly, we show that, in line with our expectations, formalization is more effective in fostering ACAP in high power distance countries. Clearly the application and enforcement of formal rules and procedures better supports knowledge management processes in cultures where hierarchical differences are accepted and expected. Contradictory to our expectations, our study reveals that specialization is less effective in supporting ACAP in high power distance cultures. Apparently the vertical component of specialization, i.e. a large number of hierarchical levels, which is obviously conform with high power distance cultures, is outweighed by the horizontal component of specialization, i.e. the creation of functional specialists through a large number of departments and functions. By creating power through functional specialization some employees implicitly question the legitimacy of hierarchical power, thereby contradicting the values of high power distance cultures. Overall the impact of specialization on ACAP is therefore negatively moderated by power distance. In line with our expectations, we find individualism to positively moderate the relationship between specialization and ACAP, since both vertical and horizontal specialization appeal to fulfilling individual needs (Triandis, 2001). In taking into account the third national cultural dimension moderating the relationship between organizational structure and ACAP, we find that uncertainty avoidance has no impact. The general impact of centralization, formalization and specialization can therefore be seen around the world, although the national cultural dimensions of power distance and individualism moderate its strength.

Limitations and avenues for further research

The results and limitations of this study suggest some avenues for further research. Firstly, we view ACAP as a second-order construct. Researchers may address the influence of

organizational structure on the individual process steps of ACAP, to reveal a more fine-grained view on how ACAP can be fostered.

Secondly, other intraorganizational factors possibly influencing ACAP need to be analyzed. While we reveal the role of organizational structure, other antecedents of ACAP, such as leadership styles, corporate cultures or network structures require further research.

Thirdly, our approach of collecting the data on independent variables and dependent variables from a single source bears the risk of receiving biased results (P. Podsakoff et al., 2003). Although our tests ruled out informant and common method bias, future researchers may try to obtain data on independent and dependent variables from different sources.

Managerial implications

Our study focuses on a firm's innovative capabilities, which are of increasing importance in global business (Morris et al., 2008), and thereby offers valuable insights to managers around the world. Firstly, we reveal that knowledge exploration and exploitation are of equal importance for firm performance across different countries. Managers should therefore try to foster the organization's ACAP to increase overall firm performance, regardless of the local cultural setting.

Secondly, our study reveals organizational structure as an important determinant in fostering ACAP. Decentralization, formalization and specialization are structural attributes that support knowledge exploration and exploitation. Managers should therefore promote participation in decision making among their subordinates and allow them to make their own decisions without requiring a superior's approval (decentralization). Furthermore, managers should create distinct departments and functions (specialization) and install rules and operating procedures (formalization) aimed at implementing new knowledge and innovations.

Furthermore, we provide internationally active managers with information on the effectiveness of organizational structure on knowledge management capabilities in different national cultural

settings. In countries with high power distance (e.g. India) managers should increase organizational formalization while reducing organizational specialization. In individualistic cultures (e.g. USA), on the other hand, managers should place a larger emphasis on organizational specialization. Merely the cultural dimension of uncertainty avoidance needs not to be taken into account by managers, as it has no impact on the effectiveness of organizational structure in fostering ACAP.

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FIGURES AND TABLES

Figure 1: Overview of the research model

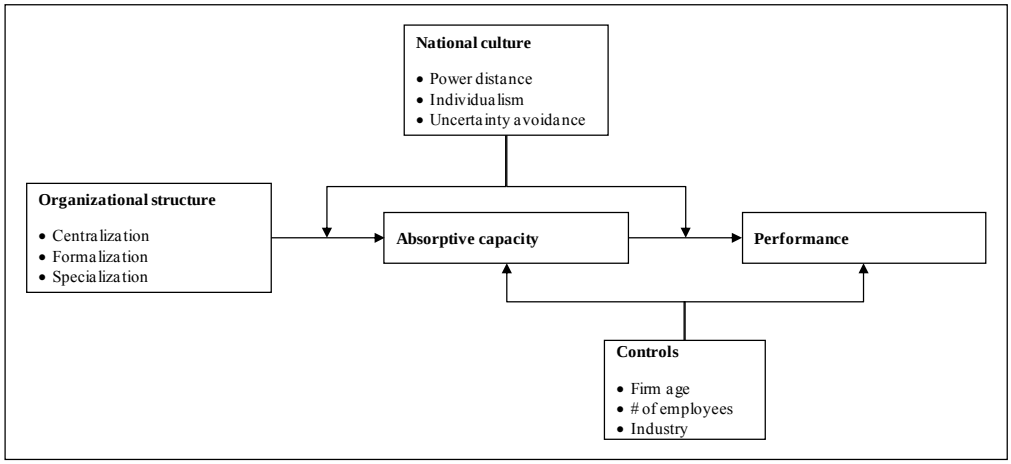

Table 1: Classification of cultural dimensions (Hofstede, 2001)

Country	Power distance	Individualism	Uncertainty avoidance
Austria	11	55	70
Brazil	69	38	76
Germany	35	67	65
India	77	48	40
Singapore	74	20	8
USA	40	91	46

Table 2: Sample composition (total sample n=549)

	Total	Austria	Brazil	Germany	India	Singapore	USA
Firm age							
0-10	25%	14%	22%	22%	47%	19%	14%
11-20	28%	32%	31%	23%	28%	22%	22%
21-50	32%	31%	37%	26%	21%	46%	43%
>50	16%	22%	10%	29%	3%	14%	21%
Firm size							
0-100	81%	88%	80%	79%	85%	62%	79%
101-200	8%	3%	9%	9%	8%	14%	5%
>200	12%	9%	11%	12%	8%	24%	16%
Industry							
Automotive	3%	4%	2%	3%	2%	3%	10%
Construction, Real estate	8%	5%	5%	11%	4%	26%	4%
Biotechnology, Healthcare	2%	0%	1%	1%	5%	0%	2%
Chemicals, Pharmaceuticals	5%	4%	2%	5%	11%	3%	6%
Electrical industry	3%	4%	5%	1%	3%	3%	2%
Energy, Natural Resources	4%	4%	2%	10%	2%	0%	4%
Engineering	10%	5%	3%	8%	27%	6%	6%
Financial services	2%	1%	1%	2%	4%	0%	0%
IT, Software, Internet	10%	3%	13%	8%	14%	6%	15%
Media	2%	1%	2%	4%	4%	0%	2%
Professional services	16%	21%	27%	12%	6%	17%	6%
Telecommunication	1%	1%	2%	1%	0%	3%	2%
Transport, Logistics	3%	5%	2%	4%	1%	3%	2%
Retail	6%	12%	8%	10%	0%	0%	0%
Other	25%	27%	26%	22%	18%	31%	40%
Position of respondent							
CEO	75%	80%	83%	70%	78%	49%	67%
Manager	25%	20%	17%	30%	22%	51%	33%

Table 3: Correlation coefficients, statistics and square root of AVE in diagonal

	1	2	3	4	5	6	7	8	9	10	11
Constructs											
1. ACAP - Acquisition	**.74**										
2. ACAP - Assimilation	.50	**.73**									
3. ACAP - Transformation	.42	.66	**.85**								
4. ACAP - Exploitation	.39	.49	.45	**.82**							
5. Performance - Customer success	.19	.46	.42	.38	**.80**						
6. Performance - Market performance	.14	.33	.30	.34	.56	**.81**					
7. Performance - Profitability	.12	.23	.28	.29	.44	.67	**.89**				
8. Centralization - Participation	.32	.49	.29	.35	.25	.17	.09	**.73**			
9. Centralization - Delegation	-.23	-.28	-.10	-.05	-.07	.02	-.02	-.22	**.76**		
10. Formalization - Rule observation	-.08	-.15	.03	.05	-.01	.04	.09	-.12	.56	**.83**	
11. Formalization - Job codification	.19	.16	.16	.15	.03	.03	.04	.36	-.41	-.21	**.71**
Statistics											
AVE	.55	.53	.72	.67	.64	.66	.79	.54	.58	.69	.50
Composite reliability	.71	.82	.91	.86	.87	.88	.94	.82	.87	.81	.83
Cronbach's alpha	.71	.80	.91	.85	.87	.88	.94	.82	.87	.81	.83

Table 4: Regression results: Relationship between ACAP and performance moderated by national culture

		Dependent variable: ACAP						
	Independent variables	Step 1	Step 2	Step 3	Step 2	Step 3	Step 2	Step 3
	Controls							
	Firm age	-.11 **	-.06	-.06	-.08 *	-.08 *	-.08 *	-.08 *
	Firm size	.01	.04	.04	.04	.04	.04	.04
	Automotive	-.05	-.03	-.03	-.04	-.04	-.04	-.04
	Construction, Real estate	-.07	-.08	-.08	-.08 *	-.09 *	-.08 *	-.08 *
	Biotechnology, Healthcare	-.05	-.06	-.06	-.06	-.06	-.06	-.06
	Chemicals, Pharmaceuticals	.05	.00	-.01	.00	-.01	.00	-.01
	Electrical industry	-.04	-.01	-.01	-.01	-.02	-.01	-.01
	Energy, Natural Resources	.01	-.01	-.01	-.02	-.02	-.02	-.02
	Engineering	-.02	-.06	-.06	-.06	-.06	-.06	-.06
	Financial services	-.06	-.10 **	-.10 **	-.10 **	-.10 **	-.10 **	-.10 **
	IT, Software, Internet	-.01	-.06	-.06	-.06	-.06	-.06	-.07
	Media	-.02	-.05	-.05	-.05	-.05	-.05	-.05
	Professional services	-.03	-.07	-.07	-.08	-.08	-.08	-.08
	Telecommunication	.01	-.02	-.02	-.03	-.03	-.03	-.03
	Transport, Logistics	-.01	.00	-.01	-.01	-.02	-.02	-.02
	Retail	-.01	-.02	-.03	-.04	-.04	-.04	-.04
	Other	-.05	-.05	-.05	-.06	-.06	-.06	-.07
	Direct effects							
	ACAP		.44 ***	.44 ***	.43 ***	.43 ***	.43 ***	.42 ***
	Power distance		.10 **	.10 **				
	Individualism				-.02	-.02		
	Uncertainty avoidance						.00	.01
	Moderating effects							
H1a	ACAP x Power distance			-.04				
H1b	ACAP x Individualism					.03		
H1c	ACAP x Uncertainty avoidance							.03
	(Adjusted) R-square	.00	.18	.18	.17	.17	.17	.17
	F-value	.85	7.17 ***	6.86 ***	6.82 ***	6.50 ***	6.80 ***	6.48 ***

***p < .01, **p < .05, *p < .10 two-tailed significance

Table 5: Regression results: Relationship between organizational structure and ACAP moderated by national culture

		Dependent variable: ACAP						
	Independent variables	Step 1	Step 2	Step 3	Step 2	Step 3	Step 2	Step 3
	Controls							
	Firm age	-.08 **	-.08 **	-.08 **	-.07 **	-.07 **	-.07 *	-.07 *
	Firm size	-.07 *	-.05	-.05 *	-.05	-.05	-.05	-.05 *
	Automotive	-.01	.01	.01	.01	.01	.01	.01
	Construction, Real estate	.02	.02	.02	.03	.02	.02	.02
	Biotechnology, Healthcare	.03	.04	.04	.04	.04	.04	.04
	Chemicals, Pharmaceuticals	.12 ***	.12 ***	.12 ***	.12 ***	.11 ***	.12 ***	.12 ***
	Electrical industry	-.06	-.06 *	-.06 *	-.05	-.05	-.06	-.06
	Energy, Natural Resources	.07 *	.04	.04	.04	.04	.05	.05
	Engineering	.08 *	.07 *	.07 *	.07 *	.07 *	.07 *	.07 *
	Financial services	.08 **	.07 *	.08 **	.07 **	.07 **	.07 **	.07 **
	IT, Software, Internet	.13 **	.12 ***	.12 **	.12 ***	.12 **	.12 ***	.12 **
	Media	.08 *	.06 *	.05	.06 *	.06 *	.06 *	.06 *
	Professional services	.10 **	.09 *	.09 **	.11 **	.10 **	.10 **	.10 **
	Telecommunication	.07 **	.07 **	.07 **	.07 **	.08 **	.07 **	.07 **
	Transport, Logistics	.01	.00	.01	.01	.01	.01	.01
	Retail	.07 *	.03	.03	.05	.05	.04	.04
	Other	.02	.02	.02	.03	.03	.03	.03
	Direct effects							
	Centralization		-.39 ***	-.38 ***	-.39 ***	-.39 ***	-.40 ***	-.40 ***
	Formalization		.10 **	.07 *	.09 **	.08 *	.07 *	.07 *
	Specialization		.12 ***	.16 ***	.12 ***	.14 ***	.11 ***	.11 ***
	Power distance		-.08 **	-.08 **				
	Individualism				.06 *	.05		
	Uncertainty avoidance						.02	.01
	Moderating effects							
H2a	Centralization x Power distance			.00				
H2b	Formalization x Power distance			.07 *				
H2c	Specialization x Power distance			-.08 **				
H3a	Centralization x Individualism					.00		
H3b	Formalization x Individualism					-.04		
H3c	Specialization x Individualism					.06 *		
H4a	Centralization x Uncertainty avoidance							.00
H4b	Formalization x Uncertainty avoidance							.01
H4c	Specialization x Uncertainty avoidance							.02
	(Adjusted) R-square	.03	.18	.19	.18	.18	.18	.17
	F-value	2.15 ***	6.78 ***	6.20 ***	6.66 ***	5.93 ***	6.56 ***	5.72 ***

***p < .01, **p < .05, *p < .10 one-tailed significance