



# What Fosters Individual-Level Absorptive Capacity in MNCs? An Extended Motivation–Ability–Opportunity Framework

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## Abstract

Absorptive capacity has been marked as one of the most important capabilities of Multinational Corporations for effective management of knowledge. To address calls for research on micro-level origins of the concept, this paper focuses on the determinants of individual-level absorptive capacity. We examine the extent to which individuals' capability to recognize, assimilate and exploit new knowledge from the environment is shaped by different forms of work motivation (i.e., intrinsic and extrinsic), overall ability, exposure to diverse country contexts and personal characteristics. Drawing on *and* extending the Motivation–Ability–Opportunity framework, we develop and test a set of hypotheses. Using a unique dataset collected from 648 individuals in a multinational corporation, we show that individuals' intrinsic motivation and overall ability are the key antecedents of absorptive capacity. In contrast, extrinsic motivation does not emerge as a significant predictor. We find that past international assignments to distant countries could be detrimental to individuals' absorptive capacity. However, our results suggest that for those individuals who are open to new experiences, assignments to distant countries become useful opportunity for absorptive capacity development. These findings contribute to existing literature by showing effects of alternative types of motivation and underscoring the importance of using selective assignment when considering exposure to diverse country context as a tool for employee capability development.

**Keywords** Absorptive capacity · Distance · Extrinsic motivation · International assignments · Intrinsic motivation · Motivation–Opportunity–Ability framework · Openness to experience

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## 1 Introduction

The ability to continuously renew, develop and transfer knowledge-based assets is a central goal for firms. In this regard, absorptive capacity stands out as *the* capability to support constant innovation and organizations' learning from their environment (van Wijk et al. 2008; Zahra and George 2002). Since Cohen and Levinthal (1990) originally defined it as the capability to identify, assimilate and exploit knowledge from the environment (c.f. Lane et al. 2006), absorptive capacity has attracted sustained interest in strategy and organization research (for systematic reviews, see Lewin et al. 2011; Sun and Anderson 2010; Volberda et al. 2010). The role of absorptive capacity is especially paramount for Multinational Corporations (MNCs), as sustaining their performance depends upon their ability to learn from diverse environments within which they operate (Almeida et al. 2002; Minbaeva et al. 2003; Song 2014; Song and Shin 2008; Song et al. 2011; Regnér and Zander 2011, 2014).

Although the collective body of work on absorptive capacity is quite extensive, it is also biased towards its macro-level antecedents and consequences, which obscures incumbent role of individual-level factors in the development of absorptive capacity. We believe that it is an important omission due to several reasons. To begin with, individuals play a crucial role in the creation, transfer and absorption of knowledge, which suggests that individual-level factors are a critical antecedent to firm-level innovative capabilities. According to Foss (2007, p. 43, emphasis added), this means that an accurate understanding of knowledge related phenomena (e.g., absorptive capacity) “cannot be reached in lieu of a *starting point* in individuals”. Given that intellectual capital is heterogeneously distributed across and within firms (Rothaermel and Hess 2007), an attempt to study antecedents and/or consequences of absorptive capacity at the aggregate level of firm would be prone to ecological fallacy (Peterson et al. 2012). However, an overwhelming majority of existing absorptive capacity literature has assumed away that individual-level heterogeneity. Instead, absorptive capacity has been routinely treated as a collective phenomenon and ubiquitously studied at various collective levels such as teams (e.g., Nemanich et al. 2010), alliances (e.g., Enkel and Heil 2014; Newey and Verreyne 2011), industrial districts (e.g., Giuliani 2005) and—most commonly—firms (for a review see, Volberda et al. 2010). As a result of insufficient attention paid to the individual-level sources and micro-foundations of absorptive capacity, the concept got reified over time based on the critical—yet debatable—assumption that “absorptive capacity resides in the firm alone [which] has also led researchers to overlook the role of individuals in developing, deploying, and maintaining absorptive capacity” (Lane et al. 2006, p. 853). Limited number of recent studies on individual-level absorptive capacity (e.g., Enkel et al. 2017; Zhao and Anand 2009), on the other hand, have considered this capability as an exogenous given and examined its outcomes (e.g., innovative performance) without probing into antecedent factors that could influence how absorptive capacity develops among individual employees. To address the insufficient understanding of micro-level origins of the concept (Hotho et al. 2012), we

will examine individual-level antecedents of absorptive capacity, develop a theoretical framework suited to this level and empirically test it on a unique dataset. Shifting our focus from collective to individual-level is important and pinpoints two additional gaps in existing absorptive capacity research.

First, although we fully concur with the conceptualization of absorptive capacity as a function of employees' ability and motivation (Minbaeva et al. 2003, 2014), we observe that motivational component (i.e., willingness to exert effort towards learning and knowledge absorption) of absorptive capacity has been treated as a unitary construct. This represents an important oversight given that past research on organizational behavior emphasizes the importance of controlling for the alternative types of motivation in complex and learning-oriented task environments (Gagné and Deci 2005; Reinhold et al. 2011). Accordingly, we draw inspiration from Self-Determination Theory (Ryan and Deci 2000a) and examine employees' different types of motivation (i.e., intrinsic and extrinsic) as distinct antecedents of their absorptive capacity. In particular, due to the inherent ambiguities and uncertainties associated with new knowledge, we predict that an individual's absorptive capacity should be driven by intrinsic interest in learning and personal development. On the other hand, given that it stimulates individual action by clear and observable outcomes, extrinsic motivation may undermine certain aspects of absorptive capacity. Therefore, making the distinction between different types of motivation is necessary to contribute to further refinement of individual-level absorptive capacity and its antecedents.

Second, recent research has suggested that individual psychological characteristics matter to a great extent in the development and management of knowledge (Cabrera et al. 2006; Wang and Noe 2010). However, explicit attention to such individual-level heterogeneity is still absent in existing absorptive capacity literature at large. By directing our attention to micro-level sources of variation in individuals' absorptive capacity, we aim to address this research gap. We do so by (a) focusing on a specific and under-researched type of opportunity for individual-level capability development (i.e., medium-term international assignments) and (b) examining a specific personality characteristic (i.e., openness to experience) to take individual-level heterogeneity into consideration when it comes to benefitting from these opportunities. Similar to Dragoni et al. (2014), we expect that not all individuals would learn equally from their international assignments and translate their experiences into competence development. In particular, we examine both the nature of past international assignments (i.e., cumulative distance from home country) and individual dispositions (i.e., openness to experience) as two determinants of the extent to which individuals could benefit from international experience and use it as an opportunity for developing their absorptive capacity. By zeroing in on the individual-level differences, we also differ from extant corpus of work on organizational capabilities and learning, which doubtfully assumes that "individuals a priori are homogenous, infinitely malleable, or randomly distributed into organizations" (Felin and Hesterly 2007, p. 196).

Based on the above, we answer two main questions: (1) what are the respective effects of motivation (i.e., intrinsic and extrinsic), ability and opportunity on the degree of individual-level absorptive capacity development? (2) how do individuals' dispositional attributes (i.e., openness to experience) affect the extent to which they

can effectively utilize opportunities for capability development? By answering these questions, we make three contributions to the literature. First, we address currently limited understanding on the drivers and antecedents of individual-level absorptive capacity (Volberda et al. 2010). This way, our ambition is to contribute to “a coherent theory of new value creation [which] must start with a consideration of the individuals who make up the organization” (Felin and Hesterly 2007, p. 196). We thus aim to shed light on the antecedents of individual-level absorptive capacity, which is an important—yet hitherto missed—starting point that would enable future research to better identify cross-level influences and drivers of firm-level absorptive capacity. Second, our theoretical framework suggests that absorptive capacity is not just about employees’ individual abilities and/or cumulative knowledge repositories (Lewin et al. 2011). Instead, we build on the Motivation–Ability–Opportunity (MOA) framework (Blumberg and Pringle 1982) and highlight motivation and opportunity as two additional antecedents of individual-level absorptive capacity. This way, we seek to identify if and how different types of motivation could be used to develop absorptive capacity in organizations. Third, we complement extant international business research on expatriation (e.g., Bonache et al. 2010; Stahl and Caligiuri 2005), and examine whether individuals’ exposure to diverse contexts by frequently partaking in medium-term international projects is conducive to the development of their own absorptive capacity. We also extend the MOA framework by taking individual-level heterogeneities into consideration and showing that only open minded individuals can benefit from opportunities for skill development via overseas assignments to distant countries. Thus, our paper identifies the boundary conditions within which employees’ past international experience is translated into competency gains (c.f. Dragoni et al. 2014).

The paper is structured as follows. In the next section, we give a theoretical background and develop our hypotheses. Following this, we describe our methodological design and data collection. We then present the results of our empirical analyses. Finally, we discuss our findings and relate them to existing literature.

## 2 Absorptive Capacity and Its Antecedents

Since the seminal article by Cohen and Levinthal (1990), absorptive capacity has been at the forefront of the organizational learning and knowledge management literatures. A myriad of issues has been discussed in different sub-streams of the absorptive capacity literature, such as the economics and management of innovation, business performance, knowledge transfer and organizational learning (Gupta and Govindarajan 2000; Lane et al. 2001; Tsai 2001; Volberda et al. 2010; Zahra and George 2002). Empirical insights from these studies evince that absorptive capacity plays a pivotal role in knowledge transfer, organizational learning efficiency and firm innovation performance (Argote et al. 2003; Cockburn and Henderson 1998; Lane et al. 2006; Lane and Lubatkin 1998; Szulanski 1996; Tsai 2001).

Although the literature on absorptive capacity is vast (for recent surveys of the field, see Volberda et al. 2010; Lichtenthaler 2016), attention has been mostly directed towards organizational-level antecedents. This extensive macro-focus has

contributed to our relative lack of understanding of micro-foundations of absorptive capacity (Lewin et al. 2011). To address this, we focus on individual-level absorptive capacity. In line with earlier studies (e.g., Schleimer and Pedersen 2013), we acknowledge the multidimensional nature of absorptive capacity. Accordingly, we empirically examine the distinct dimensions of absorptive capacity in terms of employees' *recognition*, *assimilation* and *exploitation* abilities (Cohen and Levinthal 1990).

In this paper, we draw on the Motivation–Opportunity–Ability (MOA) framework (Blumberg and Pringle 1982) and use it as our overarching framework. In this regard, it would be of value to delineate that it is not our intention to argue that MOA is *the* framework that could shed ultimate light on the antecedents of absorptive capacity at the individual-level. However, relative to other individual-level theories of organizational behavior (e.g., Goal Orientation Theory, Theory of Reasoned Action), MOA provides a more comprehensive perspective by accounting for both personal (i.e., internal) and situational (i.e., external) determinants of workplace performance. Moreover, MOA has been demonstrated as a coherent and rigorous theory that can explain variation in terms of individual-level behavior, action and performance in the context of knowledge management (e.g., Chang et al. 2012; Siemsen et al. 2008). Furthermore, we also draw inspiration from earlier knowledge transfer and absorptive capacity studies, which specifically emphasize the importance of simultaneously studying ability, motivation and opportunity to increase our understanding of creation, preservation and transfer of knowledge (Argote et al. 2003). Similarly, in their retrospective study, Minbaeva et al. (2014) invite future studies to use theories that can elucidate the role of ability, motivation and opportunity in the development of absorptive capacity. They go even further to single out MOA framework as a fruitful theoretical lens to study knowledge transfer and absorptive capacity in MNCs. Based on this, we believe that MOA is a suitable theoretical perspective, which could yield complementary insights on the individual-level antecedents of absorptive capacity.

We conceptualize motivation, ability and opportunity as three interrelated but distinct antecedents of absorptive capacity (Siemsen et al. 2008). The MOA perspective represents a meta-theoretic principle that has been widely used to explain individual-level phenomena in contexts including knowledge sharing and management (Argote et al. 2003; Chang et al. 2012; Reinholt et al. 2011; Siemsen et al. 2008). As noted by Minbaeva et al. (2014, p. 57), MOA framework holds a great potential “for framing and potentially extending our thinking about mechanisms that contribute to knowledge transfer in MNCs”. It explains how individuals' performance is affected by their motivation (i.e., willingness and inclination to perform) and ability (i.e., relevant knowledge, skills and experience possessed by the individual) to carry out their work, as well as the opportunities (i.e., those resources in the work environment that could facilitate performance) that they are provided with in their work environment. Previous studies have identified different versions of the MOA framework with alternative interaction effects (e.g., Boxall and Purcell 2003; Siemsen et al. 2008). However, past research on absorptive capacity at the organizational (Minbaeva et al. 2003) and individual level (Chang et al. 2012) have identified ability, motivation and opportunity as distinct building blocks of absorptive capacity. In

this paper, we follow the same approach and specifically look into the additive variant of MOA. Accordingly, we will only test the direct effects of ability, motivation and opportunity on individual-level absorptive capacity. Similar to earlier studies (Zahra and George 2002), we consider absorptive capacity as a higher-order latent construct, which means that it can only be inferred from the nature/intensity actions and behavior of individuals (also see Lewin et al. 2011 for a similar theoretical reasoning). In other words, absorptive capacity of an individual could be captured by a set activities and routines that are specifically aimed at the identifying, understanding and exploiting new knowledge (Flatten et al. 2011). We thus build our reasoning on the MOA framework to examine how motivation, ability and opportunity prompt an individual to *perform specific activities* that would contribute to the development of his/her absorptive capacity.

## 2.1 Motivation and Absorptive Capacity

Departing from the currently limited work on the role of effort intensity and motivation in absorptive capacity (e.g., Minbaeva et al. 2003), we divide motivation into *intrinsic* and *extrinsic* types. As noted in the introduction, different types of motivation could affect the degree of effort individuals would be willing to exert on a specific type of behavior and such effects would also depend on the specific outcome variable of interest. In particular, in this paper we subscribe to the notion that absorptive capacity is a capability that could be developed over time as a result of specific routines and practices (c.f. Hotho et al. 2012; Lewin et al. 2011). In other words, we do not consider absorptive capacity as a ‘fixed’ capability that emerges independent of an individual’s level and type of motivation. Instead, depending on his/her type of work motivation, an individual would be more or less willing to augment his/her skills to recognize, assimilate and exploit new external knowledge. Thus, our ensuing theoretical development is primarily aimed at the individual-level factors affecting *development* of absorptive capacity, rather than degree of utilization thereof. To that end, we build on Self Determination Theory to differentiate between *intrinsic* and *extrinsic* motivation (Gagné and Deci 2005; Ryan and Deci 2000a) and examine their respective roles in the development of different dimensions of individual-level absorptive capacity (i.e., recognition, assimilation and exploitation).

Intrinsically motivated people work for the sheer joy of it, throwing themselves into a task purely because they find it interesting, with little expectation of immediate rewards (Osterloh and Frey 2000; Ryan and Deci 2000b; Williams and Deci 1996). Earlier studies in educational psychology have shown that intrinsically motivated individuals score high on learning performance (Vansteenkiste et al. 2004). As stated by Vansteenkiste et al. (2006, p. 20) “intrinsic motivation is seen as the motivational instantiation of the proactive, growth-oriented nature of human beings [which] is the natural basis for learning and development”. Because of the high degree of ambiguity and uncertainty, exploratory learning processes might however not yield clearly measurable outcomes for any given degree of effort. Thus, some of the newly identified, acquired and assimilated ideas might

not be taken up, or even turn out to be useless, depriving the individual of recognition or material compensation for his/her efforts in identifying and assimilating new knowledge. This implies that individuals need to be intrinsically motivated in order to learn how to explore new ideas and assimilate external knowledge even if outcomes of such efforts are not immediate or visible (Rigolizzo and Amabile 2015). Past research has shown that intrinsic and autonomous motivation leads to higher level of effort, perseverance and persistence (Reinholt et al. 2011), all of which are important to sustain individuals' willingness to obtain required skills for the absorption of new knowledge against aforementioned hurdles such as causal ambiguity and outcome uncertainty.

In contrast to intrinsic motivation, extrinsic motivation is salient when the activity leads to material rewards and explicit recognition (Gagné and Deci 2005; Porter and Lawler 1968). Hence, extrinsically motivated employees are more likely to respond to pressure coming from external regulations and/or self-imposed pressure (Deci and Ryan 1985). Thus, when an individual has a strong extrinsic motivation, s/he would regulate his/her efforts in response to external mandates and incentives, which "often leads the individual to put in only the minimum required effort, focus on short-term gains, and take the easiest route to attain the externally defined end" (Reinholt et al. 2011, p. 1280). Considering the inherent uncertainties and risks associated with new knowledge absorption, it is possible to expect that extrinsic motivation would cause individuals to follow 'shortcuts' in their daily work, which could in turn curb individuals' absorptive capacity development.

Taken together, the reasoning above suggests different forms of motivation play separate roles in developing individual-level absorptive capacity. While intrinsically motivated employees would be more inclined to develop skills required for highly ambiguous and uncertain task of knowledge absorption, extrinsic motivation would induce some form of 'short-termism' among individuals who refrain from pursuing new (and thus uncertain) ideas that might not have clearly observable and directly measurable outcomes. This suggests that intrinsic motivation would be conducive to the development of recognition and assimilation capabilities, which require experimentation and risk taking. However, since intrinsically motivated people would be less interested in the material consequences of their work efforts, they would be less willing to put effort in enhancing their skills for exploiting new knowledge. The reverse would be the case for extrinsically motivated people, for whom efforts for recognizing and assimilating new knowledge would be too uncertain and risky to achieve those concrete results they are strongly driven by. Development of exploitation capabilities, on the other hand, would yield a straightforward way to realize material goals and external demands. Based on this, we expect that intrinsic and extrinsic motivation would have distinct influences on different dimensions of individuals' absorptive capacity. More specifically, we hypothesize:



*H1a: The higher an individual's intrinsic work motivation, the higher is her capacity to recognize and assimilate new external knowledge.*

*H1b: An individual's intrinsic work motivation would not have a significant effect on her capacity to exploit new external knowledge.*

*H1c: An individual's extrinsic work motivation would not have a significant effect on her capacity to recognize and assimilate new external knowledge.*

*H1d: The higher an individual's extrinsic work motivation, the higher is her capacity to exploit new external knowledge.*

## **2.2 Ability and Absorptive Capacity**

The second key determinant of our framework is ability, which we conceptualize as the skills, capabilities, experience and knowledge required to absorb new knowledge. Generally speaking, ability represents an individual's own perceived mastery, understanding and knowledge, which increase their competence and eventual performance (Bos-Nehles et al. 2013; Nicholls 1984). Earlier research has shown that limited education, training and past experience could undermine individuals' ability to possess, understand and utilize new information (Anderson and Jolson 1980; MacInnis and Jaworski 1989). Accordingly, ability and past knowledge have been identified as the key determinant of absorptive capacity (Cohen and Levinthal 1990). Indeed, the role of ability is so central that most past literature has simply equated it with absorptive capacity and measured it by various proxies for cumulative knowledge and experience (for an extensive review, see Maldonado et al. 2015). We depart from these studies and conceive of ability as an antecedent factor of absorptive capacity (rather than a proxy thereof) that could increase individuals' performance in terms of learning behavior.

To avoid potential criticism for tautological reasoning, we shall emphasize that we consider ability and absorptive capacity to be two distinct constructs. This distinction becomes clearer when we consider the paradox of technological capabilities (Song and Shin 2008). That is, although the extent of an existing knowledge stock could help companies effectively source new knowledge from their environment, such capabilities might also constrain knowledge seeking behavior due to well-established technological trajectories (Song 2014). The hypothesis that a large knowledge stock might lead to limited knowledge sourcing behavior is also corroborated by the past studies that point out to success traps (e.g., Levinthal and March 1993) as well as emphasize the inherent tradeoff between exploration and exploitation in organizational learning (e.g., Gupta et al. 2006; March 1991). This stands to reason that strong abilities, as reflected by accumulated knowledge stock and past experience, might not always lead to high absorptive capacity. Therefore, it becomes important to differentiate between ability and absorptive capacity and to empirically test the link in between these two constructs.

Above, we highlight the possibility that firms with high levels of knowledge stocks can fail to identify and understand new technological trends due to their path-dependent search behavior and/or overconfidence in their abilities. That said,



however, we would still predict a positive relationship between ability and absorptive capacity. This prediction is based on the cumulateness feature of absorptive capacity, which suggests that “the ability to assimilate information is a function of the richness of the pre-existing knowledge structure” (Cohen and Levinthal 1990, p. 131). Thus, the level of individual absorptive capacity would depend on the individual’s existing knowledge base, as represented by prior educational background, vocational experience and on-the-job training (Breaugh and Mann 1984). As indicated by Sun and Anderson (2010, p. 143) “the greater the breadth of [individuals’] prior knowledge, the greater is their ability to explore new sources of knowledge”. In addition to this, individuals with a rich knowledge base would find it easier to grasp new knowledge, relate it to their existing repertoire of routines *and* put it into practical use. In other words, existing knowledge would determine the degree to which the individual can recognize, value, understand and use new knowledge. Therefore, we hypothesize that:

*H2: The higher an individual’s ability, the higher is her capacity to recognize, assimilate and exploit new external knowledge.*

### 2.3 Opportunity and Absorptive Capacity

The third element in our framework is opportunity, which refers to the environmental and contextual elements that could enable certain actions (Siemsen et al. 2008). Following previous studies (e.g., Bos-Nehles et al. 2013; Boxall and Purcell 2003; Waldman 1994), we conceptualize opportunity in terms of individuals’ work environment and how their work context is shaped by situational constraints and enabling mechanisms. In the context of an MNC, a particularly interesting factor that could alter individuals’ work environment and subsequently create opportunities for skill development is the nature and context of overseas assignments (Dragoni et al. 2014). Past studies have delved into the learning effects of international assignments on individual employees (for a review, see Barakat and Moussa 2014), with a specific focus on the long-term phenomenon of expatriation (Bonache et al. 2010; Collings et al. 2009; Edström and Galbraith 1977). These studies have shown that MNCs extensively use expatriates and international assignees alike to foster knowledge transfer and organizational learning (Nery-Kjerfve and McLean 2012). As such, international assignees are used to transfer both explicit and, more importantly, tacit knowledge across different units of the MNC. Whereas explicit knowledge in the form of technical specifications and details could be mobilized by other means, it is suggested that transferring complex and deeply embedded tacit knowledge could be handled more efficiently via expatriates (Chang et al. 2012). In other words, it is possible to conceive of individuals as the prime movers of tacit and inimitable knowledge, which has been proposed as a key prerequisite for sustained competitive advantage (Reed and DeFillippi 1990).

In addition to seeing them as conduits of organizational-level knowledge transfer and learning, expatriates could also be seen as ‘learning agents’ in and of themselves. This is especially the case for medium-term assignments, which have been prevalently used by modern MNCs (see Inkson et al. 1998; Minbaeva and

Michailova 2004; Meyskens et al. 2009). Medium-term assignments represent a clinical and theoretically interesting phenomenon wherein individual-level learning and competence development takes precedence over typical hurdles associated with relocation and adjustment (Stahl and Caligiuri 2005). That is; overseas assignments present individuals with the opportunity to gain international experience and this could in turn help them learn new ways and methods of doing business and to develop professional and personal skills (Crocitto et al. 2005). Thus, through exposure to new and unique business environments, international assignees can get the opportunity to obtain first-hand understanding of subtleties and intricacies of different host countries (Hocking et al. 2007). Like expatriation, medium-term overseas assignments also provide opportunities to understand different business environments. However, as they cover a shorter time span, they require less need for adjustment and demand less bureaucratic effort (Reiche and Harzing 2011). As a result, more individuals can get involved in medium-term assignments, as compared to traditional expatriation.<sup>1</sup> In other words, even though the depth of experience in each country is relatively limited in medium-term assignments, individuals could potentially get exposed to a broader range of business contexts and focus more on capability development (rather than formal paperwork and cultural adjustment) via these assignments.

Based on the above, it is possible to think of international assignments as a specific form of global work experience, which presents opportunities for personal development that might not be possible when working in a purely domestic environment. In this paper, we adopt the definition of global work experience as those assignments that require individuals to physically transcend the national boundaries of their home country (Dragoni et al. 2014).

Institutional, educational, political, normative, linguistic and economic differences between home and host countries cause individuals to confront novel, uncertain and ambiguous situations, which could disrupt their habitual routines and cause psychological dissonance (Fee and Gray 2012). These alternative dimensions of distance have been regarded as the main constituents of psychic distance since the original inception of the concept (e.g., Johanson and Wiedersheim-Paul 1975) as well as more contemporary approaches to its measurement (e.g., Dow and Karunaratna 2006). Differences between countries in terms of languages, level of education and political systems can easily lead to confusion and uncertainty for communication and interpretation of information (Dow and Karunaratna 2006). In a similar way, when two countries differ in terms of their industrial development, likelihood of observing technological incompatibilities would increase drastically, which creates problems for interaction and transfer of knowledge between these countries (Tsang and Yip 2007). Furthermore, Eriksson et al. (1997) point out that high level of cultural distance between the home and the foreign country could make it more

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<sup>1</sup> Indeed, this pattern is also reflected in our sample. Specifically, 96% of our respondents had at least one international assignment whereas only 30% had been long-term expatriates abroad. In other words, a majority of our respondents' international experience is found to come from their past assignments to overseas projects, rather than their times abroad as expatriates. Hence, our specific focus on this alternative form of international assignment has enabled us to capture opportunities for skill development that would have been neglected otherwise.

complicated to identify and interpret communication signals and intentions. As a result, it has been argued that greater cultural distance can lead to misunderstanding, friction and conflict between individuals (Shenkar et al. 2008). The negative effects of increased distance are also corroborated by earlier research on expatriation, which shows that increased distance puts additional demands on individuals and, therefore, could complicate their adjustment process (Caligiuri 2000a; Shaffer et al. 1999; Stahl and Caligiuri 2005).

While the discussion above reflects typical negative theoretical assumptions about the effects of country differences, recent advances in international business literature suggest that such differences could also create fruitful opportunities for learning and development (c.f. Stahl and Tung 2015). In particular, international assignments to distant countries entail social interactions with host country locals and give rise to experiences that entail more intense discontinuities, aversive stimuli and unfamiliar occasions as compared to the familiar context of home country setting (Fee et al. 2013). As indicated by Dragoni et al. (2014, p. 969), when individuals are exposed to countries that are significantly different from their own, they “are challenged by salient contrasts and counterpoints to their current view of the institutional environment, particularly their implicit assumptions about people, their habits, and motivations”. To cope with these challenges, individuals need to learn how to reconcile alternative interpretations, idiosyncratic meanings and multiple realities. To that end, experience with diverse environments would induce individuals to develop more refined cognitive schemata, which could foster more elaborate ways of processing, interpreting and understanding the situational environment (Maznevski and Lane 2003). From this perspective, the distance between home and host country could be seen as a developmental challenge that is conducive to learning (Collings et al. 2009; DeRue and Wellman 2009). This contention is also in line with past research, which shows positive outcomes of diversity and heterogeneity for creativity, generation of alternative perspectives and wider search for different opportunities and solutions (see, Björkman et al. 2007; Stahl et al. 2010). Furthermore, exposure to diverse national contexts also helps individuals integrate alternative (and otherwise inconsistent) information and translate them into practical solutions and actions (Dragoni et al. 2014). In other words, international assignments to distant/diverse country contexts provides opportunities to gain competencies for not only observing and understating novel and unfamiliar ideas but also combining these novelties with existing knowledge base and developing integrated solutions. Therefore, the exposure to diverse/distant environments would help individuals develop wider interpretation and information processing schemata, which in turn could develop their ability to integrate different worldviews, better manage cognitive complexity and realize their creative potential. Based on this reasoning, we hypothesize that:

*H3: The higher the accumulated (a) educational distance, (b) industrial development distance, (c) linguistic distance and (d) cultural distance between an individual's home base and the host countries of her past international assignments, the higher is her capacity to recognize, assimilate and exploit new external knowledge.*

While international assignments are an opportunity for individual competence development, individuals might not utilize that opportunity to the same extent. Previous research emphasized the role of individual characteristics to explain heterogeneous levels of learning from experience (Dragoni et al. 2009). This is also in line with the interactionist perspective (Anderson et al. 2014), which examines how the interaction between the contextual and individual factors might foster or hinder creativity in organizations (e.g., Shalley et al. 2009; Yuan and Woodman 2010). In other words, the interactionist perspective argues that human behavior “is a function of a continuous multidirectional process of person-by-situation interactions” (Endler 1983, p. 160). Accordingly, it is relevant to identify those individual traits that cause some people to embrace and utilize their diverse experiences more than others. In this regard, past research has shown that individuals’ *openness to experience* is an important trait that could mediate or moderate the link between exposure to diversity and competency gains (Cho and Morris 2015; Leung and Chiu 2008, 2010).

As one of the Big Five personality traits, openness to experience is often associated with increased individual-level creativity in organizational contexts (George and Zhou 2001; Woodman et al. 1993). Unlike absorptive capacity, which is represented by a specific set of work-related activities targeted at acquiring and understating new knowledge, openness to experience is a personality trait that is conceptualized as a stable and extended dimension of individual differences. This suggests that openness to experience is a basic personality dimension, which is correlated but conceptually distinct from other cognitive attributes such as ability, intellect and creativity (see McCrae 1987 for a detailed treatise).<sup>2</sup>

Individuals who are more open to new experiences have been shown to depict stronger inclination to be visionary, original, novel and independent (McCrae and Costa 1997). This suggests that openness to experience induces the drive to seek out new, varied and experimental ideas and experiences. On the other hand, ‘closed’ individuals would prefer to follow conventional routines, traditional solutions and would feel uneasy about complex and unfamiliar situations (George and Zhou 2001; McCrae 1987). Thus, individuals who are more open to new experiences would have higher propensity to adopt divergent thinking and pursue flexible and imaginative solutions for existing problems (McCrae 1987; McCrae and Costa 1997). Due to having higher tolerance for ambiguity and stronger need for variety, ‘open’ individuals would be more likely to search for creative and innovative ideas (Madjar 2008). This stands to reason that “openness to experience enables individuals to reach out to foreign cultures and makes use of novel cultural knowledge to generate creative solutions to resolve problems” (Chao et al. 2015, p. 82). Following a similar line of reasoning, Maddux et al. (2009) contend that deriving benefits from a multicultural experience depends more on the adaptation of open and accommodating mindset, rather than the depth or duration of this experience. Subsequent studies further confirm that being adaptive to different cultural contexts by remaining open to new modes of thinking and behaving is an important mechanism that mediates overseas experience-creativity link (Cho and Morris 2015, Study 1; Leung and Chiu 2008;

<sup>2</sup> We are introducing this distinction in order to avoid potential criticism for tautology and lack of conceptual clarity.

Maddux and Galinsky 2009, Study 4). Thus, openness to experience has been singled out as *the* personality dimension that could determine whether multicultural exposure yield positive or negative outcomes for individuals (Chao et al. 2015).

In short, we expect that individuals who are more open to new experiences would enjoy greater competency gains as a result of their international assignments to distant countries. So, we predict that:

*H4: The higher an individual's openness to new experiences, the stronger the positive effect of the accumulated distance of past international assignments on her capacity to recognize, assimilate and exploit new external knowledge.*

We graphically present our hypotheses in Fig. 1.

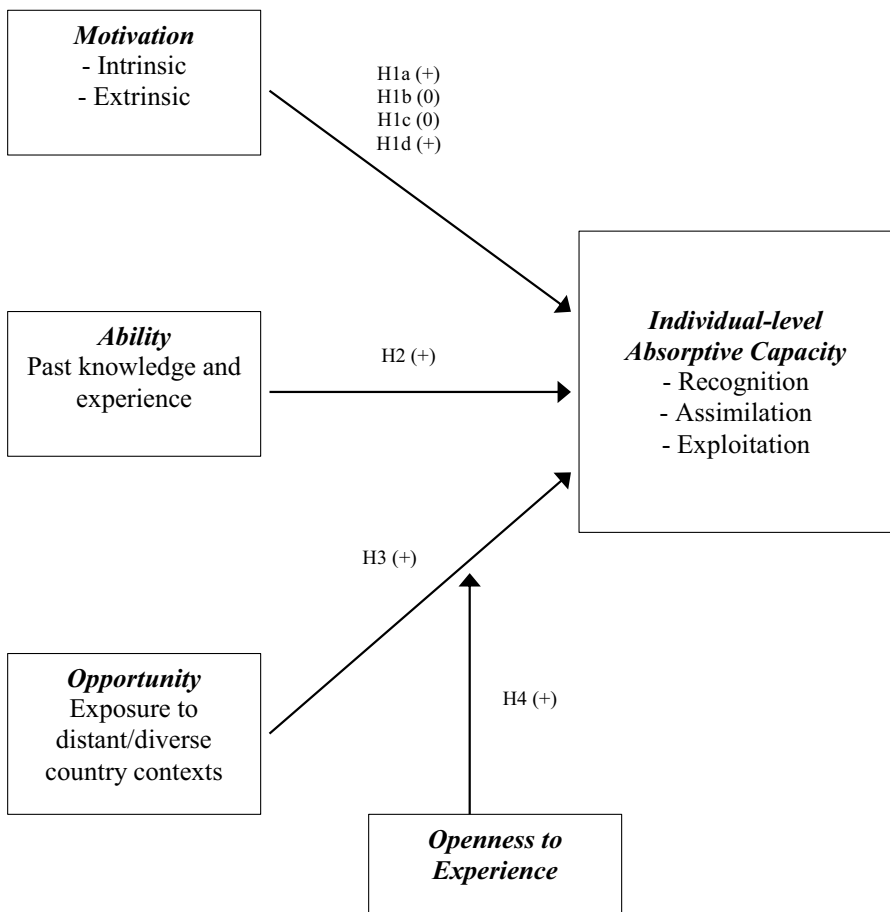


Fig. 1 Theoretical framework

### 3 Data and Method

#### 3.1 Empirical Context and Data Collection

Our empirical setting is a large European multiunit manufacturing MNC with annual sales of €1.1bn and over 2400 full-time employees. The company manufactures industrial products and the scope of its operations is quite wide, encompassing R&D, order engineering, manufacturing, site assembling, maintenance and services. Because it (a) is a high-tech company where most of the engineers do knowledge-intensive jobs and must continuously learn and apply new knowledge and technologies, (b) commonly uses middle-term international assignments and sends its employees abroad for on-site deliveries in a wide variety of countries around the globe, (c) needs to sustain deep interaction with foreign industrial customers and regulators due to its strong dependence on international markets (e.g., more than 90% of delivery projects take place outside home country), we believe this company provides a suitable empirical setting to test our theoretical conjectures on the antecedents of individual-level absorptive capacity in an international setting. Even though the focus on a single company might limit generalizability, this design also yields significant benefits, such as controlling for extraneous sources of variation from organizational-level factors such as culture, structure and suchlike. Furthermore, as this firm is large enough to contain units/departments that show sufficient intra-organizational variation, we managed to detect meaningful levels of diversity in terms of antecedent variables included in our framework.

One member of the research team was granted exclusive access to the list of all employees working at the company. In order to avoid confounding effects of nationality and cultural background, we only targeted domestic workforce of the headquarters (i.e., MNC home country nationals). To get deeper insight about our empirical context, we conducted series of open-ended interviews with 55 executives and engineers, none of whom took part in the main survey. Once we prepare the draft of the questionnaire, we pilot tested it with 20 engineers and four academic experts. None of these responses were included in the final analysis. Although we mostly used established scales for our construct measurement, we used the feedback from pre-study interviews and pilot test to make necessary adjustments in the wording and framing of some questionnaire items. Upon consultation with our informants at the human resource department of the firm, we identified those work units and functional areas where engineers' daily work is knowledge-intensive—i.e. those divisions where absorptive capacity is most relevant. The total number of employees in the selected work units was 1400. We sent individualized email invitations to these employees, where we candidly explained the main purposes of the study. Respondents were then directed to an online survey tool. We also gave standard paper-and-pen option to those who did not prefer online survey. To increase the response rate, we conducted two tranches of data collection; the second initiated two months

after the first. We conducted series of multi-group confirmatory factor analyses to check for possible systematic differences between electronic versus paper-and-pen responses and between two waves of data collection. We followed the guidelines provided by Steenkamp and Baumgartner (1998) and Dimitrov (2006). Our results confirm that our subsets of data coming from different means and waves of data collection have both configural and scalar invariance.<sup>3</sup>

After eliminating incomplete questionnaires and responses coming from non-domestic employees, our final sample consisted of 648 engineers working across a range of different functional areas. This represents a 46% response rate, which compares favorably with equivalent empirical studies in past literature (e.g., Enkel et al. 2017; Schleimer and Pedersen 2013). The average age of our respondents 43.112 (s.d. = 10.245) and 86% of them were male. To control for non-response bias, we used demographic information available in staff registries. Based on this, we compared mean differences between responding and non-responding employees in terms of their age and tenure. Our *t* test statistics were not significant ( $p > 0.10$ ), suggesting the absence of a systematic difference between participating and non-participating employees.

## 3.2 Measures

Most constructs were measured with scales adapted from prior research (Gagné et al. 2010; Löwik 2013; Minbaeva et al. 2003; Ter Wal and Salter 2011). All the questionnaire items used a seven-point Likert-type scale (where 1 = strongly disagree, 4 = neither agree nor disagree, and 7 = strongly agree) and participants were asked to indicate their agreement with the statements. Given that the official working language of the MNC was English, we did not translate the questionnaire items to the local language.

### 3.2.1 Absorptive Capacity

Given our focus on individual-level absorptive capacity, we paid particular attention to using relevant measurement items suited for our specific level of analysis. A majority of the established measurement scales in the existing absorptive capacity literature (i.e., Flatten et al. 2011; Jansen et al. 2005) have been developed for the collective (e.g., firm or unit) level. As there is no established scale to measure individual-level absorptive capacity, we draw on past studies with a similar focus as our own (i.e., Löwik 2013; Ter Wal and Salter 2011).

Using feedback obtained from pre-study interviews of the studied MNC, we combined these two scales and identified 19 items that could be used to measure our absorptive capacity construct. When entering these items into an exploratory factor analysis, we used principal component analysis eliminated five items with low

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<sup>3</sup> Full results of our invariance tests are available from the corresponding author upon request.



item-to-total correlations.<sup>4</sup> Using promax rotation, we re-ran the principal component analysis with the remaining 14 items. Three main factors with eigenvalues over 1 emerged from our analysis, which collectively explained 64.5% of the variance. All items in this analysis had primary loadings over 0.5. Only one item had a cross-loading above 0.30. Using these 14 items, we performed confirmatory factor analysis to better test the validity of our factor structure. The results confirm that three-factor model fits better with the data ( $\chi^2(68)=127.075$ , RMSEA=0.037, CFI=0.987, TLI=0.983) than the single-factor model that envisages absorptive capacity as a unitary construct ( $\chi^2(71)=323.638$ , RMSEA=0.074, CFI=0.946, TLI=0.931) and that the difference between the two models' fit was significant ( $\Delta\chi^2=196.563$ ,  $\Delta df=3$ ,  $p < 0.001$ ).

Our three-factor structure coheres well with the original conceptualization of Cohen and Levinthal (1990) and a recent empirical study by Schleimer and Pedersen (2013). Accordingly, our first dimension of absorptive capacity is *Recognition*, which refers to the extent to which individuals exert effort to find new external knowledge and are able to notice and recognize the benefits associated with it. We used four items to measure the Recognition dimension: (1) "I am always actively looking for new knowledge for my work", (2) "I intentionally search for knowledge in many different domains to look 'outside the box'", (3) "I am good at distinguishing between profitable opportunities and not-so-profitable information or opportunities" and (4) "I easily identify what new knowledge is most valuable to us". The alpha coefficient for reliability was 0.775 and maximal reliability is 0.748, which is at an acceptable level (Hancock and Mueller 2001).

Our second dimension measuring absorptive capacity is *Assimilation*, which captures the degree to which individuals can assimilate new knowledge by combining it with existing knowledge. Six items were used to measure Assimilation dimension: (1) "I am deeply involved in appraising the usefulness of external ideas", (2) "I often analyze the way expertise of external contacts could be related to our business needs", (3) "I strive to comprehend how external knowledge connects to our ongoing internal R&D activities", (4) "I take the time to 'translate' external knowledge to ensure it is properly understood by my colleagues", (5) "I make an effort to 'repackage' external knowledge to make sure it gets the attention it deserves" and (6) "I develop new insights and ideas by combining external knowledge with existing knowledge available within our firm" (alpha coefficient=0.893, maximal reliability=0.916).

Our third dimension is *Exploitation* and refers to the degree to which newly recognized and assimilated knowledge is applied towards commercial ends. We used four items to measure this dimension: (1) "I exploit new knowledge to create new products, services or work methods", (2) "I constantly consider how I can apply new

<sup>4</sup> The eliminated items were as follows: "I work hard to critically assess the potential value of external knowledge against our business needs", "I spend a lot of time processing external knowledge to get a sense of how it might be meaningful for our business", "I frequently meet up with colleagues to explain and discuss new knowledge I obtained externally", "I perform a central role in connecting external knowledge to our ongoing internal R&D activities", "I often apply newly acquired knowledge to my work".

knowledge to improve my work”, (3) “When an external idea appeals to me, I work vigorously to make sure it is implemented, even if the idea was not originally mine”, (4) “I am willing to take action to make sure that the potential of external ideas I believe in will be realized” (alpha coefficient = 0.825, maximal reliability = 0.938).

### 3.2.2 Intrinsic Motivation

The scale for intrinsic motivation was borrowed from Gagné et al. (2010). Its three items were: (1) “I am doing this job because I enjoy it very much”, (2) “I am doing this job because I have fun doing my job”, and (3) “I am doing this job for the moments of pleasure that this job brings me” (alpha coefficient = 0.915, maximal reliability = 0.939).

### 3.2.3 Extrinsic Motivation

The extrinsic motivation scale was also borrowed from Gagné et al. (2010) and included three items: (1) “I am doing this job because this job affords me a certain standard of living”, (2) “I am doing this job because it allows me to make a lot of money”, and (3) “I am doing this job for the paycheck” (alpha coefficient = 0.775, maximal reliability = 0.807).<sup>5</sup>

### 3.2.4 Ability

Our ability measure is aimed to capture the extent of individuals’ existing knowledge base, which is conducive to the development of skills required to understand and absorb new external knowledge (Cohen and Levinthal 1990). Through formal education, individuals obtain technical knowledge, which is especially important for technology intensive positions. Longer work experience also helps individuals develop industry- and company-specific knowledge over time (Vinding 2004). Lastly, training programs is an effective tool for the development of human capital in companies and individuals’ involvement in such programs would result in an extensive and diverse knowledge base (Minbaeva et al. 2003; Reinholt et al. 2011). Based on this and in line with past studies’ measures of employee ability (e.g., Breaugh and Mann 1984), our measure of ability consists of: (1) length (in years) of formal education; (2) length (in years) of total work experience; and (3) average number of days spent on professional training per year. Using these three indicators, we computed an additive index for ability and used standardized scores for our estimations.

<sup>5</sup> It is important to note that our measures for both motivation types pertain to individuals’ overall motivation towards their job. Thus, our questions do not specifically capture the motivation to acquire and apply new external knowledge. That said, however, we would like to note that the vast majority of individual participants were working in knowledge-intensive and creative positions. As a result, their usual duties and responsibilities consisted of seeking, understanding, modifying and applying new knowledge. Therefore, we assume that our measure of participants’ overall work motivation also captures their motivation for absorbing new knowledge.

### 3.2.5 Opportunity

As noted in the hypothesis development section, we consider medium-term international project assignments as a key opportunity for employees to get exposed to diverse overseas business contexts. Therefore, our aim was to capture the degree to which individuals had worked for projects in countries that are different from their home country context. For this purpose, we first asked our respondents to list the names of countries in which they had worked as an international project member. All of these projects are targeted at knowledge acquisition and transfer, with various aims for the company including product development, innovation creation, delivery of solutions, technology transfer and development of after market services. Projects were medium-term in nature, with an average time of completion of around eleven months. The average number of international projects per individual was 8.5.

Once we obtained the list of countries regarding international assignments, we calculated pairwise distance scores (i.e., distance between home and host countries) for various psychic distance stimuli. Data for educational distance, industrial development distance, political distance and linguistic distance were all based on index scores developed by Dow and Karunaratna (2006). Educational distance consists of three indicators (i.e., difference in the percentage of literate adults and difference in the levels of second and third level education enrolment between two countries). Distance in terms of industrial development is measured using nine scales (i.e., difference in GDP per capita, energy consumption, percentage of non-agricultural labor, percentage of urban population and number of cars, newspapers, radios, telephones and televisions per thousand people). Political distance is measured via four scales (i.e., Henisz's Political Constraint Index, Bollen's Polity measure, Freedom House Political Rights and Civil Liberties scales). Linguistic distance consists of three proxies (i.e., difference between the dominant languages of two countries, incidence of the home country's dominant language in the host country and incidence of the host country's dominant language in the home country). All of these multi-scale indices were aggregated to a single factor indicators using confirmatory factor analysis.<sup>6</sup> Finally, we followed the convention in the field to measure cultural distance, using the Kogut and Singh (1988) index and Hofstede's (2001) four cultural dimensions (i.e., power distance, uncertainty avoidance, individualism vs. collectivism and masculinity vs. femininity).

For a pairwise distance score to be relevant for our analysis, a given respondent had to be involved in at least one project located in the corresponding country. We then summed these relevant distance scores to calculate the 'aggregate distance' travelled by each of our respondents. For example, if an individual had worked for projects in Austria, Italy, Germany and Japan, her measure for educational distance would be the sum of distance scores between home country and each of these four countries. Using aggregate distance scores, we intended to capture the extent to which our respondents had been exposed to different country contexts and had the opportunity to develop meta-skills for knowledge absorption.

<sup>6</sup> For a more detailed description of methodology and the full dataset, visit <https://sites.google.com/site/ddowresearch/home/scales>.

### 3.2.6 Openness to Experience

We measured openness to experience by using the Big Five Inventory (BFI) and adopted items from John and Srivastava (1999).<sup>7</sup> Individuals were asked to evaluate the extent to which they saw themselves as a person who: is curious about many different things, is ingenious, deep thinker, has an active imagination, is inventive, values artistic, aesthetic experiences and likes to reflect (alpha coefficient=0.816, maximal reliability=0.847).

## 4 Analysis and Results

### 4.1 Checking for Common Method Bias

Given that some of our measures are subjective in nature and prone to possible biases emerging from common rater effects, we have followed the remedies suggested by Podsakoff et al. (2003). First of all, we ensured our respondents that their answers would be kept fully confidential. In addition to that, they were given explicit instructions that there were no right or wrong answers to our questions and that our survey was not intended to measure or detect good or bad practice. Furthermore, it is worth noting that our respondents had above-average levels of education. As indicated by Rindfleisch et al. (2008), there is an inverse relationship between respondents' education level and likelihood of social desirability bias. We also designed our questionnaire in a way that the questions/items used to measure the independent and dependent variables were not adjacent, in order to limit respondents' use of common retrieval cues while answering different questions (Podsakoff et al. 2003).

In addition to the above, we also used a number of post hoc measures to make sure that our data was not confounded by common method bias. To begin with, we conducted a Harman's one-factor test by entering all measurement items for our multidimensional variables into an exploratory factor analysis at once. This test extracted five distinct factors with eigenvalues above one, which collectively explained 69.3% of the total variance. This gave preliminary evidence for a lack of a common factor that could individually account for most of the variance. However, as noted by Podsakoff et al. (2003), Harman's one-factor test is not sufficient to fully rule out common method bias. For this reason, we took a further step and used confirmatory factor analysis to compare three models: (a) a model where we assigned each item to its theoretically relevant latent variable, (b) a model where all items were loaded on a common method factor, (c) a model that combined (a) and (b).

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<sup>7</sup> The present investigation is part of larger project on the microfoundations of innovation in multinational companies. Hence, our survey instrument also included measures for additional individual-level dispositional and personality dimensions. Thus, we also asked questions to capture other elements of Big Five personality traits (i.e., agreeableness, extroversion, neuroticism and conscientiousness). However, based on similar studies in the field of social psychology (Cho and Morris 2015; Leung and Chiu 2008; Maddux and Galinsky 2009), we only include openness in our current theoretical model and conduct our empirical tests accordingly.

It is important to note that we followed this procedure, as well as conducted Harman's one-factor test, only for our model where absorptive capacity (i.e., recognition, assimilation and exploitation), intrinsic motivation and extrinsic motivation were included. Considering that our measures for ability and opportunity are less subjective and therefore are less likely to be biased due to common rater effects, we did not include these factors in our comparative models.

Our first model with five-factors (recognition, assimilation, exploitation, intrinsic motivation and extrinsic motivation) performed well in terms of fit with the data ( $\chi^2(155)=413.29$ ,  $p<0.001$ ,  $RMSEA=0.051$ ,  $CFI=0.963$ ,  $TLI=0.954$ ). Our second model, only using a common method factor, showed poor fit ( $\chi^2(153)=2350.64$ ,  $p<0.001$ ,  $RMSEA=0.144$ ,  $CFI=0.683$ ,  $TLI=0.631$ ) in comparison to our first model ( $\Delta\chi^2=1937.35$ ,  $\Delta df=2$ ,  $p<0.001$ ). A combination of our first two models also showed good fit with the data ( $\chi^2(139)=415.40$ ,  $p<0.001$ ,  $RMSEA=0.055$ ,  $CFI=0.960$ ,  $TLI=0.946$ ). However, the difference between first and the combined models in terms of fit was not significant ( $\Delta\chi^2=2.11$ ,  $\Delta df=16$ ,  $p>0.10$ ). As a last step, we followed the recommendation of Podsakoff et al. (2012) and used an unmeasured latent method factor technique. Accordingly, we compared the significance of paths in our models with and without the common method factor. Of the six different paths, only one differed in terms of significance (i.e., Intrinsic Motivation  $\rightarrow$  Assimilate) across the two models. For this reason, we decided to retain the common method factor in our models by calculating imputed composite scores, which controlled for the likely inflation/deflation due to a common method. We then used these adjusted composite scores while testing our hypothesized structural models.

## 4.2 Results

To test our hypotheses, we used Structural Equation Modeling (SEM) using AMOS. Table 1 shows the descriptive statistics and correlations among our constructs. Since some correlation coefficients were noticeably high, we controlled for multicollinearity issue. All indicators' tolerance (VIF) values were between 1.0 and 3.4, which suggest that multicollinearity was not an issue since they are all less than the thresholds suggested by Hair et al. (2013). The results of our hypotheses concerning motivation and ability are estimated in Model 1 (see Table 2). Hypothesis 1a predicted that intrinsic motivation would have positive effect on individuals' capacity to recognize and assimilate new knowledge. Supporting this hypothesis, we found a positive effect of Intrinsic Motivation on the Recognition ( $\gamma=0.306$ ,  $p<0.001$ ) and Assimilation ( $\gamma=0.279$ ,  $p<0.001$ ) dimensions of absorptive capacity. On the other hand, we also found a positive and significant effect of intrinsic motivation on the Exploitation ( $\gamma=0.327$ ,  $p<0.001$ ) dimension, which is not in line with what we predicted in hypothesis 1b. In hypothesis 1c, our prediction was that Extrinsic Motivation would have no effect on an individual's Recognition and Assimilation capabilities. Consistent with this, we did not detect any negative effect of Extrinsic Motivation on Recognition ( $\gamma=-0.017$ ,  $p>0.10$ ), and Assimilation ( $\gamma=0.024$ ,  $p>0.10$ ) capabilities. Thus, hypothesis 1c is supported. Hypothesis 1d conjectures

**Table 1** Inter-item correlations and descriptives

	Intrinsic motivation	Extrinsic motivation	Ability	Educational distance	Industrial distance	Political distance	Linguistic distance	Cultural distance	Openness to experience	Recognition	Assimilation	Exploitation
Intrinsic motivation	5.141 (1.004)											
Extrinsic motivation	0.038	3.322 (1.019)										
Ability	0.066	-0.020	0 (0.456)									
Educational distance	0.055	0.008	0.321**	4.650 (5.466)								
Industrial distance	0.045	0.017	0.304**	0.980**	7.110 (8.592)							
Political distance	0.042	0.003	0.291**	0.956**	0.955**	4.572 (6.179)						
Linguistic distance	0.050	-0.003	0.281**	0.931**	0.951**	0.955**	1.470 (1.994)					
Cultural distance	0.043	0.014	0.337**	0.917**	0.942**	0.853**	0.888**	20.270 (21.013)				
Openness to experience	0.204**	0.009	0.139**	0.044	0.043	0.037	0.023	0.066	0 (1)			
Recognition	0.431**	-0.009	0.170**	0.004	0.002	0.013	0.000	0.024	0.605**	4.477 (0.724)		
Assimilation	0.297**	0.034	0.145**	0.009	0.002	0.018	-0.011	0.014	0.480**	0.818**	4.166 (0.975)	
Exploitation	0.401**	0.009	0.135**	-0.041	-0.045	-0.039	-0.055	-0.024	0.513**	0.860**	0.833**	3.930 (0.834)

Entries in the diagonal line represent mean and standard deviation (in parentheses) of the corresponding item

Mean score for Ability measure is zero since it is an index variable with standardized (Z) scores. Similarly, mean and standard deviation for Openness to Experience are 0 and 1, respectively, since it is computed based on factor analysis

\*\*Correlation is significant at the 0.01 level (2-tailed)

that Extrinsic Motivation would have positive influence on Exploitation dimension of absorptive capacity. However, counter to our theoretical expectations, we did not detect any positive effect of Extrinsic Motivation on Exploitation ( $\gamma = -0.002$ ,  $p > 0.10$ ) capacities of individual employees. Thus, our results did not provide support for hypothesis 1d. Our second hypothesis conjectured a positive relationship between Ability and absorptive capacity. Consistent with our predictions, we found that individuals with higher levels of existing knowledge and training had stronger skills of Recognition ( $\gamma = 0.230$ ,  $p < 0.001$ ), Assimilation ( $\gamma = 0.273$ ,  $p < 0.001$ ) and Exploitation ( $\gamma = 0.197$ ,  $p < 0.05$ ). Based on this, our hypothesis 2 was supported.<sup>8</sup>

We developed separate models for hypothesis 3, where we made predictions regarding whether international assignments to distant countries generate opportunities for absorptive capacity development. Given that high correlation between different types of distance included in our hypothesis, we decided to run separate models for each distance index to avoid multicollinearity problem. Our models tested the effects of aggregate distance traveled by individuals on different dimensions of their absorptive capacity. Counter to our predictions, we found that educational distance had a negative effect on Recognition ( $\gamma = -0.073$ ,  $p < 0.05$ ) and Exploitation ( $\gamma = -0.109$ ,  $p < 0.001$ ), but no significant influence on the Assimilation ( $\gamma = -0.054$ ,  $p > 0.10$ ) dimension (see Table 2, Model 2). Thus, our hypothesis 3a was not supported. Results followed a similar pattern for our other distance measures as well. Specifically, we detected that Industrial Development Distance had a negative effect on the Recognition ( $\gamma = -0.066$ ,  $p < 0.10$ ) and Exploitation ( $\gamma = -0.106$ ,  $p < 0.001$ ) dimensions (see Table 3, Model 4). Therefore, our hypothesis 3b was not supported.

We detected a negative effect of Political Distance on the Exploitation dimension ( $\gamma = -0.096$ ,  $p < 0.05$ ), whereas effects on Recognition ( $\gamma = -0.051$ ,  $p > 0.10$ ) and Assimilation ( $\gamma = -0.034$ ,  $p > 0.10$ ) were not significant (see Table 4, Model 6). Based on this, we could not confirm hypothesis 3c. All our absorptive capacity dimensions were negatively related to Linguistic Distance ( $\gamma = -0.048$ ,  $p < 0.10$  for Recognition,  $\gamma = -0.065$ ,  $p < 0.10$  for Assimilation and  $\gamma = -0.096$ ,  $p < 0.05$  for Exploitation), which meant that hypothesis 3d was not supported either (Table 5, Model 8). Lastly, we found that Cultural Distance had a negative influence only on the Exploitation dimension ( $\gamma = -0.088$ ,  $p < 0.05$ ), whereas effects on Recognition ( $\gamma = -0.047$ ,  $p < 0.10$ ) and Assimilation ( $\gamma = -0.047$ ,  $p < 0.10$ ) were not significant. Thus, we did not obtain support for hypothesis 3e.

In order to test our hypothesis 4, we added series of interaction terms with Openness to experience and different distance dimensions to our models. Our results for Educational Distance (Table 2, Model 3), Industrial Development Distance (Table 3, Model 5), Political Distance (Table 4, Model 7), Linguistic Distance (Table 5, Model 9) and Cultural Distance (Table 6, Model 11) are fully in line with our prediction that individuals who are open to new experiences are more likely to effectively use their past international assignments to distant countries as opportunities

<sup>8</sup> We retained intrinsic motivation, extrinsic motivation and ability in subsequent models where we tested distance effects and the reported results were consistent throughout these models.



**Table 2** Educational distance

	Model 1		Model 2		Model 3	
	Estimate	SE	Estimate	SE	Estimate	SE
Intrinsic motivation → Recognition	0.424***	0.025	0.426***	0.025	0.407***	0.025
Intrinsic motivation → Assimilation	0.288***	0.036	0.290***	0.036	0.272***	0.036
Intrinsic motivation → Exploitation	0.395***	0.030	0.398***	0.030	0.382***	0.030
Extrinsic motivation → Recognition	-0.023	0.025	-0.022	0.025	-0.030	0.025
Extrinsic motivation → Assimilation	0.026	0.036	0.027	0.036	0.020	0.036
Extrinsic motivation → Exploitation	-0.003	0.029	-0.002	0.029	-0.009	0.029
Ability → Recognition	0.142***	0.056	0.166***	0.055	0.147***	0.056
Ability → Assimilation	0.127***	0.080	0.144***	0.079	0.128***	0.080
Ability → Exploitation	0.109***	0.066	0.144***	0.065	0.129***	0.065
Educational distance → Recognition			-0.073**	0.025	-0.078**	0.041
Educational distance → Assimilation			-0.054	0.036	-0.057	0.058
Educational distance → Exploitation			-0.109**	0.030	-0.113**	0.048
Educational distance × openness to experience → Recognition					0.345***	0.011
Educational distance × openness to experience → Assimilation					0.279***	0.016
Educational distance × openness to experience → Exploitation					0.270***	0.013
Model fit						

$\chi^2(3) = 4.050, RMSEA = 0.023, CFI = 0.999, TLI = 0.978$        $\chi^2(5) = 5.016, RMSEA = 0.002, CFI = 0.999, TLI = 0.989$        $\chi^2(8) = 11.981, RMSEA = 0.028, CFI = 0.998, TLI = 0.993$

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.001$

**Table 3** Industrial development distance

	Model 4		Model 5	
	Estimate	SE	Estimate	SE
Intrinsic motivation	→	0.426***	Recognition	0.408***
Intrinsic motivation	→	0.289***	Assimilation	0.274***
Intrinsic motivation	→	0.397***	Exploitation	0.383***
Extrinsic motivation	→	-0.021	Recognition	-0.031
Extrinsic motivation	→	0.027	Assimilation	0.020
Extrinsic motivation	→	-0.001	Exploitation	-0.008
Ability	→	0.162***	Recognition	0.143***
Ability	→	0.144***	Assimilation	0.128***
Ability	→	0.141***	Exploitation	0.126***
Ind. develop. distance	→	-0.066*	Recognition	-0.075**
Ind. develop. distance	→	-0.055	Assimilation	-0.062
Ind. develop. distance	→	-0.106**	Exploitation	-0.113**
Ind. develop. distance X openness to experience	→		Recognition	0.331***
Ind. develop. distance X openness to experience	→		Assimilation	0.263***
Ind. develop. distance X openness to experience	→		Exploitation	0.253***
Model fit				

$\chi^2(5) = 4.840$ , RMSEA = 0.002, CFI = 0.997, TLI = 0.989  
 $\chi^2(8) = 12.053$ , RMSEA = 0.028, CFI = .0998, TLI = 0.993

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.001$

**Table 4** Political distance

	Model 6		Model 7			
	Estimate	SE	Estimate	SE		
Intrinsic motivation	→	Recognition	0.425***	0.025	0.410***	0.025
Intrinsic motivation	→	Assimilation	0.289***	0.036	0.274***	0.036
Intrinsic motivation	→	Exploitation	0.397***	0.030	0.384***	0.030
Extrinsic motivation	→	Recognition	-0.022	0.025	-0.028	0.025
Extrinsic motivation	→	Assimilation	0.026	0.036	0.022	0.036
Extrinsic motivation	→	Exploitation	-0.003	0.029	-0.007	0.029
Ability	→	Recognition	0.157***	0.058	0.138***	0.055
Ability	→	Assimilation	0.137***	0.083	0.121***	0.080
Ability	→	Exploitation	0.137***	0.068	0.122***	0.065
Political distance	→	Recognition	-0.051	0.027	-0.055	0.043
Political distance	→	Assimilation	-0.034	0.038	-0.037	0.062
Political distance	→	Exploitation	-0.096**	0.031	-0.099**	0.051
Political distance × openness to experience	→	Recognition			0.300***	0.011
Political distance × openness to experience	→	Assimilation			0.246***	0.015
Political distance × openness to experience	→	Exploitation			0.230***	0.012
Model fit						

$\chi^2(5) = 4.464$ , RMSEA = 0.015, CFI = 0.991, TLI = 0.970,  $\chi^2(8) = 11.403$ , RMSEA = 0.026, CFI = 0.998, TLI = 0.994

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.001$

**Table 5** Linguistic distance

	Model 8		Model 9	
	Estimate	SE	Estimate	SE
Intrinsic motivation	0.426***	0.025	0.415***	0.025
Intrinsic motivation	0.290***	0.036	0.279***	0.036
Intrinsic Motivation	0.398***	0.030	0.389***	0.030
Extrinsic motivation	-0.023	0.025	-0.023	0.025
Extrinsic motivation	0.026	0.036	0.026	0.036
Extrinsic motivation	-0.003	0.029	-0.003	0.029
Ability	0.161***	0.058	0.146***	0.057
Ability	0.146***	0.083	0.133***	0.082
Ability	0.141***	0.068	0.130***	0.067
Linguistic distance	-0.067*	0.026	-0.054	0.041
Linguistic distance	-0.066*	0.038	-0.055	0.059
Linguistic distance	-0.115**	0.031	-0.106**	0.048
Linguistic distance X openness to experience			0.233***	0.007
Linguistic distance X openness to experience			0.195***	0.047
Linguistic distance X openness to experience			0.167***	0.003
Model fit				

$\chi^2(5) = 4.763$ , RMSEA = 0.000, CFI = 0.979,  $\chi^2(8) = 9.426$ , RMSEA = 0.017, TLI = 0.983, CFI = 0.999, TLI = 0.997

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.001$

**Table 6** Cultural distance

	Model 10		Model 11	
	Estimate	SE	Estimate	SE
Intrinsic motivation	→	0.425***	0.404***	0.023
Intrinsic motivation	→	0.289***	0.269***	0.034
Intrinsic motivation	→	0.396***	0.378***	0.028
Extrinsic motivation	→	-0.022	-0.029	0.023
Extrinsic motivation	→	0.027	0.022	0.034
Extrinsic motivation	→	-0.002	-0.007	0.028
Ability	→	0.158***	0.136***	0.054
Ability	→	0.143***	0.124***	0.080
Ability	→	0.139***	0.120***	0.065
Cultural distance	→	-0.047	-0.060*	0.025
Cultural distance	→	-0.047	-0.057	0.037
Cultural distance	→	-0.088**	-0.099**	0.030
Cultural distance × openness to experience	→		0.370***	0.039
Cultural distance × openness to experience	→		0.303***	0.056
Cultural distance × openness to experience	→		0.302***	0.046
Model fit				

$\chi^2(5) = 4.654$ , RMSEA = 0.000, CFI = 0.999, TLI = 0.998,  $\chi^2(8) = 12.853$ , RMSEA = 0.031, CFI = 0.998, TLI = 0.992

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.001$

for competency gains and to develop their absorptive capacity. In all, we found support for our hypothesis 4.

## 5 Discussion and Conclusion

Due to its ability to explain firms' heterogeneous degree of learning from their environment, absorptive capacity is a key source of competitive advantage. This is particularly the case for MNCs, as they have operations in multiple business environments and have the opportunity to tap into various external sources of knowledge. Absorptive capacity has therefore been at the forefront of extant literature on organizational learning, innovation and creativity (Sun and Anderson 2010; Zahra and George 2002). As noted by Cohen and Levinthal (1990), a consideration of absorptive capacity should begin at the individual-level. In one of the pioneering papers on knowledge-based view, Grant (1996, p. 109) echoes this point by stating that "knowledge is viewed as residing within the individual, and the primary role of the organization is knowledge application rather than knowledge creation" (for a similar intuition, see Kogut and Zander 1992, 1993). Later studies in international business literature raise an equivalent argument by showing that the transfer of knowledge between different business units of MNCs happens as a result of exchange and interaction between individuals (Mäkelä and Brewster 2009; Minbaeva 2016). Despite these observations, however, the concept of absorptive capacity has mostly been analyzed at the organizational level. Volberda et al. (2010, p 932) emphasize that "there may be antecedents of [absorptive capacity] that are placed at the level of individuals. These antecedents have been similarly neglected in the literature". Therefore, individuals and their heterogeneous cognitive structures and behavioral patterns, which have been mostly assumed away in past research, should be factored in while studying absorptive capacity. This is the first research gap that we have addressed in this study.

Furthermore, studies exploring the factors affecting the development of absorptive capacity are equally scarce in extant literature. Thus, past research has been mostly interested in the outcomes of absorptive capacity (e.g., innovation, knowledge transfer, survival, performance etc.), whereas its antecedents have rarely been subject to systematic scrutiny. Among recent exceptions to this general pattern (e.g., Hughes et al. 2014; Jansen et al. 2005; Schleimer and Pedersen 2013), we primarily build our framework on the notable study of Minbaeva et al. (2003) who identify how human resource management practices could develop absorptive capacity by increasing the ability and motivation of employees. However, neither this study nor others that follow (e.g., Wang et al. 2008) differentiate between the role of different motivation types and other individual-level dispositional factors in absorptive capacity development (c.f. Enkel et al. 2017). This is the second research gap we address in this paper. Using the MOA framework, we develop a model where we examine the effect of different motivation types (i.e., intrinsic and extrinsic) and ability on individuals' levels of absorptive capacity. We further argue that medium-term international assignments cause individuals to get exposed to diverse/distant business environments and give them the opportunity for competence development. Yet, to

better understand whether all individuals equally benefit from such learning opportunities (c.f. Dragoni et al. 2014), we also incorporate a key dispositional factor (i.e., openness to experience) into our model.

Two important aspects of our findings are worthy of note and discussion. First of all, our results imply that individuals' intrinsic and extrinsic motivation do not have the same effect on their absorptive capacity. Specifically, we find that intrinsic motivation can explain variation in all three dimensions of absorptive capacity (i.e., recognition, assimilation and exploitation) whereas extrinsic motivation is not a significant predictor of these dimensions. An important implication of this is that work motivation should be seen as a multidimensional construct, rather than a unitary measure for employees' willingness to perform tasks (Reinholt et al. 2011). In this regard, we extend studies in the knowledge transfer literature, which often do not differentiate between different forms of motivation and their possible effects on individual action and behavior (e.g., Chang et al. 2012; Fey and Furu 2008; Wang et al. 2008). Understanding the distinction between intrinsic and extrinsic motivation is especially important to identify the right incentives for stimulating individual-level development and competency gains. For instance, in their model, Minbaeva et al. (2003) do not distinguish between motivation types and measure the construct at a general level. Interestingly, however, most of the human resource management practices they examine as antecedents of absorptive capacity (i.e., performance appraisal, promotion, performance based compensation) are often associated with extrinsic motivation of employees (see Minbaeva 2008). This contrasts with our finding that it is through intrinsic, rather than extrinsic, motivation that individual-level absorptive capacity could be fostered. Indeed, past knowledge transfer studies have been making a clear distinction between intrinsic and extrinsic motivation (e.g., Lin 2007; Minbaeva et al. 2012). However, this stream of research has been primarily concerned with knowledge sharing behavior of sending unit employees, rather than the role of motivation at the recipient end. Thus, our paper provides new theoretical and empirical insights motivational issues that extend earlier studies by focusing on how individuals' distinct capabilities to absorb new knowledge could be influenced by different types of work motivation.

Why, then, has extrinsic motivation not emerged as a significant predictor of individuals' absorptive capacity in our study? We might seek an answer in Self Determination Theory. For extrinsically motivated people, there is a strong expectation for immediate rewards and/or concrete results, whereas intrinsic motivation is about the fulfilment of tasks for their own sake (Osterloh and Frey 2000; Ryan and Deci 2000a). Therefore, intrinsic motivation is a better impetus for individual action and behavior when tasks demand creativity and entail uncertainty. This is quite often the case when it comes to exploration, recognition, assimilation and eventual absorption of new external knowledge, a process that entails various risks and uncertainties (Zahra and George 2002). In addition, successful absorption of new knowledge requires creativity and cognitive flexibility, which are often associated with intrinsic rather than extrinsic motivation (Ryan and Deci 2000b). Seen from this perspective, our results fall in line with the central tenets of Self Determination Theory.

The second interesting result of our analysis is that assignments to distant countries and exposure to diverse environmental stimuli is conducive to the development



of absorptive capacity only when individuals are open to new experiences. This insight is especially valuable as “more research is needed to understand factors affecting the effectiveness of learning from the experiences gained through international assignments” (Ng et al. 2009, p. 227). In developing our initial hypothesis, our intuition followed a similar thread to that of Dragoni et al. (2014). Accordingly, we expected that not all individuals would equally benefit from international experience and the learning opportunities it confers. Yet, unlike focusing on cumulative time spent abroad in different types of global work experiences, we look at whether and how diversity of business contexts generate opportunities for individual learning and skill development. More specifically, we argued that individuals get exposed to different degrees of novelty and uncertainty, depending on the amount of ‘distance travelled’ between home country and country of assignment. As such, we hypothesized that exposure to higher levels of aggregate distance would provide additional opportunities for new cognitive schemata development (Fee and Gray 2012; Fee et al. 2013), which would in turn foster absorptive capacity of individuals. Counter to our theoretical predictions, however, we found that high degrees of exposure to distant countries have a detrimental effect on individuals’ absorptive capacity. One possible reason for this negative effect is that those who are not ready or open to new experiences could feel overwhelmed and, eventually, stick closer to their habitual routines and practices (Leung and Chiu 2008). On the other hand, we find that individuals with stronger predisposition for openness to new experiences can effectively benefit from their past assignments to educationally, industrially, politically, linguistically and culturally distant countries. With these results, we extend extant research on expatriation, which typically focuses on personality traits as a predictor of individuals’ adjustment to and performance during international assignments (Caligiuri 2000a, b; Huang et al. 2005). Thus, we show that individual-level heterogeneities stemming from personality would also affect the extent to which international assignments could yield competency gains and capability development for individuals. Similar to our results on motivation, this finding also has policy implications for MNCs’ strategies for staffing and selection of personnel for international assignments.

We are inclined to see limitations of the present investigation as potential avenues for future research. First of all, one of the main goals of this study is to address the lack of attention paid to the micro-foundations of absorptive capacity (Volberda et al. 2010). This is fully in line with the logic of Cohen and Levinthal (1990) that puts individuals and their cognitions at the forefront of their pioneering treatise on absorptive capacity. However, throughout the couple of decades that follow their work, literature has evolved to analyze absorptive capacity an organizational-level capability (see Sun and Anderson 2010). We do not intend to take sides in the perennial debate on the merits and perils of methodological individualism (see Felin and Foss 2012). Our contention, which is consistent with others before us (Minbaeva et al. 2014; Volberda et al. 2010), is that absorptive capacity is a multi-level concept and it is important to understand both its distinctly individual and collective aspects. To that end, it is first important to identify antecedents and drivers of absorptive capacity at the individual-level, which is what we have focused on in the present investigation. To extend this starting point, we encourage future studies

to look at cross-level relationships and the mechanisms with which individuals' absorptive capacities aggregate to group and organizational level. Elucidating the ebbs and flows of these mechanisms would be important to identify the conditions under which individuals' absorptive capacities aggregate to a higher level by following a compositional (i.e., simple and linear aggregation) versus compilational (i.e., a non-linear aggregation where collective absorptive capacity is determined by the weakest or strongest link) patterns of emergence (see Kozlowski and Chao 2012; Kozlowski and Klein 2000).

Moreover, we only focus on one specific personal trait (i.e., openness to experience) that could affect individuals' different degrees of learning from experience and exposure geographically, institutionally and culturally distant countries. In making this choice, we are guided by earlier studies exploring how individuals learn and develop new cognitive skills as a result of multicultural experiences (Chao et al. 2015; Leung and Chiu 2008, 2010). The logic of our framework could be extended to other relevant dimensions of personality traits and characteristics such as self-esteem, need for cognition, learning orientation etc. (see Van Velsor et al. 2004). Similarly, we did not include job specific factors in our model. Although we specifically aimed at those positions that involve relatively high levels of creativity and knowledge intensity in our empirical design, it is quite possible that the hypothesized relationships between motivation, ability, opportunity and absorptive capacity would differ across different positions with varying levels of engagement with knowledge.<sup>9</sup> Therefore, future studies could pay systematic attention to this heterogeneity we assumed away in the present investigation. Furthermore, we only considered linear effects of aggregate distance on absorptive capacity development. Earlier work focusing on organizational-level mechanisms suggest that the pattern of relationship between capability transfer and distance could be curvilinear (e.g., Björkman et al. 2007), where optimum level of transfer/learning takes place at some point between extremely high and extremely low levels of distance between home and host countries.

Last, but not the least, we acknowledge the inherent limitations of working with cross-sectional data. For example, our hypothesis concerning the effects of international assignments on absorptive capacity could be prone to selection bias and reverse causality. Specifically, it is possible to expect that those who have higher absorptive capacity are more likely to be sent to overseas assignments. Thus, we believe that a more rigorous test of our ideas would be possible by using longitudinal designs and testing dynamic models (Minbaeva et al. 2014). Without a doubt, absorptive capacity is a complex, dynamic and multi-level and multifaceted phenomenon, which cannot be fully covered in a single study. This requires a collective progress and the main goal of this paper is to contribute to this cumulative process.

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