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SEARCHING LOCALLY AND GLOBALLY: APPLYING DANIEL LEVINTHAL'S SCHOLARSHIP TO INTERNATIONAL BUSINESS

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Abstract:

Daniel A. Levinthal has made several important contributions to the fields of strategy and management. His research has been pivotal in enhancing our understanding of interactions between the internal and external contexts that organizations face as well as the roles of experience, search, and learning processes. Despite substantial overlap between the core issues in international business (IB) and Levinthal's work, the IB field has yet to fully embrace key tenets of his research. We aim to bridge this gap by providing a number of concrete suggestions for areas in which IB research may benefit from Levinthal's work and vice versa.

Keywords: Daniel Levinthal; absorptive capacity; adaptation on fitness landscapes; context-dependence in learning.

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INTRODUCTION

Daniel A. Levinthal was chosen as the 2019 John Fayerweather Eminent Scholar at the annual Academy of International Business Conference in Copenhagen for his wide-ranging intellectual contributions to strategy and management. His work has also had a significant impact on research in international business (IB). However, as we argue in the following, the IB field still has a lot to learn from his scholarship.

Although several of Levinthal's seminal contributions do not embrace the rich environmental and organizational complexity, variation and contextuality that characterize the field of international business, important insights can be gained by adopting and applying his contributions to IB research. As management and strategy frameworks are rarely context-free and seldom work similarly under all conditions, our purpose is to discuss both how Levinthal's scholarship can move important discussions in IB forward and how a context appraisal may advance some of the insights from his research.

---Table 1 around here---

Levinthal's work is used in the field of IB to some extent. In total, his articles have been cited in the *Journal of International Business Studies* (JIBS) 198 times as of September 2019.[1] Details on citations of Levinthal's work in JIBS are provided in Table 1. The citations are unevenly distributed among his papers. More than half of all citations refer to the seminal article on absorptive capacity (Cohen & Levinthal, 1990), while other seminal contributions, like his 1997 article on search and adaptation (which has more than 2,400 citations on Google Scholar), have only been cited a few times in JIBS. Moreover, given the high number of citations of his work in the fields of management and strategy (more than 82,000 citations on Google Scholar), one may feel that the number of citations in IB is not that impressive. In addition, while Levinthal's work on absorptive capacity and learning has been repeatedly referenced in the IB field, his work on

[1] It has been cited in other IB journals, including the *Journal of World Business* (106 citations), *Global Strategy Journal* (41 citations), *International Business Review* (216 citations), the *Journal of International Management* (75 citations), and *Management International Review* (79 citations). The search was done on September 5th, 2019 and takes into account the life-span of each journal.

organizational design and search processes has largely been ignored. This is surprising, as questions related to organizational design, adaptation, and search processes in unfamiliar territories are highly relevant for multinational corporations (MNCs).

One may question why IB research has a skewed focus on Levinthal's work on absorptive capacity and learning. One reason might be that the IB field has historically emphasized MNCs' knowledge as a factor that distinguishes them from domestic firms. The focus on the possession of knowledge as a key aspect of the MNC goes back to Dunning's (1988) eclectic framework in which knowledge is viewed as an ownership advantage, and to internalization theory (Buckley & Casson, 1976), which emphasizes failures in markets for intangible assets. The concept of cumulative learning is also the cornerstone of the Uppsala internationalization process model (Johanson & Vahlne, 1977). Moreover, the development of the knowledge-based view (Gupta & Govindarajan, 2000; Kogut & Zander, 1993) has focused on MNCs' abilities to source, share, transfer, and adapt knowledge within their global networks. Thus, given the strong focus on knowledge and knowledge flows in the MNC, Levinthal's insights on absorptive capacity and learning may be regarded as natural building blocks.

At the same time, Levinthal's contributions go far beyond the mere concepts of absorptive capacity and learning. More specifically, there are (at least) three important areas of his research that are relevant for the IB field: 1) absorptive capacity, 2) adaptation on fitness landscapes, and 3) and the context dependence of learning.[2] In the following, we scrutinize each of these in more detail. We structure our discussion by outlining Levinthal's contributions within each area, showing how his insights have (or have not) been applied in the IB field, and discussing how the adoption of Levinthal's work can provide new insights in IB. In sum, we argue that IB research seeking to better understand contemporary IB phenomena and "grand challenges" can benefit from embracing a more nuanced view on organizational design and learning; a research agenda that Daniel Levinthal has firmly manifested.

ABSORPTIVE CAPACITY

The Essence of Levinthal's Contributions

[2] Daniel Levinthal also highlighted these three areas during his acceptance speech when receiving the 2019 John Fayerweather Eminent Scholar Award.

In their seminal articles, Cohen and Levinthal (1989, 1990) highlight that learning is cumulative and that learning performance is greatest when the topic of learning is related to what is already known. In this respect, they coin "absorptive capacity" as the capacity to spot, absorb, and exploit new knowledge. They suggest that organizations and individuals need prior related knowledge to assimilate and use new knowledge. As a result, they show that learning is more difficult in novel domains than in known domains. Specifically, they argue that the larger the existing stock of knowledge, the more valuable is the inflow of new related knowledge. Prior knowledge serves as a point of departure and provides direction for the development of new solutions and for understanding the depth of newly acquired knowledge. They argue that, in the absence of prior knowledge, individuals and organizations are unable to reap the benefits of transferred knowledge.

The concept of absorptive capacity is inherently multi-level. It has generally been understood as an organization-level construct in which specific processes and structures, such as the internal and external structure of communication and the knowledge-transfer process, support the organization's ability to absorb new knowledge. However, Cohen and Levinthal (1990) emphasize that individuals and their interaction serve as the foundation for absorptive capacity on the organizational level. Based on insights from learning and cognitive theories, Cohen and Levinthal (1990) argue that memory development in human beings is self-reinforcing, and that new knowledge is recorded in an individual's memory by creating connections with pre-existing concepts and knowledge. As they argue, "an organization's absorptive capacity will depend on the absorptive capacities of its individual members. To this extent the development of an organization's absorptive capacity will build on prior investments in the development of its constituent, individual absorptive capacities" (Cohen & Levinthal, 1990: 131). Along these lines, they pay special attention to the individuals who act as gate-keepers and boundary spanners, and emphasize that "the firm's absorptive capacity depends on the individuals who stand at the interface of either the firm and the external environment or at the interface between subunits within the firm" (Cohen & Levinthal, 1990: 132).

Accordingly, a firm's absorptive capacity depends on the processes and routines that enable individuals to share, communicate, and transfer learning to the organizational level. Indeed, a considerable amount of research on absorptive capacity has been produced since the term was introduced. Much of this

research has focused on the definition and nature of absorptive capacity as well as its antecedents and outcomes (for reviews of this extensive stream of literature, see Zahra & George, 2002; Lane, Koka, & Pathak, 2006; Volberda, Foss, & Lyles, 2010). This research is united by the idea that knowledge and learning capabilities snowball, such that possession of prior related knowledge equips individuals with a capacity to explore and exploit new knowledge. However, little attention has been devoted to specifying how individual-level learning is aggregated to the organizational level and, consequently, what organizations can do to promote absorptive capacity.

Beyond the appealing idea of absorptive capacity and the cumulative nature of learning, Cohen and Levinthal (1990) discuss the implications of this construct for the evolutionary paths of companies. They point to several interesting processes that help explain the behavior of international firms: the potential tradeoff between the assimilation of internal knowledge and external knowledge (or inward-looking versus outward-looking absorptive capacities), and the path dependency and the lock-out effect related to the lack of previous investments in related knowledge.

The Application of Absorptive Capacity in IB

Levinthal's work on absorptive capacity has been widely cited in JIBS with 121 references to three seminal articles (Cohen & Levinthal, 1989, 1990, 1994). However, when we dig deeper into the many references to the concept of absorptive capacity found in JIBS, we find that many of the citations appear more "ceremonial" in the sense that they are just passing references to Cohen and Levinthal (1989, 1990) with almost no theoretical discussion of the concept nor reflection on the effects of absorptive capacity on MNCs' evolution.[3]

The first JIBS article that offers a profound discussion of absorptive capacity is Lyles and Salk (1996), who study the acquisition of knowledge from foreign parents in international joint ventures. Their starting point is that some organizations have a greater capacity to absorb, circulate, and utilize information than others (i.e., absorptive capacity, which they refer to as the capacity to learn). They show that absorptive

[3] This is in line with the comprehensive review article on absorptive capacity by Lane, et al. (2006), who find that 80% of the literature cites the construct in a ritual way with little or no discussion of the concept itself.

capacity is important for the effective transfer of knowledge in joint ventures. They also outline several antecedents of absorptive capacity in MNCs.

The subsequent articles in JIBS on absorptive capacity fall into one of two streams. One stream focuses on the antecedents and importance of absorptive capacity in knowledge-transfer relationships that involve MNCs. This stream investigates knowledge acquisition in different corporate contexts, including teams, subsidiaries, and international joint ventures. In these articles, most of the emphasis is on the absorptive capacity of subsidiaries, which enables them to benefit from knowledge flows among different MNC units. For example, Minbaeva, Pedersen, Björkman, Fey, and Park (2003) study foreign subsidiaries of MNCs to investigate how HRM practices influence subsidiaries' absorptive capacity and, thus, internal knowledge transfers in MNCs. Phene and Almeida (2008) separate absorptive capacity into subsidiary sourcing capability and subsidiary combinative capability, and focus more on (external) knowledge absorption from the host country. Finally, Schleimer and Pedersen (2014) outline several antecedents of subsidiary absorptive capacity related to the MNC context, such as the social structure and the intensity of headquarters' effort. Authors like Autio (2005) and Prashantham and Floyd (2012) have studied learning in the context of International New Ventures (INV), but they have only indirectly drawn on the work by Levinthal as they more often refer to other parts of the learning literature and related concepts like "knowledge regeneration advantages" (Autio, 2005) or "capability development" (Prashantham & Floyd, 2012). The reason might be that the path dependency inherent in the concept of absorptive capacity does not fully resonate with the proactive and aggressive internationalization pattern of INV, where speed and learning by doing are more important than prior related knowledge.

The second stream explores the extent to which absorptive capacity is the same across an organization or varies with, for example, location, function, or type of relationship. Lane and Lubatkin (1998) highlight the contextual nature of absorptive capacity, as they argue that absorptive capacity is specific to each individual relationship (which they term "relative absorptive capacity"). Subsequent research, like Makino, Lau, and Yeh (2002) and Fang and Zou (2010), goes further in contextualizing absorptive capacity. For example, Fang and Zou (2010) study inter-partner learning in international joint ventures as determined by the relative independence/dependence of the partners.

In addition to these two main lines of research, JIBS published a Special Issue partly focused on this topic in 2007 (vol. 38, issue 7). The issue covered the roles of path dependence and accumulative learning processes in IB, and included articles that point to other forces, such as managerial intent and entrepreneurial orientation, that might help firms escape path-dependent evolution (Barkema & Drogendijk, 2007, Buckley, Devinney, & Louviere, 2007; Hutzschenreuter, Pedersen, & Volberda, 2007). As such, there is a significant stream of literature in IB suggesting that firms can and do change their strategic direction, and thus overcome limitations in their prior knowledge and absorptive capacity. Specifically, MNCs follow a path creating rather than a path dependent pattern of internationalization as reflected in research on INVs and Born Globals (see Autio, 2005 for an excellent review), subsidiary entrepreneurship (see Geleilate, Andrews & Fainshmidt, 2019 for a comprehensive review), and internationalization of emerging market firms (Luo & Tung, 2017).

IB Potential

Although some of Cohen and Levinthal's work on absorptive capacity has been utilized in IB research, we argue that there is still scope for further application that would enrich the IB literature. In particular, two areas offer fruitful potential for further research: 1) linking individual-level learning to the organization's absorptive capacity; 2) and further contextualization of the absorptive capacity construct.

Cohen and Levinthal (1989; 1990) stress that the foundation of firm-level absorptive capacity is learning on the individual level. In fact, one could argue that an organization cannot have an absorptive capacity independent of its employees. This point seems to have been forgotten over the years, as the extant studies solely focus on organizational-level absorptive capacity, while they ignore how individuals' absorptive capacities are aggregated to the organizational level through individuals' actions and interactions. There are a few exceptions. In their conceptual paper, Prashantham and Floyd (2012) show how routine micro-processes aggregate and mold the capability development in INVs. Minbaeva et al. (2003) theoretically discuss individual level absorptive capacity but fall short in the empirical analysis, as they only measure organizational (subsidiary) absorptive capacity. In general, therefore, while there has been a great deal of focus on organizational antecedents to organizational absorptive capacity, the role of individuals in forming this capacity is disregarded. Having said this, there has recently been more focus on

microfoundations of knowledge processes in the IB literature (see Foss & Pedersen, 2019 for a comprehensive review of this literature). However, this literature is still mainly programmatic, conceptual or single level on the empirical side, and solid theoretical and empirical studies outlining the mechanism of cross-level interaction in MNC knowledge processes are lacking.

This leaves many unanswered questions: When and how do individuals form their absorptive capacity? What is their motivation for doing so? What are the interaction processes that help increase individuals' absorptive capacities within and across units? To what extent are the highlighted trade-offs between internal and external knowledge rooted at the individual level? The answers to these questions are important for our understanding of how organizational absorptive capacity is formed and for our understanding of when absorptive capacity is optimal, out-of-date, or even ineffective. Importantly, these questions require researchers to embrace the tenet that absorptive capacity is a multi-level concept that takes individuals' heterogeneity and their aggregation into the organizational level into account.

In addition, there are important empirical challenges. Thus far, absorptive capacity at the organizational level has been measured using proxy variables, such as R&D investments (Cohen & Levinthal, 1990), or using multi-item scales developed from previous studies (e.g., Lane et al., 2006) in which managers assess the absorptive capacity of their units (e.g., a subsidiary) (Schleimer & Pedersen, 2014). While these have been valuable attempts to measure the concept, more work is needed in order to collect data at the individual level. Moreover, if we accept Cohen and Levinthal's (1990: 131) statement that "a firm's absorptive capacity is not … simply the sum of the absorptive capacities of its employees," a natural question is "What is it then?". If we do not operationalize absorptive capacity as a construct with shared properties (i.e., the sum or average of employees' characteristics), how can we capture configurational properties, such as patterns, distributions, or variability among employees (Kozlowski & Klein, 2000)? In this respect, researchers could consider how diversity in individuals' experiences and the structure of communication within a unit may explain differences in absorptive capacity at the organizational level.

The contextualization of absorptive capacity is close to the heart of IB research. Much IB research focus on how contextual differences derived from MNCs crossing aspects, such as borders, cultures,

institutions and regions (e.g., Rugman & Verbeke, 2004) but degrees of local embeddedness in particular environment such as global cities and industry clusters (Goerzen, Asmussen & Nielsen, 2013) produce unique opportunities and challenges for the operations and management of MNCs. Indeed, the field of IB is experiencing an increasing integration with the field of economic geography to acquire a better understanding of contextual concepts such as place, space and time and their meaning for the MNC (Beugelsdijk, McCann & Mudambi, 2010). Accordingly, we argue that the multi-layered and nested structures of the MNC call for a more contextual understanding of the absorptive capacity concept that embraces its environmental variation and complexity. For example, the not-invented-here (NIH) syndrome that Cohen and Levinthal (1990) ascribe to the incorporation of outside knowledge is relevant both when subsidiaries have to adopt innovations from subsidiaries in other countries, regions or cultures, and when adopting external knowledge. Along these lines, Asmussen, Foss, and Pedersen (2011) explore heterogeneity across MNCs' subsidiaries in terms of the internal and external sources of knowledge used when creating value. They point to an "accommodation effect" that complements the assimilation of externally sourced knowledge. More specifically, they show that subsidiaries need to receive a minimum level of knowledge from other MNC units (i.e., overlapping knowledge) if the rest of the MNC is to benefit from the transfer of knowledge that the subsidiary sources externally. Similarly, Stahl and Tung (2015) explore the effects of cultural diversity on firms' learning processes. They argue that the act of balancing new knowledge with existing knowledge becomes more complex as MNCs enter new countries. Accordingly, they propose an inverse U-shaped relationship between cultural diversity and learning capacity.

The contextualization of the concept is even more pertinent when considering individual learning. Individuals from different cultures learn in different ways and differ in certain dimensions, such as individualism and collectivism, which may have consequences for their abilities and learning. For example, individuals from some cultures prefer to learn in cooperation with others, while individuals from other cultures prefer to work independently. The implication might be that subsidiaries embedded in different cultures and locations have to build different learning environments to promote absorptive capacities among their employees. We currently do not know if absorptive capacity is the same across different contexts or

whether firms should promote it in the same way irrespective of contextual factors like culture, function, hierarchy, age, and location.

The MNC offers a natural laboratory for studying absorptive capacity, as it encompasses many individuals who are involved in interdependent learning and knowledge-acquisition processes that span multiple levels and contexts. As we argue, there is still scope for more studies on the formation, development, and contextualization of this capacity.

ADAPTATION ON FITNESS LANDSCAPES

The Essence of Levinthal's Contributions

The second stream of Levinthal's research with particular relevance for IB relates to how organizations adapt on fitness landscapes. In this respect, one needs to embrace the idea that any novel strategy is characterized by a large number of interdependent choices. For example, an internalization strategy may entail interdependent decisions, such as decisions related to the degree of ownership, location selection, and the level of host autonomy. To identify an optimal strategy, firms need to search among several combinations of choices, each of which yields different levels of performance. In 1997, Levinthal published a seminal article titled "Adaptation on Rugged Landscapes," which introduced a formal model of "performance landscapes" to explore the antecedents of organizational diversity within a population of firms. More specifically, by introducing the "NK model" in which the N represents the number of choices and K represents the number of interdependencies between the choices, Levinthal showed that complexity affects heterogeneity among organizations. In the model, a peak in a performance landscape represents one possible combination of choices, while the height of the peak represents the performance of that combination. The more interdependent the choices are, the more rugged the landscape becomes and the more peaks it contains. As such, a peak represents a choice combination in which performance cannot be improved by changing only one choice.

As boundedly rational managers do not know which solutions (or peaks) are superior, the search for good strategies is an inherently challenging task, especially when the landscape is "rugged" and characterized by several local peaks rather than "smooth" with a single global peak (Levinthal, 1997; see Figure 1). The extent to which a firm identifies the alternative choices within its immediate neighborhood

(local search) or makes long jumps (distant search) depends on the extent to which its current choice has a high fitness value. In this sense, companies experiencing poor performance might find it more attractive to opt for choices that are far from familiar alternatives.

---Figure 1 around here---

Levinthal's introduction of the model stimulated a wealth of research exploring how boundedly rational agents search for better solutions amidst interdependent decisions (for an extensive review, see Baumann et al., 2019). Levinthal's subsequent research within this domain has emphasized how such issues as complexity, organizational architectures, and inertia influence firm-level adaptations. For example, Levinthal and Warglien (1999) show how highly interdependent performance landscapes induce higher rates of failure and inertia in changing environments. Ethiraj and Levinthal (2004a, 2004b) demonstrate how the architecture of organizational complexity is a critical determinant of the feasibility and effectiveness of adaptation, and that hierarchies are important for problem solving even though they increase the costs of solution quality. Moreover, Levinthal and Workiewicz (2018) explore the effects of different organizational structures on the effectiveness of balancing the search at lower and higher levels of an organization. They find that "multiauthority forms are better suited than traditional, single-authority hierarchies in addressing challenges where issues of local specialization and global integration have to be taken into account" (Levinthal & Workiewicz, 2018: 222)

In sum, Levinthal's work on adaptation has paved way for a more systematic understanding of the ways in which managers and organizations search for novel strategies in complex environments.

The Application of Adaptation on Fitness Landscapes in IB

In general, the core ideas stemming from research into firms' adaptations to fitness landscapes have yet to be embraced by the IB community. For example, Levinthal (1997) has only been cited four times in JIBS. One study citing this work is the article by Barkema and Drogendijk (2007), which finds that companies entering foreign markets through "larger steps" (i.e., without any significant related experience) may experience lower initial performance but enhanced performance in future expansions. As Barkema and Drogendijk write (2007: 1136):

> "Exploration is learning through processes of planned variation or experimentation, and is more uncertain in terms of outcomes (Baum et al., 2000). Such 'long jumps' in time and space from the company's knowledge base (Levinthal, 1997; Gavetti and Levinthal, 2000) reduce short-term performance but enhance learning and the performance of future expansions."

Another study by Celo, Nebus, and Wang (2015) draws on the NK model to show how the structure of interdependencies between national units affects the optimal structure of MNCs. Specifically, these authors suggest that "the constructs of structure and complexity are particularly important to MNC performance and NK modeling enables us to examine their relationship in a controlled environment, by setting all other non-structural parameters equal" (Celo, et al., 2015: 183).

Nonetheless, the insights into the ways in which firms adapt on fitness landscapes have not been fully incorporated into IB research. This is arguably not surprising. To a great extent, Levinthal's work has been modelled and developed in a vacuum in which contextual factors, such as national (institutional, cultural, or industrial) differences and similarities, are not taken into account. In fact, there is a general divide between the wealth of formal simulation studies exploring firms' adaptive behaviors and associated empirical work (Bauman, Schmidt, & Stieglitz, 2019). We argue that research on adaptation and IB may benefit from further cross-fertilization. For example, future modelling of firm adaptation on rugged landscapes would benefit from the formal introduction of differences in context, such as MNCs' use of different organizational forms depending on the country, and examinations of how those differences affect the adaptation and selection processes. Similarly, the IB literature would benefit from embracing the idea of rugged landscapes to extend previous contingent approaches. In the next section, we further develop these ideas.

IB Potential

Despite the dearth of IB research explicitly drawing on Levinthal's ideas on performance landscapes, the concepts of adaptation and fit are critical for MNC research. For instance, concepts such as contingency and strategic fit are at the core of the integration-responsiveness framework (Bartlett & Ghoshal, 1989). The predictive alignment between the environment and the strategy (Ghoshal & Nohria, 1989; 1993) as well as among the strategy, the structure, and resource configuration (Egelhoff, 1988; Ghoshal & Bartlett, 1990) have been extensively researched over the last three decades. At the same time, IB research may have treated

this alignment in a somewhat static manner. For example, it is not clear whether a predicted fit (e.g., tightly coupled MNCs with high alignment among the environment, strategy, and structure) increases MNCs' dependence on successful reorientation and thus creates difficulties in adapting to changing environments.

Relatedly, questions regarding MNCs' adaptations to different cultural and institutional environments have largely been investigated through either an external institutional view focused on pressures for local isomorphism and legitimacy (e.g., Rosenzweig & Singh, 1991; Kostova & Roth, 2002) or an internal process view on how subsidiaries can adapt to MNCs' policies (e.g., Jensen & Szulanski, 2004). However, few attempts have been made to more systematically understand the MNC as an inherently complex organizational entity defined by a wide range of interdependent choices. We suggest that future research can benefit from considering how MNCs adapt their searches for optimal strategies in rugged performance landscapes. This perspective highlights a number of intriguing research questions.

First, how do we understand complexity in the MNC? What are the consequences of this complexity? According to Kostova and Zaheer (1999), MNCs offer a unique context for understanding complexity. They argue that MNCs face complexity in the institutional environment (i.e., multiple domains in the institutional environment, institutional environments in multiple countries, and institutional distance), at the organizational level (i.e., spatial, cultural, and organizational distances; language barriers; and interunit power struggles), and in the legitimation process (i.e., liability of foreignness). Yet, no real attempts have been made to carefully model the multiple levels of complexity in order to understand their performance consequences. For example, do high levels of complexity, defined by a large number of interdependent choices, cause more inertia and failure among MNCs? What are the differences between internal and external complexity for MNCs' longevity? Serious exploration of issues such as these will likely lead to an improved understanding of performance contingencies for MNCs.

In this respect, much IB research has attempted to explain how multinationality affects firm performance (e.g., Lu & Beamish, 2004; Berry & Kaul, 2016), albeit without reaching any unanimous results (e.g., Verbeke & Forootan, 2012). For example, Pisani, Garcia-Bernardo & Heemskerk (2020) conduct a large-sample, cross-national study to find no clear evidence of prior results, and instead suggests that future research need to incorporate "a more grounded and contextually-oriented approach" (2020: 169) to more

accurately capture the relationship between multinationality and performance. One way to approximate this relationship could be to more carefully understanding the complexity of MNCs' international trajectory and resulting performance landscapes.

Second, how do MNCs search and adapt in rugged performance landscapes? An implicit assumption in much internationalization work is that the incremental accumulation of knowledge and, thus, the reduction of uncertainty are positively associated with a higher foreign market commitment and performance (Johansen & Vahlne, 1977). However, we need to question how MNCs derive their knowledge positions. For example, one can ponder whether MNCs are only subject to path-dependency characterized by "local hill climbing" on suboptimal performance peaks. As this type of incremental change may only alter one decision in the performance landscape, there is a general risk that MNCs will be "stuck" on an inferior local peak. As Levinthal (1997: 940) notes, "this property of organizations being 'trapped' at a suboptimal local peak is clearly an implication of the limited nature of local search." As such, future research could explore the performance implications of local versus global moves in a rugged performance landscape. While some streams of IB research explore the performance implications of taking small or large internationalization steps (Pedersen & Shaver, 2011; Barkema & Drogendijk, 2007), there are rich opportunities to more systematically model and simulate how MNCs internationalize. For example, to what extent are MNCs subject to path-dependency that prevents them from identifying more optimal peaks on the performance landscape? What does a global move (i.e., one involving changes in several decisions) actually entail?

A third, related issue concerns our understanding of the relationship between internationalization and the associated organizational requirements. Specifically, an internationalization strategy, such as a decision to establish a foreign R&D unit, can be regarded as an organizational reconfiguration of the firm's tasks and activities —from local, co-located operations to geographically dispersed activities. While research has pinpointed the coordinative requirements added by these types of changes (Puranam & Srikanth, 2007), how MNCs effectively go about such moves is unclear. In this respect, Levinthal's work shows that major environmental change (e.g., the expansion of the MNC to new countries) generally undermines adaptation efforts unless the underlying interaction structure is loosely coupled (e.g., Ethiraj & Levinthal, 2004a, 2004b). Thus, in order to effectively adapt during internationalization processes, firms need to pay particular

attention to the degree of environmental change and the underlying interaction structure. Therefore, future research could explore the relationship between internationalization strategies and MNC complexity. For example, how does internationalization prompt MNCs to adapt their organizations and what are the performance consequences of doing so? How does the complexity of the MNC hamper or facilitate the process of effective adaptation? Are certain organizational forms (e.g., subsidiaries that are tightly integrated and coupled with MNC tasks versus more autonomous, loosely coupled subsidiaries) more suitable for adapting to complex and changing environments?

THE CONTEXT-DEPENDENCY OF LEARNING

The Essence of Levinthal's Contributions

While the performance landscape analogy points to important avenues for understanding the complexity of MNC strategy and performance, a related issue is how boundedly rational decision makers cope with such performance landscapes. As Levinthal (2011: 1517) suggests,

> "Most problems of interest to strategists do not lend themselves to well-posed problems for which an optimum solution exists. Alternative actions are typically not well specified and often need to be discovered. Uncertainty over possible future states may be difficult to express as explicit probabilities. Further, the interdependencies among choices at a point in time or across time … may make the specification of an optimum infeasible."

In this respect, the final stream of Levinthal's scholarship that we emphasize is his work on the context-dependency of learning. Starting with the seminal article written together with James March (Levinthal & March, 1993) on "the myopia of learning," Levinthal developed a stream of research exploring how individuals and organizations learn to adapt to complex contingencies. More specifically, Levinthal and March (1993) argued that myopic managers cannot easily identify a relatively high-performing peak. Instead, they have to find better solutions through sequential search processes. As they argue (1993: 95), "the imperfections of learning are not so great as to require abandoning attempts to improve the learning capabilities of organizations, but that those imperfections suggest a certain conservatism in expectations." Building on the notion that problem solving may be regarded as a sequential search process useful for identifying superior solutions (March & Simon, 1958; Simon, 1955), they outline an agenda for examining effective mechanisms and strategies for search and learning.

Subsequent work has focused on the role of cognitive representations of performance landscapes in facilitating and constraining the adaptation process. Much of Levinthal's work in this regard shows how cognitive mechanisms, such as analogies and heuristics, may assist in the representation of complex problems. For example, Gavetti and Levinthal (2000) compare forward-looking search processes (based on actors' cognitive maps of action-outcome linkages) to backward-looking, experience-based search processes. Using simulation methods, they argue that small-world representations of complex problems or even coarse insights into solutions can give firms a head start in the search process. Other studies explore how decision makers can aggregate a set of unique experiences to develop a basis for intelligent actions in seemingly novel contexts (Gavetti, Levinthal, & Rivkin, 2005). In particular, they show that more analogies are better than more details, and that analogies are most useful when problems do not have a modular structure. Relatedly, Ethiraj and Levinthal (2009) demonstrate that simplified goal structures (in contrast to full goal structure) are associated with clearer opportunities for adaptive learning.

The Application of Context-dependency in IB

IB research has embraced some of the insights from Levinthal's scholarship regarding the context-dependency of learning. For example, 25 JIBS articles cite Levinthal and March (1993). However, the majority of these articles only cite the article in a rather "ceremonial" manner without fully capturing different forms of myopia (e.g., temporal, spatial, and failure) and their effects on learning in MNCs. Nevertheless, the citations suggest that the IB community is at least somewhat aware of Levinthal's contributions regarding organizational learning.

For example, research undertaken by Morris and his colleagues emphasizes the organizational and geographical scope of individuals' knowledge searches within MNCs (Morris, Hammond, & Snell, 2014; Morris, Zhong, & Makhija, 2015). More specifically, Morris et al. (2014) focus on the role of different types of knowledge search in the development of solutions that are locally responsive. They suggest that the concept of spatial myopia is more complex in MNCs, as "distance" refers not only to new versus old knowledge but also to geographical dispersion. In addition, Morris et al. (2015) investigate the consequences of local versus global search for performance, and find that temporal myopia (i.e., a short-term orientation)

and spatial myopia (i.e., a lack of interest in knowledge available elsewhere in the firm) are more salient in MNCs.

A handful of JIBS articles more seriously acknowledge Levinthal's work on cognitive representations of complex problems and adaptations. For example, Mäkelä et al. (2013) explore how functional and line-management stakeholders evaluate operational human resource management capabilities in MNC subsidiaries. Drawing on Gavetti and Levinthal (2000), they find that "co-located line-management stakeholders are more likely to rely on experience-based cues when constructing evaluations, whereas headquarters-located functional stakeholders tend to rely on cognition-based evaluation, driven by their ability to compare across different subsidiary HR departments" (Mäkelä et al., 2013: 813). Relatedly, Asmussen, Larsen, and Pedersen (2016) build a simulation model of different strategies for learning when distributing tasks abroad. They argue that host-based learning is more effective than rationally planned home-based learning in conditions characterized by high noise due to the risk of causal ambiguity. Finally, Maitland and Sammartino (2015) find considerable variation among managers' mental models when making sense of unfamiliar locations for foreign investments. As they argue, "given the well recognized interdependencies implicated in internationalization decisions, how managers make sense of such connections should be central to how IB models MNE decision-making" (Maitland & Sammartino, 2015: 734).

Notwithstanding the above contributions, we believe it is fair to suggest that the IB community can benefit from an understanding of how MNCs and their decision makers learn about and adapt to complex problems that draws more systematically from Levinthal's insights. In particular, although the IB community clearly acknowledges the importance of learning, it tends to treat the concept somewhat naively, adopting the assumption that "more is better." For example, research based on internalization theory suggests that international experience reduces foreign environmental and transactional uncertainty and, hence, the cost of using the market (Anderson & Gatignon, 1986; Benito & Gripsrud, 1992; Tihanyi, Griffith, & Russell, 2005). Other streams of IB research that emphasize learning (e.g., research focused on absorptive capacity) also assume that more experience is positively related to beneficial and performance-enhancing learning. However, there has been little discussion of the potential boundaries of this learning. As Levinthal and

March (1993: 95) suggest, “there are limits to learning. Designing organizations to learn without attention to those limits is no more sensible than designing organizations to be rational without attention to the limits of rationality.”

IB Potential

We believe a number of pertinent research questions emerge from the tenet that learning can be myopic and potentially constrained. In particular, how do decision makers in MNCs deal with different types of myopia (i.e., temporal, spatial, and failure)? For example, a recent article by Elia, Larsen, and Piscitello (2019) suggests that experience with international ventures may have adverse consequences for future entry-mode decisions in the MNC. They argue that an underperforming past venture creates a representation bias, which results in failure myopia among decision makers. That myopia, in turn, increases the propensity to make suboptimal entry-mode decisions. Accordingly, knowledge derived from experience can be biased and, thus, limit the effectiveness of learning. Future research could therefore continue exploring the effectiveness, limits and constraints of managers’ and MNCs’ learning processes. For example, what types of myopia (or biases) do managers suffer from when engaging in internationalization? What kind of learning from international markets is purposeful to performance and what kind is detrimental? To what extent do the geographical dispersion and the multi-layered structure of MNCs add nuances to the three forms of myopia? How do managers most effectively learn to deal with the complexity of internationalization? What are the performance consequences of that learning?

Another avenue of research relates to understanding whether some learning strategies are more effective than others. In several articles, Levinthal shows that cognitive simplifications, such as analogies and simplified goal structures, may serve as powerful mechanisms that guide adaptation. Accordingly, international business research could more systematically investigate forms of analogies as well as the extent to which they support learning and adaptation in MNCs. Are certain analogies (e.g., supported by more/less information; closer/more distant from the underlying performance landscape) more effective when engaging in international decision making and adaption? What is the relationship between certain organizational forms of MNCs (e.g., globally integrated versus locally adapted subsidiaries) and the effectiveness of different ways of learning (e.g., backward-looking versus forward-looking)?

Finally, adaptation is often the result of decision makers' cognitive representations of performance landscapes (e.g., Gavetti & Levinthal, 2000). Therefore, how the complexities of internationalization hinder or foster effective learning is unclear. For example, the internationalization process is often surrounded by substantial noise and uncertainty, which undermine effective feedback-based learning. Indeed, internalization theory is largely based on the assumption that uncertainty is a central element in market imperfections that motivates the internalization of foreign activities (Buckley & Casson, 1976). Another potential way to interpret this is that noise and uncertainty generate errors in the feedback on which adaptations are based (Levinthal, 1997; Denrell & March, 2001). Consequently, they produce failures and successes that are arbitrary relative to the true potential of foreign ventures. According to Levinthal (1997: 947), "noisy evaluation of points near a local peak will often look superior to the perceived fitness value associated with the actual peak." In this respect, one may expect different sources of noise to influence learning related to internationalization in idiosyncratic ways. For example, noise stemming from liabilities of foreignness may influence learning differently than noise stemming from inherent uncertainties in the technology being produced in a foreign location. As managers learn to deal with noise and the uncertainty of operating internationally in idiosyncratic ways, future research could explore how boundedly rational decision makers in MNCs make sense of the noise and uncertainty that occur during the internationalization process. Do different types of noise prevent or foster learning? How effective are different learning strategies when different types of noise occur during internationalization?

CONCLUSION

Although Daniel A. Levinthal has made a number of important contributions to the fields of strategy and management, his ideas have received relatively little attention in the field of international business. We argue that this is surprising, as many of his insights build on the interactions between firms' internal search and learning processes and the external (performance) landscapes in which they are embedded. One reason for this ostensible disconnect might be that while IB research typically focuses on specific contextual factors, like differences in cultures, institutions, languages, and industry composition, Levinthal's research and, specifically, his simulation models focus more on abstract contextuality (e.g., complexity, performance landscapes, and noise).

We hope that this note initiates a discussion on how to bridge this gap and provides inspiration for examining how the field of IB can more seriously embrace and develop such issues as absorptive capacity, search and adaptation, and learning myopia. Indeed, the field of IB does already embrace these and related concepts. Important contributions relating to internationalization processes (e.g., Johanson & Vahlne, 1977), MNC structure and configurations (Ghoshal & Bartlett, 1990) and knowledge processes (Lane, Salk & Lyles, 2001) all shed important light on issues such as search, complexity and learning in MNCs. At the same time, IB research has a tendency to draw on alternative theoretical lenses, such as institutional theory (e.g., Kostova & Roth, 2002), to account for the complexity and variation derived by operating across countries and cultures. Thus, we argue that an increasing consolidation between the current IB streams of research that explore these issues and the insights generated by Levinthal's work can contribute added explanatory power, and, eventually, a richer and more realistic inquiry of the MNC. In the previous sections, we have outlined several potential avenues for concrete research along these lines. The key points are summarized in Table 2.

---Table 2 around here---

A uniting theme in all these suggestions is to more systematically embracing a more nuanced view of MNC organizational design and learning. This applies to absorptive capacity (e.g., by understanding the role of individuals in multinational structures), to adaptation on fitness landscapes (e.g., by inquiring how MNC configurations can effectively adapt to complex and changing environment), and to the context-dependency of learning (e.g. by exploring how certain types of MNC structures are more apt to certain types of learning). Accordingly, we suggest that a serious inquiry into these areas of research can break important ground in our understanding of MNEs and IB phenomena more broadly. While recent IB contributions have already started this journey, exploring issues such as autonomy, adaptation amid complexity, and the role of MNE headquarters (e.g., Asmussen, Foss, & Nell,, 2019; Geleilate et al., 2019; Nuruzzaman, Gau, & Sambharya, 2019), future research may benefit by embracing these insights more carefully. According to Buckley, Doh and Benischke (2017: 1046), IB scholars devote more attention to addressing "grand challenges, with the purpose of advancing IB theory, contributing to important debates with scholars allied in social sciences, as well as actually helping to resolve these difficult challenges our generation is currently facing." In this respect, important knowledge will be gained by subjecting future research on important concurrent

phenomena like the emergence and strategies of MNCs from emerging markets (e.g., Awate et al., 2015) and the increasing pressures for MNC social responsibility and sustainability (e.g., Kolk, 2016) to a more realistic portrayal of how MNCs actually learn and adapt in complex environments.

Although we emphasize what the IB field can learn from Levinthal's research, we also believe that there is a possibility for inspiration to flow in the opposite direction. One of the more important aspects of IB research is a rich understanding of context and its effect on key issues, such as MNCs' structures, strategies, and processes. By more seriously embracing the actual contextual factors and contingencies (e.g., multiple institutions, cultures and geographies, dimensions of distance, "exogenous" reconfigurations, and global distribution), a more grounded and empirically relevant understanding of such concepts as performance landscapes, complexity, and heuristics can be developed. While Levinthal treats these constructs in a relatively abstract manner, their manifestations in the real world are somewhat unclear. As such, Levinthal's work may be thought of as a "skeleton" to which the field of IB can add more flesh.

In sum, the IB context in which MNCs must cope with learning, adaptation, and organization in a complex, dynamic, and uncertain world may provide a perfect natural laboratory for further exploring and extending Levinthal's work. We argue that this will enrich both the IB literature and Levinthal's work.

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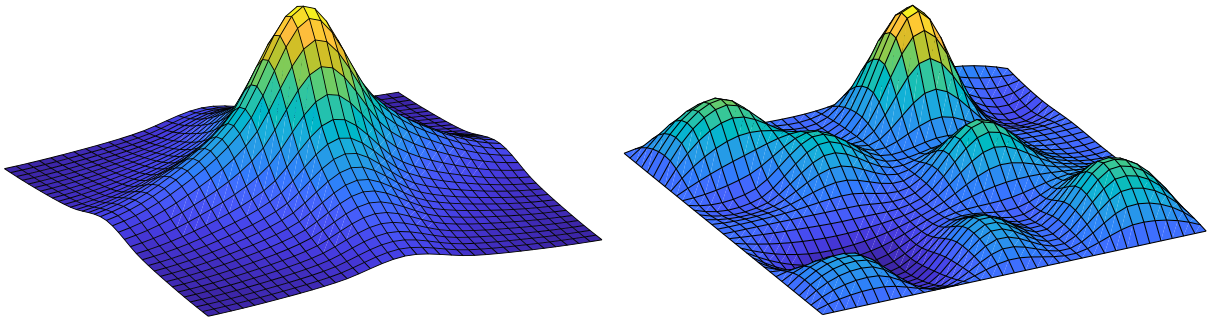
Table 1. Number of citations of Levinthal's publications in JIBS as of September 5th 2019

Publication	**Number of citations**
Cohen & Levinthal (1990)	105
Levinthal & March (1993)	25
Cohen & Levinthal (1989)	14
Levinthal & Fichman (1988)	8
Gavetti & Levinthal (2000)	5
Fichman & Levinthal (1991)	4
Levinthal (1997)	4
Seabright, Levinthal, & Fichman (1992)	4
Adner & Levinthal (2004)	4
Articles with less than four citations (17)	25

Table 2: IB opportunities based on Levinthal's work

	Absorptive capacity	**Adaptation on rugged landscapes**	**Context-dependency of learning**
The essence of Levinthal's contributions	Learning is cumulative; previous knowledge paves the way for adapting new, related knowledge	A systematic understanding of how organizations search for novel strategies in complex environments	Learning is myopic and may be assisted by cognitive mechanisms, such as analogies and heuristics
Application in IB	Mainly in cases of knowledge acquisition in teams, subsidiaries, and international joint ventures; a few studies on how absorptive capacity varies with the context	Very limited	A few studies apply the work on cognitive representation of complex problems and adaptation
IB potential	1) Linking individual-level learning and organizational-level absorptive capacity 2) Contextualizing the absorptive capacity construct	1) More profound understanding of complexity in MNCs 2) Adaption to the environment under the assumption of rugged landscapes 3) Ways of coping with organizational interdependencies when internationalizing	1) How decision makers deal with different types of myopia 2) The effectiveness of different learning strategies 3) The impact of different types of noise and uncertainty on learning strategies

Figure 1. Smooth and rugged performance landscapes



a) Smooth landscape b) Rugged landscape