

Disruptive Innovation by Emerging Multinational Latecomers: The Mechanisms Underlying the Trajectories of Catching-Up And Leapfrogging

Peter Ping Li
Copenhagen Business School, Denmark
Department of International Economics & Management,
Copenhagen Business School
pli.int@cbs.dk

Paper presented at the Third Copenhagen Conference on “Emerging Multinationals’: Outward Investment from Emerging Economies”, Copenhagen, Denmark, 25-26 October 2012

**DISRUPTIVE INNOVATION BY EMERGING MULTINATIONAL LATECOMERS:
*The Mechanisms Underlying the Trajectories of Catching-up and Leapfrogging***

Abstract

Despite the growing interest in the emerging-economy multinational enterprise (EMNE), there is little knowledge about the underlying mechanism for EMNEs as latecomers to catch up with and even leapfrog the traditional MNEs as early-movers. The cross-fertilization between the research streams on disruptive innovation (DI) and the bottom of the pyramid (BOP) provides a great opportunity to shed light on the key issue. To take advantage of this “missed” opportunity, I integrate the two reframed constructs of DI and BOP and also develop a typology of four ideal-typical innovations toward a theory of *latecomer innovation* as a special DI by EMNE at BOP to provide insights into the mechanisms underlying the trajectories of catching up and leapfrogging. Built upon latecomer innovation, EMNEs at BOP can emerge as the most disruptive challengers to the MNE incumbents at TOP. The implications of reframed constructs, integrative typology, and emerging theory for research and practice are also discussed.

Keywords:

Latecomer Innovation; Disruptive Innovation; Bottom of Pyramid; Globalization; MNE Latecomer; Emerging Economy; Catch-up; Leapfrogging.

DISRUPTIVE INNOVATION BY EMERGING MULTINATIONAL LATECOMERS:

The Mechanisms Underlying the Trajectories of Catching-up and Leapfrogging

The relatively new research on the emerging-economy multinational enterprises (EMNEs) has been growing rapidly (e.g., Li, 1994, 2003, 2007; Luo & Tung, 2007; Mathews, 2002, 2006; Yeung, 1994). The emerging research has been primarily focusing on the potential of EMNEs as latecomers to catch up with and even leapfrog the traditional MNEs as early-movers despite the doubts raised by the traditional MNE theories, such as the Ownership-Location-Internalization (OLI) Model (Dunning, 1988, 1995, 2006) as well as the Internationalization Process (IP) Model (Johanson and Vahlne, 1977, 2003, 2006). Even though the unique potential of EMNEs has been increasingly recognized (e.g., Li, 2003, 2007; Mathews, 2002, 2006), we know so little about the underlying mechanism for EMNEs to catch up with or leapfrog the traditional MNEs, especially their unique sources of competitive advantages and their unique mechanisms of innovation that underlie the trajectory or process of *accelerated learning* via exploration and exploitation (see Li, 2010 for a review). In particular, the apparent assumption is that most EMNEs rely primarily on *low-cost imitation* as the source of their competitive advantage. Hence, there exists a huge gap in the literature on EMNEs. To truly understand the trajectories of catching up and leapfrogging by EMNEs and fully develop the learning-based view of internationalization), we must answer the central question about the unspecified drivers behind the trajectories of accelerated learning by EMNEs in contrast to the traditional MNEs (cf. Hobday, 1995, 2005; Li, 1994, 2010).

Further, given the rapid emergence of China and India as the new economic powers in global competition, one has to wonder if the emerging economies pose as great opportunities or threats. The answer is bound to differ due to diverse perspectives. In a broad sense, however, it seems increasingly clear that EMNEs as latecomers will play a critical role in global competition by being the *bottom-up* disruptive challengers to the traditional MNEs as incumbents. The rise of emerging economies, coupled with the fact that the majority of the populations are at the *bottom of the pyramid* (BOP) as the lowest-end segment of the global market (Prahalad, 2009) so that they cannot afford the products and/or services designed for the developed markets, has made the emerging market the fertile ground for *disruptive innovation* or DI (Govindarajan & Ramamurti, 2011; Ricart

et al., 2004; Yu & Hang, 2010), especially the business model innovation (Eyring, Johnson & Nair, 2011; *The Economist*, 2010). In this sense, the previously separated streams on DI (Christensen, 1997; Christensen & Raynor, 2003; Christensen, Anthony & Roth, 2004) and BOP (Karnani, 2007; London & Hart, 2011; Prahalad, 2009) should benefit from their rare cross-fertilization. More importantly, the new research on DI at BOP may shed light on the mechanism underlying the trajectories of catching up or leapfrogging by EMNEs. In other words, the notion of DI at BOP has the good potential to explain why and how EMNEs can catch up and leapfrog.

Despite the strategic importance of DI at BOP, it is surprising that this issue has not been explored in a systematic manner. The growing literature on DI is largely confined to the context at the top of the pyramid (TOP). Only in the books or journals for practitioners, the link between DI and BOP (e.g., Hagel & Brown, 2005; Hart & Christensen, 2002; Immelt, Govindarajan & Trimnle, 2009), and the role of local entrepreneurs for such a link (e.g., Eying et al., 2011; *The Economist*, 2010; Zeng & Williamson, 2007) have been discussed. It is our conviction that the DI at BOP should be taken as a new “*big question*” of International Business (Ricart et al., 2004), especially the unique contribution by those local entrepreneurs at BOP. Further, this topic has the good potential to settle the major debates over the nature, rationale, criteria, and process of DI by clarifying the extant conceptual ambiguities and confusions (see Yu & Hang, 2010 for a review) as well as the nature and impact of BOP (see Karnani, 2007 for a review). This is largely because that DI tends to occur at BOP due to the indigenous need for novel value propositions to be embodied by initial *sub-standard* (lower price) and emerging *future standard* as two defining qualities of DI. Further, this new area of research is imperative because we know little about the link between globalization and innovation (Aharoni & Brock, 2010; Castellani & Zanfei, 2006; Loof, 2009; Nieto & Rodriguez, 2011), especially their interaction and underlying mechanisms in the emerging economies (Asakawa & Som, 2008; Gassmann & Keupp, 2008; Gorodnichenko, Svejnar & Terrell, 2010). The globalization of innovation by traditional MNEs (Lewin & Couto, 2007) and EMNEs (Li, 2007) in both developed and emerging economies bears key implications. In this sense, the DI at BOP as latecomer innovation has the great potential to cross-fertilize the diverse research

streams on innovation, entrepreneurship, dynamic capability, business model, strategy, and the theory of the firm, all in the *context* of globalization, especially concerning the mechanisms underlying the trajectories of cross-border learning (Li, 2010).

The purpose of this exploratory study is to integrate the research streams on DI and BOP toward a new theory on the mechanisms for EMNEs to catch up with and leapfrog the traditional MNEs. As the primary contribution of this study, the new theory completes the learning-based view of internationalization by specifying the driving force behind the trajectory of accelerated learning in terms of catching up and leapfrogging. Specifically, I first seek to reframe the two constructs of BOP and DI so as to settle the related debates. Second, I seek to offer an integrative typology of global innovation to differentiate and integrate all types of innovations in all types of markets so as to provide a conceptual core for a theory of latecomer innovation as the underlying mechanisms for EMNEs to catch up with and leapfrog the traditional MNEs. Third, I finally seek to discuss the major implications of latecomer innovation for both research and practice. The rest of this article is structured into three parts in line with the above agenda.

REFRAMED CONSTRUCTS

Reframed Construct of the Bottom of the Pyramid

If we follow the metaphor of pyramid, we can divide the world population into five key segments: the top-down first and second segments are TOP; the third segment is the middle of the pyramid (MOP), and the fourth and fifth segments are BOP. This is the *global pyramid* where the notions of TOP, MOP, and BOP derive from. According to the *World Resources Institute*, those people with GDP per capita below \$3,000 belong to BOP. According to this benchmark, BOP will cover the majority of those populations in the emerging economies (e.g., 80% in China and 98% in India). In this sense, Prahalad (2009: 7) also refers BOP specifically as the “emerging consumer markets or just emerging markets”, which is a more emotionally neutral term. Others refer to BOP in term of “the base of the pyramid” (e.g., London & Hart, 2010).

If we look at the *national pyramid*, we can still have the similar five segments. However, the difference between the developed and emerging economies is that the top two segments in the global pyramid reside in the

developed economies, while the bottom two segments in the global pyramid reside in the emerging economies, with the middle segment resides in both TOP (the bottom segment of TOP) and BOP (the top segment of BOP) as the overlapped MOP. For the purpose of differentiating and integrating TOP and BOP, we reserve the terms “TOP” (over-served or well-served markets at the high-income level), “MOP” (properly-served market at the mid-income) and “BOP” (under-served or unserved markets at the low-income level) for global pyramid, but not for national pyramid. Hence, I propose the definition of BOP below:

BOP refers to the primarily unserved (non-consumption) and secondarily under-served (under-consumption) markets on a global scale, which is lower than the mainstream market in the developed economies being the top of the pyramid (TOP), thus including the mainstream market in the emerging economies and the non-mainstream segment in the developed economies.

To simplify my analysis, I refer to all of the emerging economies as BOP because the overwhelming majority of their populations fall at the bottom of the global pyramid. I also refer to all the developed economies as TOP because the overwhelming majority there resides at the top of the global pyramid. However, this view does not deny the fact that a small minority of the populations in the emerging economies are at MOP and even at TOP, while a small minority in the developed economies are at MOP and even at BOP. I fully embrace the overlaps between the notions of TOP, MOP and BOP. Hence, none of such notions is absolute with the sharp and fixed boundaries. Instead, all these notions are relative in nature, consistent with the Chinese frame of *Yin-Yang Balance* (Li, 1998, 2008, 2011a). I also maintain that there must be a dynamic process with a gradual shrink of BOP and a gradual expansion of both MOP and TOP over time. Such a dynamic process is the general pattern or trajectory of poverty alleviation through the mechanism of DI at BOP.

Reframed Construct of Disruptive Innovation

As the most recent literature review (Yu & Hang, 2010: 435) pointed out, “the scattered and conflicting nature of the literature on disruptive innovation in the last decade may pose a state ambiguity for future research”. I posit that the debates over the nature and process of DI are rooted in the prolonged conceptual confusions and ambiguities in several areas (cf. Christensen & Raynor, 2003; Danneels, 2004; Govindarajan & Kopalle, 2006a; Markides, 2006; Schmidt & Druehl, 2008; Tellis, 2006). We can solve such problems by

properly reframing DI.

The first major cause for the extant conceptual confusion is the inclusion of both low-end segment of mainstream market and peripheral “new-market” segment of non-consumption as DI. I take issue with this approach. The mix of the low-end segment of mainstream market with the marginalized market for DI creates the serious ambiguity and confusion over if DI is solely for marginalized customers or for both marginalized customers and low-end mainstream customers. If the latter is the case, we should differentiate the low-end mainstream segment for DI from the high- or mid-end mainstream segment for sustaining innovation or SI (cf. Christensen & Raynor, 2003). It would be much clearer if we leave all three segments of mainstream market out of the notion of DI. One way to remedy the problem is to reframe the “low-end” DI as the “lower-end” DI. The “*lower-end*” segment refers to the under-consumption at TOP with non-mainstream or marginalized consumers whose needs are under-served and who are ready to defect whenever a novel value proposition is offered beyond the lower price. Because the “lower-end” segment at TOP is lower than the low-end segment of mainstream market (similar to the “immediate” and “fringe” segments, Schmidt & Druehl, 2008), there is no more ambiguity to the effect that DI always invades the mainstream market by attacking its low-end segment first and then move up to the mid-end and even the high-end over time in a bottom-up process.

The second major cause for the extant conceptual confusion is the later proposed notion of *high-end* DI in terms of radically new quality and higher price (e.g., Carr, 2005; Govindarajan & Kopalle, 2006a; Markides, 2006; Utterback & Acee, 2005). This view equates DI with radical innovation (RI) by explicitly assuming RI as having both superior quality and higher price. I take issue with the notion of high-end DI as well as the assumption of RI with both superior quality and higher price due to several reasons. First, the notion of high-end DI is incompatible with the original concept of DI with inferior quality and lower price (Christensen, 1997; Christensen & Raynor, 2003; Christensen et al., 2004). Although Christensen sometimes cites questionable or wrong examples of DI (e.g., higher priced Bell telephone and mobile phone), he has been largely consistent with the theoretical argument that DI tends to have a lower price to disrupt incumbents in a bottom-up process (Schmidt & Druehl, 2008). Even those who argue for high-end DI admit that Christensen’s

notion of DI is a low-end and bottom-up type (e.g., Carr, 2005; Utterback & Acee, 2005). Second, it is the lower price and the resulted lower profit margin that causes the general neglect of DI by most incumbents. In other words, an innovation will become disruptive when it emerges from the low-end market in a bottom up process rather than the high-end RI in a top-down process. Govindarajan and Kopalle (2006) mentioned four primary reasons for high-end RI to qualify as DI, but two of them (the last two) are questionable and inconsistent. The higher profit margin and the defection from the mainstream market tend to sound a big alarm to incumbents who would react more forcefully than they would do in the case of low-end DI. For instance, in the case of digital camera for Kodak (Gilbert & Bower, 2002; Lucas & Goh, 2009), the top management team at Kodak reacted decisively in its swift response to the threat of digital technology. Even though Kodak finally lost the war, it is not due to the lack of motive, but due to the lack of ability, to take proper actions (e.g., its reluctant and resistant middle management due to the incompatibility between the chemical and digital paradigms). I refer to a lack of ability to shift between paradigms as *paradigm conflict* (cf. Dosi, 1982; Kuhn, 1962) to gauge the potential of disruption beyond architectural and business model innovations (cf. Godoe, 2000; Henderson & Clark, 1990; Markides & Oyon, 2010). The distinction between the lack of motive and that of ability can differentiate low-end bottom-up RI (from an initial lack of motive to the later lack of ability) from high-end top-down RI (a lack of ability). Hence, I reframe “*creative destruction*” (Schumpeter, 1942) into two types of RI: top-down and bottom-up destructions (cf. Carr, 2005; Govindarajan & Kopalle, 2006a; Markides, 2006; Utterback & Acee, 2006).

Third, another major distinction between high-end RI and DI lies in the timing of market adoption or consumption, with high-end RI for early-adopters in contrast to DI for late-adopters (see Govindarajan & Kopalle, 2006b for the differentiation between DI and high-end RI). Fourth, the assumption of RI being higher in quality and price is not always warranted (Chandy & Tellis, 1998; Leifer et al., 2000). For instance, Chandy and Tellis (1998) measured RI as high in both “newness of technology” (e.g., new feature) and “customer need fulfillment per dollar” (e.g., low cost). Leifer and colleagues (2000) took RI as meeting one of three criteria: (1) an entirely new set of performance features; (2) improvements in known feature of five

times or greater, and (3) a significant (30 percent or greater) reduction in cost. Hence, it is possible for RI to have a lower price, and even an inferior quality in the extant features as long as having a superior quality in at least one new feature (Utterback & Acee, 2005). However, I take issue with the perspective that RI must have “an entirely new set of performance features” (Leifer et al., 2000), or both new in technology and market (Chandy & Tellis, 1998; Garcia & Calantone, 2002). This is because that it is virtually impossible to have a product/service or process with an entirely new set of features, and also rare to be novel in both technology and market (Garcia & Calantone, 2002). Consistent with the exploitation-exploration framework (March, 1991), I reframe “breakthrough” (Chandy & Tellis, 1998), “really new”, and “discontinuous” innovations as RI (in addition to the rare type of RI mentioned above). Further, I reframe RI as *new-feature* innovation in contrast to *enhanced-feature* one (i.e., performance improvement as well as cost reduction, which can be reframed as incremental innovation or II, cf. Leifer et al., 2000). To broaden the concept of RI, I include both product/service RI and *process RI* (e.g., Ford assembly line; Toyota JIT system, and Dell model). Finally, I classify both RI and II into *top-down* (higher price, thus not DI) and *bottom-up* (lower price as DI) types. The essence of DI is to target non-consumption and under-consumption from the low-end market via lower price in a bottom-up (never top-down) process (Schmidt & Druehl, 2008). In this sense, both mobile phone and digital camera should be taken as top-down RI rather than DI (bottom-up RI) due to their initial higher prices. In sum, DI is taken as low-end bottom-up innovation, including both bottom-up RI and II, in contrast to high-end top-down RI and II, thus clarifying the distinctions and links between various types of innovation. This implies that we can build a typology with top-down and bottom-up as one dimension.

The third major root cause of the extant conceptual confusion is the lack of compelling rationale to explain why DI disrupts. I posit that the essence of DI is its *bottom-up novel value proposition* as the core of business-model innovation, reflected in a bottom-up process with the initial sub-standard (for inferior performance at lower price) and emerging future standard (for new or even enhanced features) as two *embodiments* of the novel value proposition to partially replace the extant mainstream standard and incumbents. Hence, I treat “sub-standard” (at lower price) and “future standard” as the *two defining qualities* of DI. By

challenging the notions of “low-end” and “high-end” DI, I provide a solution to their conceptual confusions by highlighting the theme of bottom-up novel value proposition (cf. Christensen et al., 2004; Schmidt & Druehl, 2008). Built upon the theme, the notion of “future standard” bears two implications. Although evaluated as lower in quality by the extant mainstream standard, DI could be higher in quality if judged by the emerging future standard. Further, because the bottom-up novel value proposition cannot prevail initially, it must start with a lower price. This notion is consistent with the recent definition of DI as “an innovation that cannot be used by customers in mainstream markets. It defines a new performance trajectory by defining new dimensions of performance compared to existing innovations” (Christensen et al., 2004: 293). I posit that, while the initial sub-standard and emerging future standard are the core mechanisms for the success of latecomers, the motive and ability in paradigm conflict are the underlying mechanisms for the failure of incumbents as *inertia* (cf. Barnett & Pontikes, 2008; Rumelt, 1995). In other words, latecomers and incumbents are affected by DI differently via distinctive mechanisms.

It is worth noting that all innovations entail novel value propositions, which are the core of all business models that integrate technology and market (Chesbrough & Rosenbloom, 2002). Innovation and business model share the common theme of integrating technology with market (Chandy & Tellis, 1998; Freeman & Soete, 1997; Garcia & Calantone, 2002) in sharp contrast to technological invention. In other words, innovation and business model are the two sides of the same coin. I define *business model* as business strategy delineated by resource configuration as well as task coordination as the means for the ends of strategic intent and thrust (Li, 2003, 2007; Teece, 2007; see Zolt, Amit & Massa, 2011 for a review). Later I will further discuss the overall link between DI and business model as well as their links with other issues. In sum, it is the two qualities of initial sub-standard (the lack of motive on the part of incumbents so as to ignore the threat of DI) and emerging future standard (the lack of ability on the part of incumbents so as to be paralyzed by DI) that define the downfall of incumbents in the context of DI.

The fourth major cause of the extant conceptual confusion is the lack of explicit criteria to judge if an innovation is disruptive, especially the ex ante criteria (Danneels, 2004). If we only have the ex post

criteria of actually substituting the old standard and incumbents, we would not predict where and when DI can occur (Tellis, 2006). A directly related concern is at which point of disruptiveness we can regard an innovation disruptive (Danneels, 2004). Most scholars would agree that DI does not have to replace incumbents, but DI should have an ultimate impact on an extant market without totally replacing it (e.g., Chandy & Tellis, 1998; Markides, 2006; Schmidt & Druehl, 2008). I extend the above views by positing that novel value proposition, as the theme of DI, should provide the key to the above concerns. First, the ex ante criteria of DI could be the two defining qualities of sub-standard and future standard, with the last quality as the compelling rationale and criterion for disruption. Second, the two ex ante criteria implies that DI will have a major bottom-up disruptive impact on the old standard as well as incumbents, but not necessarily replace them. In other words, it is not possible to specify any perfect ex ante criteria to predict DI, but we can adopt the two defining qualities as approximate ex ante criteria to gauge the *potential* of DI in terms of its likely strong or weak impact on the old standard as well as incumbents (cf. Christensen et al., 2004; Gonindarajan & Kopalle, 2006a; also see Schmidt & Druehl, 2008 for a method to estimate the potential impact of DI). Built upon the theme of bottom-up novel value proposition, I propose three ex ante criteria in terms of three questions: (1) Is there an actual or potential new feature (e.g., small size of PC for personal use)? (2) Is the new feature potentially imperative so that it can emerge as a new future standard (e.g., portability of PC)? (3) Is the new standard so incompatible with the old standard that the two will be in paradigm conflict (e.g., the conflict between the core business models for chemical and digital photography)? If only the first answer is positive, the potential impact of DI is the smallest; if the answers to all three questions are positive, the potential impact is the largest; if the first two answers are positive, the potential impact is moderate. It is worth noting that it is hard to adequately gauge the potential impact of DI at the initial stage because any novel product/service or process tends to be immature initially, even for high-end RI, so it takes time to prevail along an *S-curve* (Foster, 1986).

The last key cause of the extant conceptual confusion is the lack of clarity on the content of DI in terms of technology, market, product/service or process (cf. Christensen & Raynor, 2003; Danneels, 2004). I agree that DI can occur in both technology and business model (Christensen & Raynor, 2003) and that DI is a

problem for incumbents more in terms of business model than in terms of technology (Christensen, 2006; Govindarajan & Kopalle, 2006a), but I do take issue with the attempt to separate the two elements as independent types of DI (e.g., Markides, 2006). Distinctive from technological invention, *innovation* is an application of technology to market by taking the concrete forms of novel product/service or process as the primary elements of business model (OECD, 1997). In this sense, it is problematic to group innovation into technological and market types (e.g., Garcia & Calantone, 2002; Markides, 2006). I share the view that innovation should contain technological and market elements as the two sides of the same coin (Chandy & Tellis, 1998; Freeman & Soete, 1997), so the debate over DI as related to technology, product, or business model is largely misplaced. For instance, in the case of the “low-end” DI, the source of disruption is lower price without much technological innovation, thus largely market innovation; in the case of “new-market” DI, the source of disruption is a blend of technological and market innovations (Christensen & Raynor, 2003). To cover all types of DI and have both technological (supply) and market (demand) elements, I posit that technological and market elements must be incorporated into DI as business model innovation with novel value proposition as its core in the forms of product/service or process. I embrace the inevitable overlap, rather than the sharp and fixed boundaries, between paired constructs, including those of mainstream and non-mainstream, non-consumption (unserved) and under-consumption (under-served), standard and sub-standard, technology and market, superior and inferior, high and low, bottom-up and top-down, supply and demand, and new and old, all as dualities. *Duality* refers to a pair of contrary (contradictory) yet complementary (compatible) elements as opposites-in-unity that mutually negate and affirm to different degrees in different aspects at different times (Li, 1998, 2008, 2011a). Finally, I suggest that we gauge the potential of disruptiveness at the industry (macro) level rather than at the firm (micro) level because the latter can be problematic (cf. Garcia & Calantone, 2002). For instance, an imitation at the industry level could be taken as an innovation (even RI) at the firm level since the imitation is “novel” (“radical” and “exploratory”) to the imitating firm (cf. Wu, Ma & Shi, 2010), thus resulting in unnecessary conceptual confusion. In sum, I propose to delineate DI as a duality of initial sub-standard (at the lower price) and emerging future standard so as to embody the *theme* of bottom-up novel value proposition.

DI is a business model innovation with product/service and/or process innovations to target primarily non-consumption and secondarily under-consumption via initial sub-standard and emerging future standard to embody a bottom-up novel value proposition.

AN INTEGRATIVE TYPOLOGY

Toward an Integrative Typology

By definition, DI should be inferior to the mainstream standard, but it has good potential because it offers a novel value proposition by initially targeting both unserved and under-served customers. In this sense, almost all innovations at BOP are DI simply because the “mainstream” market at BOP is largely unserved (by the standard at TOP) in contrast to the mainstream market at TOP as well-served or even over-served. While I differentiate new-feature DI from enhanced-feature DI at BOP, I regard them both as “new-market” DI because they target non-consumption in contrast to DI at TOP for both non-consumption (by “lower-end” DI) and under-consumption (by new-market DI). Further, though the DI at BOP is partly *imitative*, it is partly innovative with bottom-up value proposition for the unique local context at BOP (cf. Kim, 1997; Wu et al., 2010), especially the *reverse* or *blowback innovation* as new-feature DI at BOP (Hagel & Brown, 2005; Immelt et al., 2009). New-feature DI at BOP initially targets the local market at BOP, but later expands into a new niche market, or even the mainstream market, at TOP. New-feature DI can be initiated by global incumbents (e.g., GE for portable ultrasound scanner) as well as local entrepreneurs (e.g., Acer for netbook computer). Enhanced-feature DI at BOP, often an adaptive (imitative) version of TOP’s innovation at a sharply lower price (e.g., the adaptive “shanzhai” or “bandit” versions of mobile phone in China, *The Economist*, 2010), also contains a novel value proposition, often in the form of low-cost process innovation about production or delivery (e.g., BYD’s labor-intensive or low-automation process for making batteries and cars). Hence, the DI at BOP is different from the DI at TOP not only due to the customers at different *income levels* on the demand side (cf. Adner, 2002), but also due to the production and delivery processes at different *cost levels* on the supply side (cf. Li, 2007, 2010). Such differences on both demand and supply sides can be captured by the two defining qualities (i.e., initial sub-standard and emerging future standard) to embody the theme of DI (i.e., bottom-up novel value proposition).

Bottom-up novel value proposition is unique because it adapts to the local context toward *indigenous innovation*, which tends to take the form of imitative innovation (He, Lim & Wong, 2006; Ouyang, 2010; cf. Wu et al., 2010). To reflect its indigenous uniqueness as a distinctive ideal-type, I refer to the DI at BOP as *latecomer innovation* with five key connotations. First, it crystallizes the theme of bottom-up novel value proposition (innovation content). Second, it also symbolizes a bottom-up process with a low-to-high trajectory of innovation (innovation process). Third, it reflects an indigenous demand as adaptive to the unique local contexts in the emerging markets (innovation context). Fourth, it adopts the perspectives of local firms as latecomers to catch up or leapfrog from the emerging markets, and local subsidiaries of global incumbents operating in the emerging markets (innovation agency). Fifth, it implies that not all types of potential can be fully realized (innovation outcome). Hence, integrating the ideas of reverse, blowback, and indigenous innovations, latecomer innovation consists of both new-feature DI (I refer to it as *leapfrogging innovation* in terms of path-creating innovation) and enhanced-feature DI (I refer to this as *catch-up innovation* in terms of path-skipping innovation, cf. Lee & Lim, 2001). The notion also covers the holistic and dynamic functions of DI from being sub-standard to being future standard, which integrates technology (product/service or process) and market (business model). Hereafter I refer to the DI at BOP by latecomers as latecomer innovation that consists of both catch-up innovation and leapfrogging innovation (cf. Hobday, 1995; Lee & Lim, 2001; Kim, 1997; Mu & Lee, 2005; Wu et al., 2010; Xie & Wu, 2003; Yu, 2007).

Further, by taking the mainstream market at TOP (including its three, i.e., high-end, mid-end, and low-end, segments) as the benchmark, and by taking the reframed constructs of DI and BOP as the components, I propose an integrative typology of global innovations (see Table 1). This typology integrates the dimension of sustaining-disruptive innovation with the dimension of radical-incremental innovation. The dimension of sustaining-disruptive innovation focuses on the domain of technology, while the dimension of radical-incremental innovation focuses on the domain of market; together, the two dimensions delineate four ideal-types of global innovation. The standards of quality and price in the mainstream market at TOP are used as the benchmarks to compare the qualities and prices of global innovations across both TOP and BOP. Finally,

in addition to the above “spatial” content of DI, this typology implies a *dynamic process* of DI in terms of a general trajectory involving all four cells from latecomer innovation to DI at TOP and then from DI to SI. This process is recursive in nature. In sum, this typology sheds light on the natures, rationales and criteria of global innovations in general.

Insert Table 1 about here

Novel Qualities of DI at BOP by Latecomer as Latecomer Innovation

As implied in Table 1, the potentially path-breaking contribution of DI at BOP (latecomer innovation) is that it offers the most solid anchor for DI because it has the clearest delineation of DI without the serious conceptual confusions and ambiguities in the extant conceptualization of DI. As shown in Table 1, latecomer innovation is explicitly distinctive from the DI for the lower-end segment at TOP (cf. Christensen & Raynor, 2003) because latecomer innovation (with novel value propositions for the unique local needs at BOP) is novel in differentiating both new-feature and enhanced-feature DI from both new-market and low-end DI at TOP. The “low-end” DI with low-cost structure in the same “value network” cannot disrupt (cf. Christensen & Raynor, 2003). When reframed as the “lower-end” DI at TOP, this type primarily targets under-consumption. As the “lower-end” DI focuses on under-consumption, I take it as the *weak form* of DI because of its smaller disruptive impact on the mainstream market and incumbents. I also regard the enhanced-feature latecomer innovation as the weak form of DI because it relies more on low-cost process innovation than on product/service innovation, thus with a much smaller disruptive impact on the mainstream market and incumbents. This type of latecomer innovation is primarily effective for the latecomers to catch up with, rather than leapfrog, the incumbents. Hence, I term it catch-up innovation. In contrast, I regard new-market DI at TOP and new-feature latecomer innovation as the *strong forms* of DI due to their much larger disruptive impact on the mainstream market and incumbents (tied to their natures as bottom-up RI). This type of latecomer innovation is primarily effective for the latecomers to leapfrog, rather than catch up with, the incumbents. Hence, I term it leapfrogging innovation. It is worth noting that the impact of DI is the ex ante potential rather than the ex post reality; the

size or degree of potential impact as the measure of strong or weak form of DI can be gauged by the *degree of novelty in value proposition*, reflecting the possible chance to disrupt the mid-end and even high-end mainstream segments at TOP beyond its low-end segment. Consequently, both types of latecomer innovation (i.e., new-feature leapfrogging DI and enhanced-feature catch-up DI) are “new” since they target the non-consumption at BOP (in contrast to the lower-end DI at TOP for under-consumption), while non-consumption is the unique quality of the “mainstream” market at BOP (London & Hart, 2011; Prahalad, 2009). This unique quality of latecomer innovation best highlights the defining qualities and theme of DI. In sum, because latecomer innovation most explicitly captures the nature, rationale, and criterion of DI in general, there are no more confusions and ambiguities in the conceptualization of DI.

Further, latecomer innovation offers the most compelling rationales and criteria to fully explain why and how DI actually occurs and functions. Such rationales and criteria derive from the distinctions between the DI at BOP and the DI at TOP not only in the income level of their respective targeted customers, but also in the unique content of their respective business models. The two distinctions are directly related to business-model innovation rather than technological innovation. While they share the qualities and theme of DI in general, latecomer innovation can serve primarily non-consumption, but the DI at TOP serves both under-consumption and non-consumption. Also, latecomer innovation must be *adaptive to the indigenous contexts* at BOP, including the unique economic and cultural contexts. It is the need to adapt to the indigenous context at BOP that drives the demand for latecomer innovation to be indigenous in its value proposition. Hence, instead of characterizing latecomer innovation as “imitative”, I regard latecomer innovation as “indigenous”, which refers to the adaptation of product/service and process to the unique local context. In this sense, latecomer innovation can be understood as indigenous in nature with new-feature (leapfrogging) DI and enhanced-feature (catch-up) DI as the two essential forms. Hence, the root rationale and criterion for latecomer innovation to be uniquely compelling for explaining why and how DI occurs and functions lie in the indigenous context of latecomer innovation (Li, 2007, 2010). For instance, the potential of disruptive impact of latecomer innovation tends to be much larger than the DI at TOP because the local context at BOP is more fertile for both new-

feature DI and enhanced-feature DI, including the contextual factors of large and fast-growing market of non-consumption, state support, and unique demand at some of the BOP markets (Mu & Lee, 2005; *The Economist*, 2010; Wu et al., 2010; Xie & Wu, 2003; Yu, 2007). This is similar to the experiences of the former latecomers (Cho, Kim & Rhee, 1998; Kim, 1997; Lee & Lim, 2001; Sohn, Chang & Song, 2009).

To adapt to the indigenous context at BOP, the two forms of latecomer innovation have their own unique qualities distinctive from DI at TOP. For new-feature leapfrogging innovation, it is expected that this type of DI will disrupt the mainstream market and incumbents to a larger extent because its value proposition will be more novel by definition. As the strong form of DI, new-feature leapfrogging innovation has the dual-role function by being both DI and RI (i.e., the radical-disruptive type), so it can leverage the strength of DI with the strength of RI. Given that role, new-feature leapfrogging innovation will have the larger potential to disrupt the mainstream market and incumbents than new-market DI at TOP, since the former provides the indigenously novel product/service innovations for the unique local demands at BOP that are highly unlikely to occur at TOP (e.g., GE's portable ultrasound scanner; Acer's netbook computer). In addition, enhanced-feature catch-up innovation can also disrupt the mainstream market and incumbents more than lower-end DI at TOP because the former can provide an indigenously novel process innovation that is unlikely to occur at TOP due to the unique local supply at BOP (e.g., BYD's labor-intensive/low-automation production system; China's "shanzhai" products). It is enhanced-feature catch-up innovation that highlights the importance of *process innovation*, in addition to product/service innovation. Focusing on the product/service related RI and DI at TOP, the extant literature often neglects process innovation as secondary (OECD, 1997). In contrast, enhanced-feature catch-up innovation can best showcase the rationale and criterion of process innovation from the low-cost perspective. For instance, BYD, China's largest maker of batteries and electric cars, is a salient example of enhanced-feature catch-up innovation with a unique labor-intensive (low-automation) production system as a major low-cost process innovation (Gunther, 2009). It is BYD's business model innovation (with process innovation as the critical part) that makes it a disruptive challenger. It is worth noting that BYD has been recently ranked as the eighth most innovative firm in the world (*Newsweek*, 2010). However, it is

necessary to point out that, while enhanced-feature DI (lower-cost in most cases) may help latecomers catch up with incumbents, it is new-feature DI that is uniquely capable of helping latecomers leapfrog incumbents. Hence, I take issue with the treatment of “path-skipping” catch-up as leapfrogging (cf. Lee & Lim, 2001). Instead, I distinguish leapfrogging innovation from catch-up innovation, and I only regard “path-creating” innovation as leapfrogging. This distinction is implicitly supported by the evidence that both path-following and path-skipping share the same character of involving only private effort, while path-creating has the unique need for private-public collaboration (Lee & Lim, 2001). In other words, path-creating (path-breaking) leapfrogging can be taken as exploration for paradigm shift with the new rules of the game (e.g., new-feature DI), while path-skipping (path-dependent) catch-up can be regarded as exploitation with the same rules of the game (e.g., enhanced-feature Di) without any paradigm shift (Dosi, 1982; Li, 2010; March, 1991).

To further elaborate the uniqueness of latecomer innovation, we differentiate enhanced-feature catch-up innovation from those “lower-end”, “immediate-market”, and “fringe-market” innovations in three aspects (cf. Schmidt & Druehl, 2008). First, while the “lower-end” DI at TOP targets the under-consumption by the non-mainstream customers who are the marginalized minority at TOP, low-cost catch-up innovation targets the non-consumption of the “mainstream” customers as the majority at BOP. Second, while the “lower-end” DI at TOP needs to reduce the cost slightly with a minor process innovation, the low-cost catch-up innovation must reduce the cost substantially with a significant DI in process innovation (e.g., BYD’s labor-intensive/low-automation system in China). Third, it is even doubtful whether the “lower-end” DI is qualified as innovation if it does not involve process innovation. It should be reframed as a minor process innovation so as to be qualified as innovation. In sum, the proposed integrative typology solves the conceptual confusions and ambiguities about the types of DI in particular and the rationales and criteria of DI in general.

As a caveat for the integrative typology, we need to realize that, as a process from sub-standard to future standard, DI in general and latecomer innovation in particular, does not have to fully or completely replace the old standard or incumbents. I posit that, when an innovation successfully enters the mainstream market (including its low-end segment) by establishing a new standard as one of multiple options for the mainstream

market, this innovation is qualified as disruptive (e.g., netbook computer and portable ultrasound scanner). In other words, disruption (disruptiveness) can range from being strong (high) to weak (low). For instance, GE's portable ultrasound scanner is a strong DI by global incumbent, but it is unlikely to replace the high-end ultrasound systems at TOP. Acer's netbook computer can be a strong DI by local latecomer at BOP, but it is unlikely to replace the high-end notebook computers at TOP. Also, BYD's electric cars and the electric bikes in China, which have the potential to become the strong form of DI at BOP, are unlikely to replace their high-end counterparts any time soon. Finally, those "shanzhai" products, including the mobile phones built with the integrated chip by MediaTek (Sun, Chen, & Pleggenkuhle-Miles, 2010), could be the weak form of DI by local latecomers at BOP when they are well adapted to the local context as imitative innovations (i.e., enhanced-feature DI), but they are even less likely to replace the high-end products at TOP than new-feature DI.

Toward a Theory of Latecomer Innovation

The characters of latecomer innovation can be captured on the five basic dimensions of "spatial" content of MNE evolution, including ultimate intent, external context, internal profile, strategic choice, and market effect (Li, 2003). First, latecomer innovation will depend very much on the ambitious strategic intent as the long-term goal. Without such ambitions, DI will not even occur due to the lack of motivation. EMNEs at BOP are good at DI since they are eager and also under the greater pressure to innovate in the disruptive manner. Second, latecomer innovation depends on the unique local context of EMNEs at BOP, including the large size, fast growth, and diverse demand in the local market as well as cheap labor supply, and state policy incentive, as in the case of China (Li, 2007; Xie & Wu, 2003). It is imperative that the large size, fast growth and diverse demand in the local market provide a unique chance for the trial and error toward DI. Cheap labor supply, including the low-skilled and high-skilled labor, provides the strongest base for low cost. State policy incentives provide a new motive for DI. Further, latecomer innovation will depend on the external context of global supply chain, modularization, and open innovation, all of which make it much easier and faster for EMNEs to benefit from the global network. Third, latecomer innovation will finally depend on the internal profile of latecomers, including the lack of resources, which tends to put a greater pressure on latecomers to engage in innovation. In

this sense, the greater lack of resources results in the higher likelihood of latecomer innovation. For instance, the serious lack of natural resources in Japan and South Korea forced them to rely more on human resources by promoting education and teamwork (Cho et al., 1998; Sohn et al., 2009). In sum, the above three factors delineate the overall context for EMNEs to engage in latecomer innovation. Based on the above discussion, we tentatively develop three propositions concerning the initiating and enabling conditions for latecomer innovation:

Proposition 1: The more ambitious ultimate intent of a latecomer will be associated with the higher frequency and quality of the latecomer innovation of the latercomer.

Proposition 2: The more conducive external context (e.g., large, fast growing and diverse home market; limited technology and capital; cheap labor; strong state support; mature industry, and global outsourcing) for a latecomer to engage in emergent innovation will be associated with the higher frequency and quality of latecomer innovation.

Proposition 3: The more conducive internal profile (e.g., latecomer status, lack of core resources, and aggressive culture) for a latecomer to engage in emergent innovation will be associated with the higher frequency and quality of latecomer innovation.

Fourth, for the specific content of DI in terms of business model, latecomer innovation will depend most on an accelerated learning by EMNEs, including the sequential process from reverse engineering to technology licensing (often as a key part of OEM contract manufacturing) and from internal R&D to R&D alliance (Li, 2010). This learning path requires a unique R&D model with an emphasis on imitative innovation, and also learning from alliance partners. Hence, it is logical for latecomers to adopt business model innovation as latecomer innovation with three characters: (1) it can target BOP before TOP; (2) it can customize products/services according to the unique indigenous context at BOP toward higher values, and (3) it can focus on the low-cost process system by taking full advantage of cheap labor (“*people power*”), especially in the areas of R&D and marketing as well as by innovatively combining extant technologies. In this sense, this model is unique with high *value-price ratio*. In particular, DI at BOP can take advantage of convenience in design as new-feature innovation with the values of compactness and portability (e.g., GE portable ultrasound scanner and Acer’s netbook). The notion of *convenience* is critical to DI at BOP in the sense it is the third core product feature besides the features of functionality, reliability and cost in the product evolution model as the *Buying*

Hierarchy (Christensen, 1997: 217). The model posits that customers make their buying decisions by following the sequential order from functionality to reliability to convenience and finally to cost. I posit that DI in general and latecomer innovation in particular will most likely embody the features of convenience (for new-feature DI) and cost (for enhanced-feature DI), in sharp contrast to II or RI at TOP with the features of functionality and reliability. For example, Huawei, a telecommunication equipment maker from China, designed a compact and portable distribution base station, called *Single-RAN*, which helped Huawei win two big contracts in Europe (i.e., the Netherlands in 2004 and Norway in 2009). Built upon the features of convenience and cost, this new-feature latecomer innovation has become the new standard for the incumbents to adopt (Li, 2011b). This standard, however, may not be in paradigm conflict with the old standard, so it remains to be seen if Huawei will be able to replace the incumbents due to the new standard. This is a good example of path-creating leapfrogging DI (exploration) in contrast to path-skipping catch-up DI (exploitation). Fifth and finally, the market effect of learning about the emerging markets can be quicker and stronger for latecomers than the learning about the established markets. This limitation supports the view that EMNEs tend to have unique advantages in latecomer innovation as DI at BOP rather than DI at TOP. After the initial success in latecomer innovation, EMNEs will inevitably move up to DI at TOP. However, there is still a long way to go before any latecomers can reach the top-end of TOP, but it has been proven to be competitive at MOP and also increasingly competitive at the mid-end of TOP. Based upon the above discussion, we tentatively provide eight propositions about the stages and mechanisms of latecomer innovation:

Proposition 4: Latecomer innovation mediates between the first three “spatial” factors (i.e., ultimate intent, external context and internal profile) as the input, and the last “spatial” factor of market effect as the output.

Proposition 5: Latecomers will follow the trajectory from low-cost enhanced-feature DI to high-value new-feature DI, and then from latecomer innovation to RI at TOP.

Proposition 6: Latecomers will most likely focus on the feature of convenience for new-feature DI as well as the feature of cost for enhanced-feature DI.

Proposition 7: The potential disruptiveness will be the greatest if new-feature DI will emerge as future standard in a paradigm conflict with the old standard.

Proposition 8: The latecomer innovations of latecomers will not fully disrupt all global incumbents.

Proposition 9: Latecomers will confront greater competition at TOP initially, especially in terms of the unique challenges in exploring the market access at TOP.

Proposition 10: Incumbents will confront greater competition at BOP over time, especially in terms of the unique challenges in exploring the market access at BOP.

Proposition 11: Latecomers and incumbents will benefit more from their inter-group alliance at BOP, MOP, and TOP, especially at MOP.

DISCUSSION AND CONCLUSION

Discussion of the Contributions and Implications

Applied to BOP, DI bears unique strategic implications for both local entrepreneurs in the emerging economies and global incumbents in the established economies. The future landscape of global competition can be dramatically reshaped by DI at BOP as latecomer innovation. It is increasingly clear that latecomer innovation has the greatest potential to make the world “flatter” (Friedman, 2007) and more sustainable (London & Hart, 2011; Samli, 2008). This exploratory study has made two novel contributions to the research on latecomer innovation by reframing the constructs of DI and BOP; proposing an integrative typology of global innovations, and building a tentative theory of latecomer innovation. First, this study has tentatively settled the key debates regarding DI and BOP, thus paving the way for an integrative typology of global innovations on two key dimensions. Second, this study has tentatively built a theory of latecomer innovation to explain why and how latecomer innovation serves as the mechanism underlying the trajectories of catching up with and leapfrogging by EMNEs. In other words, this study has the potential to bridge the literatures on innovation and globalization, thus with critical implications for research and practice across the two research streams.

There are two implications of latecomer innovation for future research. First, latecomer innovation has the great potential to truly settle the *debates* over the nature and process of DI by clarifying the conceptual ambiguities and confusions. This is because that DI is most likely to occur at BOP largely because of the indigenous requirements for special value propositions to be embodied by sub-standard and future standard as the two defining qualities of DI. For instance, due to the salience of China as the largest, fastest, and most

complex economy at BOP, the DI in the indigenous context of China will bear far-reaching implications for both local entrepreneurs in China and global incumbents operating in China. Hence, the research on latecomer innovation can greatly enrich the theories concerning emerging MNE latecomer with key insight into the unique competitive advantages and strategies for local latecomers relative to those of global incumbents, such as the holistic contents of ultimate intent, external context, internal profile, strategic choice, and market effect in a dynamic process of accelerated latecomer. Further, the research on latecomer innovation can shed light on the historical pattern in which the Japanese firms (e.g., Toyota and Sony) caught up with the Western incumbents as well as those firms from newly industrializing economies in East Asia (e.g., South Korea and Taiwan) have been catching up with the Japanese firms. This is the central theme of latecomer model in Asia, and potentially the standard latecomer model for all emerging economies if history is a worthy guide (Freeman & Soete, 1997; Hart & Christensen, 2002).

Hence, the longitudinal comparative case studies are needed to identify more detailed holistic contents and dynamic processes of latecomer innovation, and then compare them with the features of DI at TOP. Since it takes two to tango or two sides to form a single coin as a duality, we should examine the mechanisms for both latecomers and incumbents to understand the holistic contents and dynamic processes of destruction in general and disruption (latecomer innovation) in particular. In this sense, it is more effective to compare the cases in contrasting pairs, as suggested by the *Yin-Yang Method* of case study (Li, 2011a), with a latecomer matched with the incumbent being targeted to disrupt by the latecomers. This unique method has the great potential to identify the uniquely distinctive contents and processes of DI as a duality. I call for more comparative case studies (especially via the Yin-Yang Method) to explore the mechanisms for latecomers to disrupt incumbents as the way to catch up and leapfrog.

Equally important is that the research on latecomer innovation can clarify the conceptual confusions regarding DI in particular and innovation in general. This can be readily achieved by focusing on the two defining qualities (i.e., sub-standard and future standard) for the theme (i.e., bottom-up novel value proposition) of latecomer innovation. The qualities and theme can suggest the *litmus test* of DI by evoking the

three criteria to measure the potential of disruptive impact (i.e., a new feature; its attractiveness toward future standard, and the paradigm conflict between the old and new standards). Consequently, the essence of top-down creative destruction is the lack of ability on the part of incumbents to engage in paradigm shift, while the essence of DI as bottom-up creative destruction lies in the initial lack of motive as well as the later lack of ability. Finally, the research on latecomer innovation can help enrich and integrate types of innovations in terms of both innovation content (e.g., product/service and process; technological and business model) and innovation process (e.g., RI and II; DI and SI). As a result, the research on latecomer innovation can expand our knowledge about the distinction and link between the management in general and innovation in particular at BOP as well as those at TOP, including their implications for the competition between EMNEs and MNE incumbents. It is worth repeating that the key to global competition lies in dynamic capability, which is embedded in business model innovation to overcome paradigm conflict. While the three criteria of disruptive impact suggest the absence of ability (also motive), dynamic capability implies the presence of ability (also motive). Such absence and presence of ability and motive constitute two more dualities. This is consistent with the paradox that the home-based capability of MNE tends to enhance the absorptive capacity of the MNE, but it also reduces the MNE's motivation to outsource knowledge from host countries, thus leading to an *inverted U-shaped* balance between the home-based capability and knowledge sourcing from the host country (Song & Shin, 2008). In sum, the emerging research on latecomer innovation has the good potential to enrich and enhance the research on DI by clarifying various conceptual confusions as well as by contextualizing DI as a global phenomenon.

Second, to complement the cross-fertilization from the research stream of globalization to that innovation, the latter has the potential to enrich and enhance the former. The two-way cross-fertilization is imperative, especially when the extant research on cross-border R&D has largely “missed the opportunity for theoretical advancement that might arise from drawing upon more general theories of innovation and technological process in organizations (Frost, 2001: 101). In particular, despite the fast growing significance of EMNEs in global competition (Li, 2007; *The Economist*, 2010), there is little work on latecomer innovation, especially the unique mechanisms underlying the trajectories of catching up and leapfrogging. The extant

research on globalization of innovation or R&D focuses on the perspective of MNE incumbents (e.g., Castellani & Zanfei, 2006; Dunning, 2002; Loof, 2009; Nieto & Rodriguez, 2011; Patel & Vega, 1999), including the R&D activities located in the emerging economies and their spillover effect (e.g., Asakawa & Som, 2008; Gorodnichenko et al., 2010; Lewin & Couto, 2007; Li & Zhong, 2003; Mahmood & Zheng, 2009; Manolopoulos, Papanastassiou & Pearce, 2007). What is largely missing is the cross-border R&D effort by EMNEs, especially the R&D effort in the developed economies (Li, 2007, 2010; cf. Di Minin & Zhang, 2010; Ester, Assimakopoulos, von Zedtwitz & Yu, 2010; Liu, Wang & Zheng, 2010;). To fill the gap, this study is one of the first attempts to take advantage of the missed opportunity by focusing on latecomer innovation as one of the best candidates for the cross-fertilization from the research on innovation to that of globalization.

In addition to the contribution of clarifying and contextualizing the construct of DI, the second contribution of this study is to explain why and how latecomer innovation is the primary mechanism underlying the trajectories of catching up and leapfrogging by EMNEs. Specifically, the extant literature on globalization of innovation does suggest something we can evoke to help develop a theory for latecomer innovation. One of the emerging themes in the literature is about the effect of competition via the presence of MNE incumbents in the emerging economies on the intensified innovation by local firms, and the effect of spillover from the R&D activities by MNE incumbents that operate in the emerging economies on the enhanced innovation by local firms (Gorodnichenko et al., 2010), especially when the competition and R&D activities are not only for the purpose of adapting the extant products to the local market, but also for the objective of inventing for the global markets (Asakawa & Som, 2008; Li & Zhong, 2003; also see Immelt et al., 2009; Manolopoulos et al., 2007). This is consistent with the trend by MNE incumbents to shift their R&D focus from home-based exploitation to host-based exploration (Castellani & Zanfei, 2006; Dunning, 2002; Frost, 2001; Kuemmerle, 1999; Nieto & Rodriguez, 2011), given the growing need for sourcing talents on the global scale (Lewin & Couto, 2007). Further, this is also paradoxically consistent with the emerging evidence that the local R&D activities by MNE incumbents tend to benefit more when they establish alliances with local firms for the purpose of targeting the local market (Castellani & Zanfei, 2006; Loof, 2009).

Based upon the above discussion, I go further to posit that EMNEs can benefit a lot from the competition and R&D activities of MNE incumbents at the home market, which provides the rare opportunities for EMNEs to learn at home initially and later venture abroad via the initially acquired absorptive capacity to learn more along an accelerated trajectory (Li, 2003, 2007, 2010). This trajectory of learning can be further analyzed as a duality with two interrelated patterns: one as path-skipping catch-up innovation via exploitation of acquired capabilities, while the other as path-creating leapfrogging innovation via exploration of novel capabilities. This duality can be integrated with the duality of centrifugal (global and slippery) and centripetal (local and sticky) forces (Dunning, 2002; also see Song & Shin, 2008). From this perspective, the overall pattern of global R&D activities consists of two parallel trends: (1) the trickle-down global spillover from the established economies to the emerging economies (also from headquarters to subsidiaries), and (2) the trickle-up spillover from the emerging economies to the emerging economies (also from subsidiaries to headquarters) as reverse or blowback innovation and latecomer innovation (Hegal & Brown, 2005; Immelt et al., 2009). In the pattern of trickle-up spillover, DI at BOP is the key mechanism for EMNE to catch up and leapfrog MNE incumbents. Given the conflicting anecdotal evidence for the trajectories of cross-border R&D activities by EMNEs (cf. Di Minin & Zhang, 2010; Li, 2011b; Liu et al., 2010), it is imperative to focus more on the specific nature of R&D activities, such as that of DI or II. For instance, as the underlying mechanism to catch up or leapfrog, latecomer innovation tends to start by imitating the key features of functionality and reliability (the first and second features in the Buying Hierarchy) from the existing products or services, and then shift to the exploration of new features in convenience and cost (the third and fourth features in the Buying Hierarchy). I posit that, while catch-up innovation is related only to enhanced-feature DI (e.g., the feature of cost), leapfrogging innovation requires new-feature DI (most likely deriving from the feature of convenience, such as compact and portable designs). In sum, latecomer innovation bears the implications for the two-way cross-fertilization between the research streams on both globalization and innovation.

The research on latecomer innovation also bears several imperative practical implications, so this research is good for scholars to connect with practitioners. Specifically, the research bears major practical

implications for both local entrepreneurs (emerging MNE latecomers) and global incumbents. While latecomer innovation is a great opportunity for local entrepreneurs to catch up and challenge global incumbents, it is a serious threat to global incumbents. However, these two groups can also complement each other as alliance partners to share the key benefits of latecomer innovation. In other words, these two groups could be the two sides of the same coin as a duality.

First, local entrepreneurs at BOP can take advantage of latecomer innovation by using it to challenge global incumbents at BOP initially and then at TOP later. These local entrepreneurs can focus on new-feature latecomer innovations for non-consumption and enhanced-feature ones for under-consumption if they are ignored by global incumbents. Local entrepreneurs often grow first at home, but they will not stop there. They can and will leverage their learned capabilities at home to aggressively enter the “lower-end” segment in the established markets (Hagel & Brown, 2005; Hart & Christensen, 2002). In other words, local entrepreneurs could grow into emerging multinational latecomers as formidable challengers to global incumbents much faster than most have anticipated due to the unique benefit of DI. This is particularly true for those multinational latecomers from large emerging economies like China and India (Li, 2007; Luo & Tung, 2007; Zeng & Williamson, 2007), primarily due to their diverse and competitive markets at home. This accelerated catching-up effort by local entrepreneurs as a *bottom-up strategy* bears far-reaching economic, political, and social implications (Samli, 2008), which extend beyond the debated role of global incumbents applying a *top-down strategy* (cf. Karnani, 2007; Prahalad, 2009). It seems that local entrepreneurs tend to have an upper hand in alleviating the poverty at BOP relative to global incumbents largely due to the *inherent advantage* of having the best *value-price ratios* for products/services as required for survival at BOP home. The value-price ratio is often achieved via open innovation with diverse partners in an alliance network (Chesbrough, 2003; Li, 2010). However, local latecomers also have some disadvantages, especially the lack of resources other than low-skilled labor and potential market. The existence of both advantage and disadvantage on the part of local latecomers at BOP further suggests the need for taking all complex issues as dualities so as to capture the holistic and dynamic balances between the opposite forces.

Second, some global incumbents (e.g., GE) realize not only the threats from, but also the opportunities in, latecomer innovation, so they can protect themselves from, and take advantage of, such DI. The latecomer innovation that is initially targeted at the emerging markets can be taken globally, thus reversing the typical sequence from TOP to BOP, thus known as the reverse or blowback innovation (Hagel & Brown, 2005; Immelt et al., 2009). However, there are many special challenges to global incumbents, as documented by Christensen and his colleagues (2003, 2004). Global incumbents face major challenges because their past experience at home has not prepared them to meet the aggressive value-price ratio typically required at BOP. Further, global incumbents are not sensitive to the unique demands at BOP due to the resource constraints there. In other words, global incumbents have the *inherent disadvantage* in latecomer innovation. This is especially true for global incumbents operating in China and India largely due to the uniquely diverse and competitive markets there. It is worth noting that the “inferior” quality implies not only sub-standard performance but also distinctive feature to embody a novel value proposition rather than a simplified version of mainstream product/service with the old value proposition. In other words, emergent innovation implies a bottom-up process of innovation from an initial sub-standard to emerging future standard, which is the great opportunity for MNE latecomers but the great threat to global incumbents. However, global incumbents have many advantages, including technological and financial resources. Again, the existence of both advantage and disadvantage on the part of global incumbents at TOP shows the need for taking complex issues as dualities.

Third, given the lack of resources on the part of local latecomers and the abundance of resources on the part of global incumbents, there is a huge opportunity for the two groups to be strategic partners in their joint pursuit of DI (cf. Zeng & Williamson, 2007). It is a special duality for local latecomers and global incumbents to emphasize competition and cooperation as equally imperative, rather than either/or dualism. However, such a duality should never be interpreted as a symmetrical 50-50 balance between the opposites. A true duality balance is asymmetrical with one opposite as the dominant to be balanced in a curvilinear pattern (an inverted U-shaped curve) by the other opposite as the subordinate. In other words, the subordinate opposite can balance the dominant opposite as complementary for synergy in the low-to-mid level portion, but the former will turn

into contrary for tradeoff once it extends beyond the threshold into the mid-to-high part of the inverted U-shape curve (Li, 2011c; Song & Shin, 2008).

Conclusion

I have provided a tentative sketch of a new theory of latecomer innovation by clarifying and contextualizing DI as well as by specifying and positioning the DI at BOP by EMNE as the mechanism underlying the trajectories of catching up and leapfrogging. Latecomer innovation contains a number of unique qualities, including the theme of bottom-up novel value proposition (innovation content); the bottom-up process with a low-to-high trajectory (innovation process); the indigenous demand adaptive to the unique local contexts in the emerging markets (innovation context); the perspective of local latecomers to catch up and leapfrog from the emerging markets as well as that of local subsidiaries of global incumbents operating within the emerging markets (innovation agency), and finally the possible failure of latecomer innovation (innovation effect). In essence, latecomer innovation is an overall duality with such specific dualities of low-price and new-feature; initial sub-standard and emerging future standard; bottom-up and top-down; high-end and low-end; technology and business model; potential and realized; motive and ability; latecomer and incumbent; local and global; BOP and TOP; paradigm shift and paradigm conflict; inertia and dynamic capability; exploration and exploitation; core competence and core rigidity; opportunity and threat; competition and cooperation, and success and failure. The key is to keep the holistic and dynamic balances between the opposites-in-unity as a duality.

Equipped with the above duality qualities, latecomer innovation has the good potential to contribute in two broad areas. First, it can enrich and integrate the currently separated research streams on DI and BOP by reframing latecomer innovation as an ideal-type of innovation in the special context of BOP. Hence, it can cross-fertilize from the research on globalization to that on innovation in general and DI and business model innovation in particular by clarifying the extant conceptual confusions and contextualizing the notion of DI with its global implications. Second, it can enrich and integrate the research streams related to globalization, especially the emerging issues of BOP and EMNE. Hence, it can cross-fertilize from the research on innovation to that on globalization in general and BOP and EMNE in particular by specifying the core trajectories and

mechanisms of catching up and leapfrogging. Future research should take advantage of the great opportunity of rich cross-fertilization between globalization and innovation. In particular, those largely separated research streams on entrepreneurship, dynamic capability, business model, and the theory of the firm could be well integrated by highlighting novel value proposition and global context as their shared theme.

References

- Adner, R. 2002. When are technologies disruptive? A demand-based view of the emergence of competition. *Strategic Management Journal*, 23: 667-688.
- Aharoni, Y. & Brock, D.M. International business research: Looking back and looking forward. *Journal of International Management*, 16: 5-15.
- Ahuja, G., Lampert, C.M. & Tandon, V. 2008. Moving beyond Schumpeter: Management research on the determinants of technological innovation. *Academy of Management Annals*, 2: 1-98
- Alvarez, S.A. & Barney, J.B. 2010. Entrepreneurship and epistemology: The philosophical underpinnings of the study of entrepreneurial opportunities. *Academy of Management Annals*, 4: 557-583.
- Asakawa, K. & Som, A. 2008. Internationalization of R&D in China and India: Conventional wisdom versus reality. *Asia Pacific Journal of Management*, 25: 375-394.
- Barnett, W.P. & Pontikes, E.G. 2008. The Red Queen, success bias, and organizational inertia. *Management Science*, 54: 1237-1251.
- Cantwell, J. & Molero, J. (eds.) (2003). *Multinational enterprises, innovative strategies and systems of innovation*. Cheltenham, UK: Edward Elgar.
- Carr, N.G. 2005. Top-down disruption. *Strategy+Business*, 39: 1-5.
- Castellani, D. & Znnfei, A. 2006. *Multinational firms, innovation and productivity*. Cheltenham, UK: Edward Elgar.
- Chandy, R.K. & Tellis, G.J. 1998. Organizing for radical innovation: The overlooked role of willingness to cannibalize. *Journal of Marketing Research*, 35: 474-487.
- Chesbrough, H. 2003. *Open innovation: The new imperative from creating and profiting from technology*. Cambridge, MA: Harvard Business School Press.
- Chesbrough, H. & Rosenbloom, R.S. 2002. The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology. *Industrial and Corporate Change*, 11: 529-555.
- Child, J. & Rodrigues, S.B. 2005. The internationalization of Chinese firms: A case for theoretical extension? *Management and Organization Review*, 1: 381-410.
- Cho, D-S., Kim, D-J. & Rhee, D.K. 1998. Latecomer strategies: Evidence from the semiconductor industry in Japan and Korea. *Organization Science*, 9: 489-505.
- Christensen, C.M. 1997. *The innovator's dilemma: When new technologies cause great firms to fail*. Boston, MA: Harvard Business School Press.
- Christensen, C.M. 2006. The ongoing process of building a theory of disruption. *Journal of Product Innovation Management*, 23: 39-55.

- Christensen C.M. & Raynor, M.E. 2003. *The innovator's solution: Creating and sustaining successful growth*. Boston, MA: Harvard Business School Press.
- Christensen, C.M., Anthony, S.D. & Roth, E.A. 2004. *Seeing what's next*. Boston, MA: Harvard Business School Press.
- Crossan, M.M. & Apaydin, M. 2010. A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of Management Studies*, 47: 1154-1191.
- Danneels, E. 2004. Disruptive technology reconsidered: A critique and research agenda. *Journal of Product Innovation Management*, 21: 246–258.
- Di Minin, A. & Zhang, J. 2010. An exploratory study on international R&D strategies of Chinese companies in Europe. *Review of Policy Research*, 27: 433-455.
- Dosi, G. 1982. Technological paradigms and technological trajectories. *Research Policy*, 11: 147–162.
- Dunning, J. (ed.). 2002. *Regions, globalization, and the knowledge-based economy*. Oxford: Oxford University Press.
- Ester, R.M., Assimakopoulos, D., von Zedtwitz, M. & Yu, X. 2010. Global R&D organization and the development of dynamic capabilities. *Journal of Knowledge-based Innovation in China*, 2: 25-45.
- Eyring, M.J., Johnson, M.W. & Nair, H. 2011. New business models in emerging markets. *Harvard Business Review*, January-February Issue: 89-95.
- Foster, R.N. 1986. *Innovation: The attacker's advantage*. New York: Summit Books.
- Foster, R.N. & Kaplan, S. 2001. *Creative destruction: Why companies that are built to last underperform the market--and how to successfully transform them*. New York: Doubleday.
- Freeman, C. & Soete, L. 1997. *The economics of industrial innovation* (3rd Edition). Cambridge, MA: MIT Press.
- Friedman, T.L. 2007. *The World Is Flat: A Brief History of the Twenty-First Century* (2nd Revised and Expanded Edition). London, UK: Farrar, Straus & Giroux.
- Frost, T. 2001. The geographic sources of foreign subsidiaries' innovations. *Strategic Management Journal*, 22: 101-123.
- Garcia, R. & Calantone, R. 2002. A critical look at technological innovation typology and innovativeness terminology: A literature review. *Journal of Product Innovation Management*, 19: 110-132.
- Gilbert, C. & Bower, J.L. 2002. Disruptive change: When trying harder is part of the problem. *Harvard Business Review*, May Issue, 95-101.
- Godoe, H. 2000. Innovation regimes, R&D and radical innovations in telecommunications. *Research Policy*, 29: 1033-1046.
- Gorodnichenko, Y., Svejnar, J. & Terrell, K. 2010. Globalization and innovation in emerging markets. *American Economic Journal: Macroeconomics*, 2: 194-226.

- Govindarajan, V. & Kopalle, P.K. 2006a. The usefulness of measuring disruptiveness of innovations ex post in making ex ante predictions. *Journal of Product Innovation Management*, 23: 12-18.
- Govindarajan, V. & Kopalle, P.K. 2006b. Disruptiveness of innovations: Measurement and an assessment of reliability and validity. *Strategic Management Journal*, 27: 189-199.
- Govindarajan, V. & Ramamurti, R. 2011. Reverse innovation, emerging markets and global strategy. *Global Strategy Journal* (forthcoming).
- Gunther, M. 2009. Warren Buffett takes charge. *Fortune*, April 13.
- Hagel, J. & Brown, J.S. 2005. *The only sustainable edge: Why business strategy depends on productive friction and dynamic specialization*. Cambridge, MA: Harvard Business School Press.
- Hannan, M.T. & Freeman, J. 1989. *Organizational ecology*. Cambridge, Harvard University Press.
- Hart, S.L. & Christensen, C.M. 2002. The Great Leap: Driving Innovation from the Base of the Pyramid. *MIT Sloan Management Review*, 44: 51-56.
- He, Z-L., Lim, K. & Wong, P-K., 2006. Entry and competitive dynamics in the mobile telecommunications market. *Research Policy*, 35: 1147-1165.
- Henderson, R.M. & Clark, K.B. 1990. Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*, 35: 9-30.
- Hobday, M. 1995. East Asian latecomer firms: Learning the technology of electronics. *World Development*, 23: 1171-1193.
- Hobday, M. 2005. Firm-level innovation models: Perspectives on research in developed and developing countries. *Technology Analysis & Strategic Management*, 17: 121-146.
- Immelt, J.R., Govindarajan, V. & Trimble, C. 2009. How GE is disrupting itself. *Harvard Business Review*, October Issue: 3-11.
- Ireland, R.D. & Webb, J.W. 2007. A cross-disciplinary exploration of entrepreneurship research. *Journal of Management*, 33: 891-927.
- Jones, M.V. & Coviello, N.E. 2005. Internationalization: Conceptualizing an entrepreneurial process of behavior in time. *Journal of International Business Studies*, 36: 270-283.
- Karnani, A. 2007. The Mirage of Marketing to the Bottom of the Pyramid: How the Private Sector Can Help Alleviate Poverty. *California Management Review*, 49: 90-111.
- Kim, L. 1997. *Imitation to innovation: The dynamics of Korea's technological learning*. Boston: Harvard Business School Press.
- Kuemmerle, W. 1999. The drivers of foreign direct investment into research and development: An empirical investigation. *Journal of International Business Studies*, 30: 1-24.
- Kuhn, T. 1962. *The structure of scientific revolution*. Chicago, IL: University of Chicago Press.

- Le Bas, C. & Sierra, C. 2002. Location versus home country advantages; R&D activities: some further results on multinationals' locational strategies. *Research Policy*, 31: 589-609.
- Lee, K. & Lim, C. 2001. Technological regimes, catching-up and leapfrogging: Findings from the Korean industries. *Research Policy*, 30: 459-483.
- Leifer, R., McDermott, C.M., O'Conner, G.C., Peters, L.S., Rice, M. & Veryzer, R.W. 2000. *Radical innovation: How mature companies can outsmart upstarts*. Boston: Harvard Business School Press.
- Leonard-Barton, D. 1992. Core capabilities and core rigidities: A paradox in managing new product development. *Strategic Management Journal*, 13 (Summer): 111-125.
- Li, J. & Zhong, J. 2003. Explaining the growth of international R&D alliances in China. *Managerial and Decision Economics*, 24: 101-115.
- Li, P.P. 1998. Toward a geocentric framework of organizational form: A holistic, dynamic and paradoxical approach, *Organization Studies*, 19: 829-861.
- Li, P.P. 2003. Toward a geocentric theory of multinational evolution: The implications from the Asian MNEs, *Asia Pacific Journal of Management*, 20: 217-242.
- Li, P.P. 2007. Toward an integrated theory of multinational evolution: The evidence of Chinese multinational enterprises as latecomers. *Journal of International Management*, 13: 296-318.
- Li, P.P. 2008. Toward a geocentric framework of trust: An application to organizational trust. *Management and Organization Review* 4: 413-439.
- Li, P.P. 2010. Toward a learning-based view of internationalization: The accelerated trajectories of cross-border learning. *Journal of International Management*, 16: 43-59.
- Li, P.P. 2011a. Toward an integrative framework of indigenous research: The geocentric implications of Yin-Yang Balance. *Asia Pacific Journal of Management* (forthcoming).
- Li, P.P. 2011b. Huawei; The case of catching up and leapfrogging. Working paper, Copenhagen Business School.
- Li, P.P. 2011c. The rigor-relevance balance for engaged scholarship: New frame and new agenda for trust research and beyond. *Journal of Trust Research*, 1: 1-21.
- Liu, J., Wang, Y. & Zheng, G. 2010. Driving forces and organizational configurations of international R&D: The case of technology-intensive Chinese multinationals. *International Journal of Technology Management*, 51: 409-426.
- London, T. Hart, S. (Eds.). 2011. *Next generation business strategies for the base of the pyramid: New approaches for building mutual value*. Upper Saddle River, NJ: Pearson Education.
- Loof, H. 2009. Multinational enterprises and innovation: Firm level evidence on spillover via R&D collaboration. *Journal of Evolutionary Economics*, 19: 41-71.
- Luo, Y. & Tung, R.L. 2007. International expansion of emerging market enterprises: A springboard perspective. *Journal of International Business Studies*, 38: 481-498.

- Manolopoulos, D., Papanastassiou, M. & Pearce, R. 2007. Knowledge-related competitiveness and the roles of multinationals' R&D in a peripheral European economy: Survey analysis of Greece. *Management International Review*, 47: 661-681.
- March, J.G. 1991. Exploration and exploitation in organizational learning. *Organization Science*, 2: 71-87.
- Markides, C.C. 2006. Disruptive innovation: In need of better theory. *Journal of Product Innovation Management*, 23: 19-25.
- Markides, C.C. & Oyon, D. 2010. What to do against disruptive business models (when and how to play two games at once). *Sloan Management Review*, 51 (4): 25-32.
- Mathews, J.A. 2002. Competitive advantages of the latecomer firm: A resource-based account of industrial catch-up strategies. *Asia Pacific Journal of Management*, 19: 467-488.
- Mathews, J.A. 2006. Dragon multinationals: New players in 21st century globalization. *Asia Pacific Journal of Management*, 23: 5-27.
- Mu, Q. & Lee, K. 2005. Knowledge diffusion, market segmentation and technological catch-up: The case of the telecommunication industry in China. *Research Policy*, 34: 759-783.
- Newsweek*. 2010. Top 10 most innovative companies. December, 22.
- OECD. 1997. *The Oslo manual: Proposed guidelines for collecting and interpreting technological innovation data*. Paris, OECD.
- Ouyang, H.S. 2010. Imitator-to-innovator S Curve and chasms. *Thunderbird International Business Review*, 52: 31-44.
- Patel, P. & Vega, M. 1999. Patterns of internationalization of corporate technology; Location vs. home country advantages. *Research Policy*, 28: 145-155.
- Prahalad, K.C. 2009. *The Fortune at the Bottom of the Pyramid* (5th Edition). Upper Saddle River, NJ: Wharton School Publishing.
- Ricart, J.E., Enright, M.J., Ghemawat, P., Hart, S.L. & Khanna, T. 2004. New Frontiers in International Strategy. *Journal of International Business Studies*, 35: 175-200.
- Rumelt, R.P. 1995. Inertia and transformation. In C.A. Montgomery (Ed.), *Resources in an evolutionary perspective: Towards a synthesis of evolutionary and resource-based approaches to strategy*. Norwell, MA: Kluwer Academic Publishers, 101-132.
- Samli, C.A. 2008. *Globalization from the Bottom Up*. New York: Springer.
- Schmidt, G.M. & Druehl, C.T. 2008. When is a disruptive innovation disruptive? *Journal of Product Innovation Management*, 25: 347-379.
- Schumpeter, J. 1942. *Capitalism, socialism and democracy*. New York: Harper.
- Sohn, E., Chang, S.Y. & Song, J. 2009. Technological catching-up and latecomer strategy: A case study of the Asian shipbuilding industry. *Seoul Journal of Business*, 15 (2): 25-57.

- Song, J. & Shin, J. 2008. The paradox of technological capabilities: A study of knowledge sourcing from host countries of overseas R&D operations. *Journal of International Business Studies*, 39: 291-303.
- Sorenson, O. & Stuart, T.E. 2008. Entrepreneurship: A field of dreams? *Academy of Management Annals*, 2: 517-543.
- Sun, S.L., Chen, H & Pleggenkuhle-Miles, E.G. 2010. Moving upward in global value chains: The innovations of mobile phone developers in China. *Chinese Management Studies*, 4: 305-321.
- Teece, D.J. 2007. Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28: 1319-1350.
- Teece, D.J. 2010. Business models, business strategy and innovation. *Long Range Planning*, 43: 172-194.
- Tellis, G.J. 2006. Disruptive technology or visionary leadership? *Journal of Product Innovation Management*, 23: 34-38.
- The Economist*. 2010. Special report on innovation in emerging markets: The world turned upside down. April 15th.
- Utterback, J.M. & Acee, H.J. 2005. Disruptive technologies: An expanded view. *International Journal of Innovation Management*, 9: 1-17.
- Von Zedtwitz, M. 2005. International R&D strategies in companies from developing countries: The case of China. UNCTAD.
- Wu, X., Ma, R. & Shi, Y. 2010. How do latecomer firms capture value from disruptive technologies? A secondary business-model innovation perspective. *IEEE*, 57 (1): 51-62.
- Yin, R.K. 2009. *Case study research: Design and methods* (4th Edition). Thousand Oaks: Sage.
- Yu, J. 2007. From path-following to path-creating, some paradigm shifts in China's catching-up. *International Journal of Technology and Globalization*, 3: 409-421.
- Yu, D. & Hang, C.C. 2010. A reflective review of disruptive innovation theory. *International Journal of Management Reviews*, 12: 435-452.
- Zahra, S.A., Sapienza, H.J. & Davidson, P. 2006. Entrepreneurship and dynamic capabilities: A review, model and research agenda. *Journal of Management Studies*, 43: 917-955.
- Zeng, M. & Williamson, P. 2007. *Dragons at your door: How Chinese cost innovation is disrupting global competition*. Boston: Harvard Business School Press.
- Zott, C., Amit, R. & Massa, L. 2011. The business model: Theoretical roots, recent developments and future research. *Journal of Management* (forthcoming).

TABLE 1

An Integrative Typology of Global Innovation

Mainstream Market At TOP as Benchmark <i>(high, mid & low ends)</i>	Radical Innovation (Initially large gap in quality with new features for major market expansion)	Incremental Innovation (Initially small gap in quality with enhanced features for minor market expansion)
---	--	---

Top-down Innovation (Initially higher price: High-end for well-served or over-served markets at TOP)	Top-down Radical Radical-Sustaining at TOP (e.g., mobile phone; HDTV) Radical-Destructive at TOP (e.g., CD; iPod; digital camera; Toyota JIT; Dell model)	Top-down Incremental Enhanced-feature (value) at TOP (e.g., high-end CPU; high-end car)
---	--	---

Bottom-up Innovation (Initially lower price: Low-end for under-served or unserved markets at TOP or BOP)	Bottom-up Radical (strong DI) New-market at TOP (e.g., PC; e-Bay) New-feature at BOP (e.g., GE portable ultrasound; Acer netbook computer)	Bottom-up Incremental (weak DI) Lower-end at TOP (e.g., Hyundai car; Wal-Mart) Enhanced-feature (cost) at BOP (e.g., BYD production process; Adaptive “shanzhai” in China)
---	---	---

Notes:

1. An innovation is an application of technology to a new product/service and process for a novel value proposition. Value proposition is the core of *business model*, which entails product/service or process innovations.
2. This typology contains four *ideal-typical* innovations on the two dimensions of “radical-incremental innovation” and “top-down-bottom-up” as two continuums/dimensions. They are all *relative* in nature.
3. Creative destruction derives from two directions: top-down and bottom-up.
4. The “top-down radical” type is a *strong* and *immediate* RI with initially higher quantity and quality of new features, while the “bottom-up radical” type is a *weak* and *long-term* RI with initially lower quantity and quality of new features.

5. The nature, rationale, and criterion of DI, as the bottom-up destruction, derive from a bottom-up novel value proposition embodied by sub-standard and future standard as two defining qualities of DI.
6. Since DI is a bottom-up process from sub-standard to new standard, BOP is the better context for DI relative to TOP. DI is more likely to occur at BOP than TOP due to the indigenous need for a bottom-up novel value proposition. The DI at BOP by EMNE is renamed as *latecomer innovation*.
7. The typical process for latecomers is from “bottom-up incremental” to “bottom-up radical” as well as from “bottom-up” to “top-down”, while a possible process for incumbents is from “top-down” to “bottom-up” as their reaction to the DI from latecomers.