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ORIGINAL ARTICLE

"Distance" in intellectual property protection and MNEs' foreign subsidiary innovation performance

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Abstract

Drawing on the institution-based view of intellectual property (IP) rights, we argue that "distance" in IP protection strength of MNEs' home and host countries reduces the ability of MNEs to innovate at foreign subsidiary locations. We contend that this logic applies in both directions—i.e., (1) downward direction, when MNEs originating from stronger IP protection regimes innovate in weaker IP protection regimes, and (2) upward direction, when MNEs originating from weaker IP protection regimes innovate in stronger IP protection regimes. Furthermore, we suggest that the negative effect of IP protection distance on foreign subsidiary innovation performance will be moderated by internal (strategic) and external (institutional) conditions, such as the subsidiary experience, subsidiary ownership type (full vs. partial), cultural distance and the extent of scientific labor in the host country. We test the above relationships using a very large panel data set consisting of MNE subsidiary-level data in the manufacturing industry for 15,246 subsidiaries of 11,284 parent firms, representing 47 home countries and 31 host countries and covering a total of 91,347 observations for the period 2005–2013. Our findings show that (1) the adverse effect of IP protection distance on subsidiary innovation performance applies in both directions; (2) the effect is more intense in case of the downward direction; and (3) the moderating effects vary depending on the direction of IP protection distance.

KEYWORDS

cultural distance, host-country experience, intellectual property rights, ownership type, scientific labor, subsidiary innovation

1 | INTRODUCTION

The institutional environment surrounding firms is known to have a great impact on their innovation processes (Björk & Magnusson, 2009; Chesbrough, 2007). Multinational enterprises (MNEs) are increasingly innovating at foreign subsidiary locations having considerably different institutions from the MNE's home-base, and this increases the complexity in conducting innovation at subsidiary levels. Prior research suggests that in countries characterized by weak intellectual property (IP) protection, the threat of unintended knowledge spillovers to local incumbent

firms (Ryu et al., 2018) or even the appropriation of knowledge by host governments (James & Vaaler, 2013), deters MNEs from increasing the scope of innovative activities and negatively impact innovation performance (Berry, 2015; Kaufmann & Roessing, 2005; Kumar, 1996). Conversely, strong IP protection regimes in host countries reduce the aforesaid risks and impact foreign subsidiaries' innovation performance positively (Awokuse & Yin, 2010; Khoury & Peng, 2011; Kumar, 1996; Yoo & Reimann, 2017). For the same reason, MNEs from weaker IP protection regimes often "escape" to stronger IP protection regimes to become more innovative (Cuervo-Cazurra et al., 2015; Piperopoulos et al., 2018), or to patent their innovations (Licht & Zoz, 1998; Yang & Kuo, 2008).

In this paper, we aim to extend this logic by suggesting that a foreign subsidiary's innovation performance will not just depend on the strength of the "host" IP protection regime, but also on how the "home" (Cuervo-Cazurra et al., 2018) is different from the "host". Institutional theory suggests that organizations are embedded in the external institutions they originate from, and develop routines and practices considered "legitimate" among institutional actors and stakeholders in their home country. Formal institutions within the home country, in our case, the strength of IP protection, reduce uncertainty, risk and transaction costs, and hence impact the ways through which MNEs engage in innovation. When MNEs innovate at a foreign subsidiary level, due to the different institutions in the host environment, they must learn new ways of conducting innovation by satisfying different (often conflicting) legitimacy requirements and expectations (Kostova & Zaheer, 1999). Foreign subsidiaries, thus face "institutional duality" (Hillman & Wan, 2005; Nell et al., 2015; Zhang et al., 2016), i.e., potentially conflicting institutional pressures from *within* the MNE (inspired by home-country institutions) and from the institutional environment of the host country in which they operate. To this end, drawing upon institutional theory in the context of IP protection, we contend that differences (or distance) between the strength of IP protection regimes between MNEs' home and host countries constitute an important factor affecting foreign subsidiary innovation performance. Such a distance would be manifested, for instance, when MNEs from a "knowledge protective" institutional environment (i.e., in stronger IP home countries) innovate in a "knowledge sharing" institutional environment (i.e., in weaker IP host countries), resulting in potential conflicts while innovating. Due to frictions arising from institutional duality, subsidiaries located in proximate locations to their home country in terms of IP protection regime strength would be able to innovate better than subsidiaries located in institutionally distant IP protection regimes. In line with this, our key research question is: *To what degree does IP protection distance affect the extent to which MNEs' foreign subsidiaries can innovate within host countries?*

Practitioner points

- Dissimilarity in IP protection regimes between home and host countries significantly challenges MNEs foreign subsidiaries' innovation performance. As a result, MNEs find it easier to innovate in foreign subsidiaries that are located in relatively similar IP protection regimes.
- The negative effect of IP protection distance is more intense for MNEs originating from countries characterized by stronger IP protection regimes and innovate in countries characterized by weaker IP protection regimes.
- When MNEs originate from stronger IP protection regimes and operate in weaker IP protection regimes, they can reduce the negative effect of IP protection distance by gaining operational experience in the host country, sharing a similar cultural background with the host country and entering host countries with abundance in scientific labor.
- When MNEs originate from weaker IP protection regimes and operate in stronger IP protection regimes, they can reduce the negative effect of IP protection distance through collaborative entry modes (such as a JV).

Extant research studying the relationship between institutional differences (distance) and foreign subsidiary performance has highlighted the role of *asymmetry* in distance (Chikhouni et al., 2017; Contractor et al., 2016; Hernández & Nieto, 2015; Konara & Shirodkar, 2018; Trąpczyński & Banalieva, 2016). As such, one would expect the aforesaid effect of IP protection distance on the innovation performance of foreign subsidiaries to manifest differently for (1) MNEs originating from stronger IP protection regimes innovating in subsidiaries located in weaker IP protection regimes (i.e., *downward* distance), as compared to (2) MNEs originating from weaker IP protection regimes innovating in subsidiaries located in stronger IP protection regimes (i.e., *upward* distance). This is because, the institution-related challenges are different for subsidiaries operating under conditions of downward distance and upward distance (Kostova et al., 2020). At downward distance, the lack of formal institutions forces subsidiaries to adjust to more informal ways to protect their IP, whereas at upward distance, subsidiaries must learn to adjust to more formal institutional protocols while

innovating (Filiou & Golesorkhi, 2016). Due to these differences, we also explore: *Does the effect of IP protection distance on the extent to which MNEs' foreign subsidiaries can innovate depend on the direction of distance?*

Finally, extant literature has suggested that the effect of institutional distance on foreign subsidiary performance can be compromised by internal (strategic) and external (institutional) conditions (Peng et al., 2017b; Salomon & Wu, 2012). We thus draw on the literature to identify such internal and external conditions under which the effect of IP protection distance on subsidiary innovation performance can be alleviated (or strengthened). We suggest that the subsidiary's experience and its ownership type (i.e., full vs. shared ownership) provide the internal (strategic) conditions through which the foreign subsidiary can develop greater levels of local legitimacy (Fang et al., 2007; Kostova & Zaheer, 1999), and engender higher levels of knowledge sharing and knowledge co-creation with local actors, thus mitigating the negative effect of IP protection distance on foreign subsidiaries' innovation performance. In the same vein, we argue that two important external (institutional) factors, namely the extent of similarity in cultural values (as informal institutions) (Tihanyi et al., 2005) and the availability of skilled labor in the host country (Dikova, 2009) provide the external (institutional) conditions that can alleviate the negative effect of IP protection distance on foreign subsidiaries' innovation performance by reducing the need for the transfer of resources and knowledge from the MNE's home-base, and hence, reducing the conflicts in knowledge sharing and knowledge co-creation practices with local actors (Johanson & Vahlne, 2009). The examination of the aforementioned moderating effects will allow us to draw a more holistic picture of the ways though which the impact of IP protection distance on subsidiary innovation can be conditioned. Overall, our final research question is: *How will host country experience, subsidiary ownership type, cultural distance and host country scientific labor moderate the relationship between IP protection distance and subsidiary innovation performance?* Figure 1 depicts the aforementioned conceptualization of our study.

To test our hypotheses, we use a very large panel data set consisting of MNE subsidiary-level data in the manufacturing industry. Overall, 15,246 subsidiaries of 11,284 parent firms, representing 47 home countries and 31 host countries and covering a total of 91,347 observations for the period 2005–2013 are analyzed. Our study's key findings show that the adverse effect of IP protection distance on subsidiary innovation performance applies in both directions, while the effect is more pronounced in case of the downward direction. Also, the impact of the moderating effects varies depending on the direction of IP protection distance.

Our study contributes to the existing literature in the following three ways. First, we contribute to both more recent as well as older studies that look solely at the effect of the strength of the "host" country's IP protection regime on the internationalization of MNEs' R&D activities (Awokuse & Yin, 2010; Khoury & Peng, 2011; Kumar, 1996; Yoo & Reimann, 2017). We do so, by not only focusing on the host country, but also by bringing in the perspective of the MNEs' "home" country (Cuervo-Cazurra et al., 2015; Cuervo-Cazurra et al., 2018) where IP protection regime may be different (either stronger or weaker), and hence may deter the ability of the foreign subsidiary to innovate in the host country. As such, we contribute to a more comprehensive understanding of the costs and benefits involved in innovating in foreign countries. Second, knowing that product and radical innovations are better protected by legal IP protection mechanisms (Hussinger, 2006), our study contributes to the new product development literature through advancing our knowledge on how IP protection distance can either foster or impede innovation (Hong et al., 2013; Manzini & Lazzarotti, 2016; Mazzola et al., 2018; Roy & Sivakumar, 2011; Shu et al., 2015). As such, we highlight that the ability to innovate will not just depend on the IP protection regime strength, but also on whether the costs of adapting to the innovation process in a distant IP protection regime exceed the benefits of innovating. Third, by examining the moderating effects of subsidiary experience, subsidiary ownership type, cultural distance between the MNE's host and the home country and the abundance of host-country scientific labor on the above relationship, we contribute to ongoing discussions on how MNEs can mitigate the negative effects of institutional differences when innovating abroad (Filiou & Golesorkhi, 2016; Wu, 2013). In doing so, we contribute to a more holistic understanding of how foreign subsidiaries can deal with dual legitimacy pressures in improving their innovation performance (Peng et al., 2009).

2 | THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

Institutional distance relates to the differences between the regulatory, cognitive and normative dimensions of MNEs' home and the host countries (Scott, 1995). Cuervo-Cazurra et al. (2018) posit that MNEs learn from common institutional challenges at home to create sources of competitive advantages (e.g., innovative products, services or knowledge) that can be transferred to foreign countries. For instance, intense competition at home, supported by regulatory factors (in our case, strong IP protection regimes) compels its firms to innovate and to use these innovations to compete in foreign markets (Rugman &

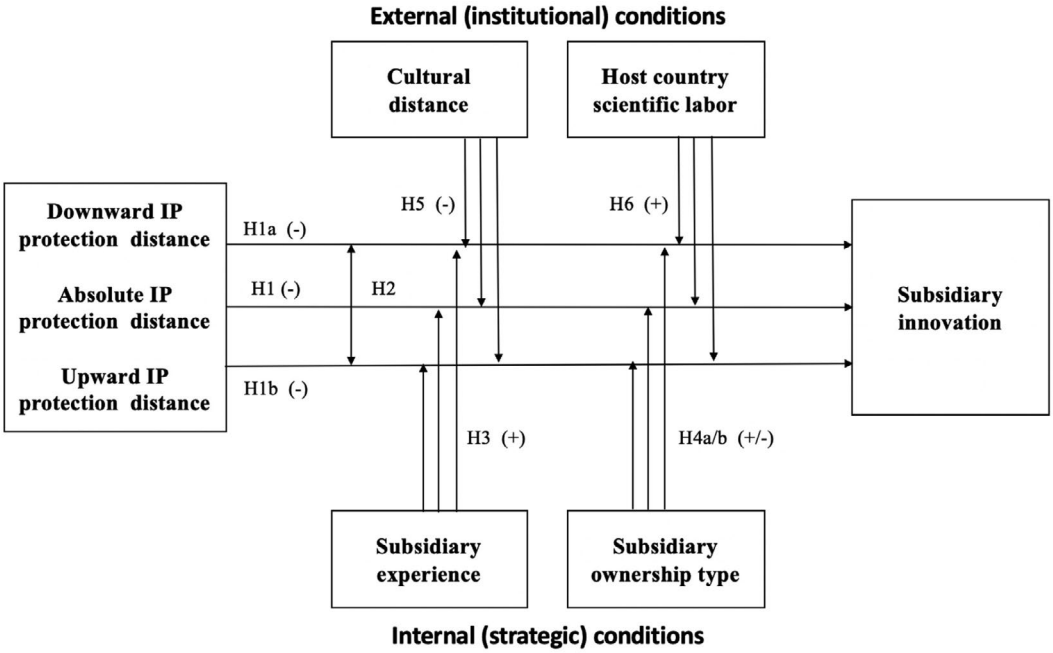

FIGURE 1 Conceptual model

D'cruz, 1993). Such external institutional factors in the home country, subsequently force MNEs to develop their own *internal* institutions (comprised of values, routines, practices and decisions) that form the basis of their legitimacy and competitive advantage and persist in light of new (or different) external institutions when the MNE enters a new foreign market. As a result, the MNE would refrain from adopting new practices at the foreign subsidiary level due to being uncertain about the implications of these (Lu, 2002; Oliver, 1997). When home and host institutions differ significantly, the foreign subsidiary faces a greater duality of legitimacy pressures due to the needs of adapting to the external institutional environment of the host country, as well as in maintaining their legitimacy in line with the MNE's internal institutions.

2.1 | IP protection regimes: Why "distance" matters in the innovation process?

In relation to the regulatory (or formal) institutional forces impacting innovation processes, countries with strong IP protection regimes enforce patent, copyrights and trade secrecy laws more effectively, minimizing the potential for leakage and appropriation of IP, for instance, via legal mechanisms that disallow employees engaged in R&D to join rival firms, or by preventing the use of firms' proprietary IP for their private gains (Nandkumar & Srikanth, 2015; Shu et al., 2015). In aligning with such formal institutions, MNEs originating from stronger IP protection regimes become habituated to a "knowledge protective" institutional environment (Zhao, 2006) where IP protection rights are valued as a key basis of their innovation performance. However, countries with strong IP regimes do not necessarily form the strongest bases of innovation as they reduce the scope of knowledge sharing. For example, during the "ideation process", regarded as the frontend of the innovation process and used to justify further product development (Salter et al., 2015), knowledge-protective processes have been rather argued to deter co-innovation processes, and subsequently make the firm suffer from loss of novelty, originality and credibility, and limit its ability to attract and work with external collaborators (Arias-Pérez et al., 2020). In contrast, the sharing and co-creation of knowledge (particularly, tacit knowledge), both within and outside the firm, improves the utilization of intangible assets for innovation (Hurmelinna et al., 2007). In weak IP protection regimes, due to the lack of effective legal enforcement mechanisms in protecting IP (via patenting, copyrighting etc.), firms embedded in these regimes see greater advantages in innovating collaboratively with other firms (Hurmelinna et al., 2007; Yang, 2005). Therefore, the innovativeness of firms in such environments depends on their ability to share knowledge with others, and to drive their innovations by exploiting ideas from others (Hurmelinna et al., 2007, Yang, 2005). This process can enhance the ideation performance of a firm by gaining access to a more diverse and wider pool of external resources, pivotal for identifying and seizing new innovation opportunities (Maggitti et al., 2013), rather than being restricted to internal sources of knowledge

(Fleming & Sorenson, 2001). As such, weaker IP regimes foster a comparatively stronger "knowledge sharing" institutional environment and MNEs originating from such regimes develop different innovation processes and consider these processes as the basis of their competitive advantage.

Further, MNEs conduct innovative activities at foreign subsidiary locations to take advantage of the available knowledge within those locations and to benefit from spillovers emanating from the innovative activities of other firms operating in the same region (Almeida & Phene, 2004). MNEs do so by relocating some R&D managers to subsidiary locations and also recruiting skilled local nationals. In this context, knowledge sharing and knowledge co-creation are important drivers of subsidiary level innovation. Greater IP protection distance between the MNE's home and host country of the subsidiary will engender greater conflicts in the innovation process at the foreign subsidiary level (Ho et al., 2018). This is because, greater distance brings together two vastly different institutional contexts of innovating—one that fosters knowledge-protective practices, and another that fosters knowledge-sharing practices. With greater distance, a foreign subsidiary would face greater dual legitimacy pressures while innovating—i.e., to develop knowledge sharing and co-creation processes in line with the expectations of both the parent MNE (embedded in its home institutions) and the host country which is embedded in a significantly different institutional environment (Davis, 2000; Kostova & Roth, 2002; Rodriguez et al., 2005). Such conflicts and pressures will increase the costs of innovating in a distant institutional environment. Therefore, we suggest that greater IP protection distance will be detrimental for innovation performance at the foreign subsidiary-level. Based on this, we propose the baseline hypothesis of our study:

Hypothesis 1 *The higher the IP protection distance between the foreign subsidiary's home and host location, the lower the subsidiary-level innovation.*

2.2 | IP protection distance and subsidiary-level innovation: The downward direction

As previously emphasized, the effects of institutional distance may not be symmetric, and in addition to the magnitude of institutional distance, the "direction" of distance can also have implications for the foreign subsidiary's behavior and performance (Chikhouni et al., 2017; Hernández & Nieto, 2015; Konara & Shirodkar, 2018; Trąpczyński & Banalieva, 2016). We suggest that when foreign subsidiaries originating from countries with stronger IP protection regimes innovate in countries with weaker IP protection regimes, greater distance in this downward direction would impact the subsidiary's innovation performance negatively. This is because, firms originating in stronger IP protection regimes perceive weaker IP regimes as fragile and low-cost bases for innovation which can expose their proprietary knowledge to the risk of appropriation (Berry, 2017; Zhao, 2006). Due to this, MNE-managers will be unwilling to share valuable knowledge with subsidiary managers located in weaker IP regimes (Li et al., 2016), or to apply for patents as they are likely to be infringed. To protect their IP in this direction, MNE-managers may use alternative mechanisms, such as adopting a selective R&D strategy (Zhao, 2006) by conducting only a part of their R&D project in weak IP protection countries and the rest in a strong IP protection country (Athreye et al., 2020). For example, Emerson Electric Co., a US-based electronics manufacturer with strong presence in the Chinese market, only transfers the minimum required technology to China to produce their products, and do not transfer sensitive material which could be potentially appropriated by local partners (Schotter & Teagarden, 2014). MNEs also use defensive human resource strategies (e.g., providing training, fringe benefits and higher wages) in order to internally protect their IP (Gallié & Legros, 2012) in this direction.

However, such defensive practices to protect IP create further barriers to knowledge sharing and co-creation processes between the MNE and its foreign subsidiary, and conflict with the "knowledge sharing" institutional processes prevalent in weak IP regimes. Also, such knowledge-protective practices deter intra-firm collaboration, which is pivotal for enhancing the exploratory role of the foreign subsidiary in the process of becoming more innovative (Berry, 2015; Martin & Salomon, 2003). Overall, in this direction, with greater distance, there will be more costs and conflicts while innovating, as MNE-level managers are not only habituated to knowledge-protective innovation processes but will also apply more defensive and protective strategies to work with subsidiary managers habituated to knowledge-sharing practices. We therefore hypothesize:

Hypothesis 1a *The higher the IP protection distance in the downward direction, the lower the subsidiary-level innovation.*

2.3 | IP protection distance and subsidiary-level innovation: The upward direction

We also argue that foreign subsidiary-level innovations are likely to be reduced when MNEs originating from

countries with a comparatively weaker IP protection regime establish subsidiaries in countries with a stronger IP protection regime (i.e., upward distance), despite the strong formal institutional environment for innovation in such countries. This is because, first, similar to the previous argument, due to the home-institutional effect, MNEs originating in weaker IP protection regimes are habituated to innovating in a more "knowledge-sharing" environment, and therefore their subsidiaries in stronger IP protection regimes would face conflicts and costs in adapting to the knowledge-protective innovation processes prevailing there. In weak IP protection regimes, firms benefit from imitating other firms' innovations and produce savings in the early stages of the innovation process or by preventing duplication (Hurmelinna et al., 2007). For example, many Indian pharmaceutical firms innovate by applying reverse engineering techniques to develop generic versions of pharmaceutical products and then improve these products by adding new performance features (Kale & Little, 2007). Firms originating in weak IP protection regimes also develop specific competencies around dealing with the idiosyncrasies associated with weak IP protection regimes, such as by employing informal internal safeguarding mechanisms to protect their innovations or focusing on certain types of innovations/practices that enable them to appropriate the value from their own innovations vis-à-vis imitators. Such imitative practices and informal competencies in protecting their IP are less likely to add much value in the upward direction, due to the effective formal legal procedures in patenting and copyrighting, as well as due to the stigmatization of such informal practices and their association with wrongdoing (Lyan & Frenkel, 2020). As such, with greater IP protection distance in the upward direction, a foreign subsidiary will find it difficult to innovate in an environment where knowledge is well-protected and there are limited opportunities to utilize know-how from other firms as a basis for innovation (Hurmelinna et al., 2007). This would lead to a negative effect of upward IP protection distance on innovation at the foreign subsidiary level. We therefore hypothesize that:

Hypothesis 1b *The higher the IP protection distance in the upward direction, the lower the subsidiary-level innovation.*

2.4 | IP protection distance and subsidiary-level innovation the comparative effect of direction

While we previously argued that the effect of IP protection distance will negatively impact innovation within foreign subsidiaries in both upward and downward directions, we suggest that the magnitude of this effect will vary based on the direction. Specifically, we suggest that the negative effect will be greater in the downward direction than in the upward direction. This is because, despite the aforementioned conflicts faced by foreign subsidiaries when innovating in the upward direction, the extent of these conflicts would be lesser than in the downward direction. In the upward direction, due to the stronger formal institutions concerning IP protection in host locations, there is lesser uncertainty of knowledge appropriation by partners and collaborators. As formal institutions are codified, adapting to formal innovation protocols is easier than adapting to informal practices. MNE managers would also be more willing to apply for patents and copyrights in this direction because of the belief that doing so will be effective in protecting IP. Thus, although in the upward direction MNEs have to bear with the costs and conflicts of engaging with different institutional protocols (Alexy et al., 2009), which would negatively affect foreign subsidiary innovation, we expect that this negative effect will be of relatively smaller magnitude. In contrast, with greater distance in the downward direction, foreign subsidiaries would have to put greater efforts in adapting to the informal cultural idiosyncrasies of the weaker IP protection regime and develop new practices to innovate effectively (Raziq et al., 2021; Schmiele, 2013). However, at the same time, such practices will be considered less legitimate and risky, given the knowledge-protective practices institutionalized within the MNE in its home base. The dual legitimization pressures are thus greater in the downward direction than in the upward direction leading to relatively greater costs of innovating in the downward direction. Due to this, we expect that subsidiary-level innovation performance will be more negatively affected at downward distance than at upward distance. Based on this, we formulate the following hypothesis:

Hypothesis 2 *The negative effect of IP protection distance will be stronger in the downward direction than in the upward direction.*

2.5 | The moderating effect of internal (strategic) factors

2.5.1 | Foreign subsidiary's experience in the host country

Prior studies in international business have highlighted the role of experiential knowledge in reducing the liabilities of foreignness faced by MNEs' foreign subsidiaries in host countries (Kostova et al., 2008; Kostova & Roth, 2002).

As previously argued, with greater IP protection distance, MNEs face conflicts in innovating due to the differences in knowledge sharing and knowledge co-creation practices between MNE and subsidiary managers (Berry, 2017; Zhao, 2006). When a foreign subsidiary is newly established, it would assume greater legitimacy by mirroring its parent MNE's values and practices, and the expectations to adapt to host institutions by local stakeholders are lesser. But with experience, the foreign subsidiary is exposed to local partners, suppliers and other informal business connections, and becomes pressured to learn about host institutions to build their local legitimacy. Hence, with experience, foreign subsidiaries find ways to balance dual legitimization pressures by familiarizing themselves with local practices and disregarding some of the MNE-institutionalized practices that may be detrimental to subsidiary performance (Konara & Shirodkar, 2018).

We expect the same logic to apply for the case of innovation processes, whereby the dual legitimization pressures incurred by IP protection distance on the subsidiary in conducting innovation will be reduced. Newly founded foreign subsidiaries, due to their lack of local knowledge and exposure to local institutions in conducting R&D, will find it harder and less legitimate to adopt new innovation practices prevalent in the host environment and thus are likely to rely on mandates given by the parent MNE. In contrast, with greater experience, the subsidiary is expected to adapt to the local practices involved in the innovation process, since the aggregate experience from operating in the host context enables them to more efficiently assimilate knowledge from external sources (Song & Shin, 2008). As a result, experienced subsidiaries can mitigate the conflicts and costs/risks associated with innovating in an institutionally distant environment and mitigate the negative effect of IP protection distance on innovation. For instance, experienced foreign subsidiaries will more effectively protect their IP even in highly volatile contexts (Laursen & Salter, 2014) and will be more attentive to potential risks stemming from external knowledge sourcing while taking precautionary measures to protect themselves from unintended knowledge spillovers (Santangelo et al., 2016). With experience, the subsidiary would also be better able to understand how other firms in the host country generate ideas for innovation, how the innovation activity can be locally financed, as well as how to deal with administrative and other operational barriers while innovating. This would subsequently reduce the negative effect of IP protection distance on subsidiaries' innovation performance, as the knowledge-sharing practices which are specific to the host-country will become less costly and more rewarding for the MNE's foreign subsidiary. Based on these arguments, we formulate the following hypothesis:

Hypothesis 3 *The negative effect of IP protection distance on the innovation of MNEs' foreign subsidiaries will reduce with greater subsidiary experience in the host country.*

2.5.2 | Foreign subsidiary's ownership type

Studies suggest that by using a suitable type of ownership (e.g., joint venture vs. full ownership) for the foreign subsidiary, the MNE can mitigate some of the adverse effects of institutional distance. Competing theoretical arguments, however, exist on the moderating role of subsidiary ownership on foreign subsidiary outcomes, and we expect similar logics to be applicable to the relationship between IP protection distance and a subsidiary's innovation performance. On one hand, in a partnership mode, a foreign subsidiary can deal more effectively with dual legitimization pressures in the foreign environment (as described previously) by benefiting from the partner's knowledge of local practices (Chen & Hu, 2002). Therefore, shared ownership (compared to full ownership) of the foreign subsidiary can reduce the costs/risks associated with innovating in an institutionally distant environment and reduce the negative effect of IP protection distance on innovation. On the other hand, finding a reliable and trustworthy partner is a challenge in itself, particularly in the downward direction of institutional distance. Consequently, collaboration with a partner can lead the MNE to fear the risk of misappropriation by the partner itself (Contractor et al., 2016; Gaur & Lu, 2007; Krammer, 2018). In addition, when partners come from vastly different backgrounds, including diverse IP protection regimes, it is difficult to build a high level of trust between them due to their different ideologies and expectations in safeguarding and securing knowledge (Kang & Kang, 2014). A multi-partner venture thus entails risks pertaining to opportunistic behavior, also leading to further problems and conflicts in enhancing knowledge sharing and knowledge co-creation practices (Hoffmann, 2005). Instead, full-ownership of the subsidiary provides the necessary conditions for greater control of it and facilitates smoother knowledge transfer between the MNE (parent) and the subsidiary, as well as allows more experimentation with the technology (Athreye & Kapur, 2009). Therefore, shared ownership (compared to full ownership) of the foreign subsidiary can aggravate the conflicts and costs/risks associated with innovating in an institutionally distant environment and increase the negative effect of IP protection distance on innovation. Based on the above arguments we conclude that it is not clear whether a full ownership (compared to a shared ownership) is more efficient in terms of dealing with a distant IP

protection regime. Therefore, we formulate the following two competing hypotheses:

Hypothesis 4a *The negative effect of IP protection distance on the innovation of MNEs' foreign subsidiaries will increase further with fully owned subsidiaries.*

Hypothesis 4b *The negative effect of IP protection distance on the innovation of MNEs' foreign subsidiaries will increase further with jointly owned subsidiaries.*

2.6 | The moderating effect of external (institutional) factors

2.6.1 | Cultural distance

We further argue that the negative effect of IP protection distance on the innovation of MNEs' foreign subsidiaries increases with the cultural distance (or reduces with cultural similarity) between the MNE foreign subsidiary's home and host country. First, cultural distance can lead to poor understanding of the host country's social norms, values, beliefs and assumptions (Yang, 2005), thus causing the foreign subsidiary to face greater dual legitimization pressures and continue to adopt practices that are internally legitimate (within the MNE) rather than those considered legitimate in the host environment. Second, cultural differences can increase intra- and inter-organizational conflicts (and reduce trust) and therefore further heighten the uncertainties and complexities associated with innovating in a distant IP protection regime. More specifically, as noted earlier, for the MNE to generate new ideas and innovate at the foreign subsidiary level, there must be an effective transfer of tacit knowledge; and cultural dissimilarities will increase the difficulty in communication between the MNE's home-base and the foreign subsidiary (Peltokorpi, 2017), as well as the effective communication of such tacit knowledge—an important process for safeguarding an MNE's proprietary knowledge. As a result, this can further intensify the negative effect of IP protection distance on the innovation performance of the foreign subsidiary. Third, cultural differences can influence individuals' beliefs and their overall perception about IP protection (Yang, 2005). For example, counterfeiting and imitation are both perceived as a legitimate means of learning in some cultures (e.g., collectivist cultures), while these actions are perceived as unjust and immoral in other cultures (e.g., individualistic cultures) (Yang, 2005). Fourth, differences in cognitive institutional environments can put strains in terms of how foreign subsidiaries and local actors develop a common understanding of the purpose and applicability of various knowledge practices (Jensen & Szulanski, 2004). Such a misalignment can raise walls in terms of how knowledge is being shared and co-created between dissimilar cultural mindsets, thus further increasing the efforts and costs associated to aligning with a different IP protection regime. Therefore, we propose the following hypothesis:

Hypothesis 5 *The negative effect of IP protection distance on the innovation of MNEs' foreign subsidiaries will increase further when cultural distance increases.*

2.6.2 | Host country's scientific labor

Finally, we expect a host country's extent of scientific labor to reduce the negative effect of IP protection distance on the innovation performance of MNEs' foreign subsidiaries. The role of a country's scientific labor on improving firms' innovation capabilities has been well documented in the literature (Almeida & Phene, 2004; Czarnitzki & Hottenrott, 2009; Mudambi, 2008). For foreign subsidiaries, access to competent scientific labor is considered as an important innovation-seeking motive (Almeida, 1996). As such, we consider the availability of scientific labor to act as a motivating factor for foreign subsidiaries to extend their knowledge sharing and knowledge co-creation activities, thus alleviating the negative effect of IP protection distance on the subsidiary's innovation performance. This is because, in host countries with abundant scientific labor, there is a greater scope for foreign subsidiaries to recruit local talent rather than transferring home-based R&D workers, thus, potentially reducing the institutional effect of home on the innovation processes within the foreign subsidiary. As such, if there is a greater pool of scientific labor in the host country that the foreign subsidiary can tap into, the foreign subsidiary would be able to work more autonomously in conducting R&D. Also, in countries with abundant scientific labor, there is a greater scope that local knowledge workers are better aware of the institutional frameworks of sharing and co-creating knowledge. Therefore, notwithstanding the concerns of MNE-managers, any conflicts arising due to dual legitimization pressures in such an environment are expected to be relatively lesser, as the local scientific labor will be better able to achieve a balance between both MNE-level and local knowledge sharing and co-creation practices. In contrast, in countries with less abundant scientific labor, the MNE would have to rely more on transferring personnel from its home-base to the host location to conduct research and development. This would lead to a greater home-institutional effect on subsidiary-level innovation, as managers from the MNE's home-base would assume

greater legitimacy of the innovation practices established within the MNE, rather than in the host country. There would also be greater costs of recruiting and training local personnel in such locations, as the overall pool of competent scientific labor to conduct R&D work is lesser, thus increasing the overall costs of innovation. Therefore, we propose the following hypothesis:

Hypothesis 6 *The negative effect of IP protection distance on the innovation of MNEs' foreign subsidiaries will reduce with greater abundance of scientific labor in the host country.*

3 | METHODOLOGY

3.1 | Data collection

We collected our study's firm-level data from Bureau van Dijk's ORBIS database, which provided us with MNEs' subsidiary-level data over the 9-year period of 2005–2013. We then downloaded the information of all patent applications during 2005–2013 (over 10 million patents) from the Patent-module in the Orbis database. Using the unique firm-level identifier in the Orbis database and the publication date of the Patent, we matched each of these patents to the firm (subsidiaries and parents in our data set) and the respective year. Following prior studies (Becker & Dietz, 2004; Evangelista et al., 1997; Love & Roper, 2001), we focus on manufacturing industries. Our final sample consists of 15,246 subsidiaries of 11,284 parent firms, representing 47 home countries and 31 host countries (see Table S1 for a full list of countries represented by this dataset). Altogether, we analyze 91,347 firm/year observations.

3.2 | Measures

We measured MNEs' subsidiary innovation performance by the number of patent applications in each year (*Patents*), which is our dependent variable. The count of patents has been commonly used to measure innovation performance (Almeida & Phene, 2004; Phene & Almeida, 2008; Sampson, 2007; Wu et al., 2016). The use of patents to measure innovation performance has its limitations, such as, for instance, the fact that patents do not account for other forms of tacit/uncodified knowledge and new products launched. However, since we focus on cross-country differences in IP regimes, the number of patents can be methodologically justified as an important outcome of firms' innovation processes. Studies also argue that these alternative measures of innovation performance are complementary to patents (e.g., Mowery et al. (1996). Also, some measures such as the number of new products launched can be accounted for only through the use of survey data, which significantly undermines the sample size. As such, due to the uniformity of patenting process across countries and the greater scope of including a larger sample through this process, we suggest that our measure is better suited to answer our research questions.

Our key explanatory variable is *IPR distance* between the host country of the subsidiary and the home country of the parent firm. To develop the IPR distance variable we use the patent enforcement index recently developed by (Papageorgiadis & Sofka, 2020).[1] This index tracks the differences in patent enforcement for 51 countries between 1998–2017. We use this index because it particularly focuses on both the "enforcement" and "strength" of IP protection. As we focus on the institutional mechanisms of IP protection, the enforcement of IP laws plays a major role in the extent to which firms would develop their ideation and innovation processes. Based on this index, and in order to develop our first key explanatory variable, we calculated the absolute difference between the home country and the host country (*IPR absolute distance*). To construct the directional distance variables, we first calculated the *IPR distance* by subtracting the host country IPR score from the home country's IPR score, therefore, a positive score represents moving down from a stronger IP protection regime to a weaker IP protection regime, while a negative score represents moving up from a weaker IP protection regime to a stronger IP protection regime. We then partitioned this variable into an *upward IPR distance* and a downward IPR distance using a spline function as follows (see Carpenter and Sanders [2002], Greve [2011] for similar applications):

$$\text{upward IPR distance} = |\,\text{IPRdistance}\,| \text{ if IPRdistance} < 0$$
$$\text{upward IPR distance} = 0 \text{ otherwise}$$
$$\text{downward IPR distance} = |\,\text{IPRdistance}\,| \text{ if IPRdistance} > 0$$
$$\text{downward IPR distance} = 0 \text{ otherwise}$$

We partition the *IPR distance* into two directional vectors in order to correctly capture the effect of these two directions of *IPR distance*. *Upward IPR distance* captures the distance in the upward direction (when $IPRdistance < 0$) and this needs to take the value of zero in the downward direction (when $IPRdistance > 0$) and no distance ($IPRdistance = 0$). In contrast, *downward IPR distance*

[1]We would like to thank an anonymous reviewer for stressing the importance and inclusiveness of this index.

captures the distance in the downward direction (when *IPRdistance* > 0) and this needs to take the value of zero in the upward direction (when IPRdistance < 0) and no distance (IPRdistance = 0). To demonstrate this further, in our data set, IPR distance spans from −7.6 to +8.1, our upward IPR distance measure varies from 0 to 7.6 and the downward IPR distance measure varies from 0 to 8.1.

We measure subsidiary experience (our moderator) using the subsidiary's age (*subsidiary age*) in the host country, i.e., the number of years since the MNE subsidiary was incorporated in the given host country. We contend that age is a good measure of subsidiary experience in the IP protection regime of the host country for both greenfield- and acquisition-type investments. This is because, when an MNE forms a subsidiary by acquiring a local firm, the prior experience of the acquired firm contributes to the subsidiary's host-country experience because the local firm is already embedded in the host country's institutional context. In contrast, when a subsidiary is formed through a greenfield investment, the subsidiary is relatively new to the institutional context. We measure ownership type (our second moderator) using a dummy variable (*full ownership*) that takes the value of 1 if the subsidiary is wholly owned (i.e., more than 90% ownership) and 0 if the firm is partially owned with at least a 10% stake (Gaur & Lu, 2007). To measure *Cultural Distance* between the home and host country (our third moderator), we constructed a composite variable using the Euclidean method based on Hofstede's four cultural dimensions: power distance, uncertainty avoidance, individualism, and masculinity (Konara & Mohr, 2019). We measured the scientific labor in the host country (our fourth moderator) by the measure of "Availability of scientists and engineers" reported in Global Competitiveness Index (GCI).

Guided by previous literature and empirical evidence, we include several control variables that traditionally influence subsidiary-level innovation. First, we include the *subsidiary size* as firm size is a key determinant of firm's innovation (Andries & Faems, 2013). We represent *subsidiary size* by the log value of the firm's total assets. To control for the subsidiary-level firm-specific assets that can influence subsidiary-level innovation, we include the ratio of intangible assets to total assets (*Intangibles*) as a control variable (Chang et al., 2013). To make sure that the causal effect is from the explanatory variables towards the dependent variable, we lag these firm-specific variables by 1 year. To control for the parent firm's innovation capacity, we include the number of patents owned by the parent (*Parent Innovation*). With regard to host country-level controls, we include the market size of the host country (*host market size*), represented by the domestic market size index reported in Global Competitiveness Index, as size of the local market can influence the decision to locate innovating activities in the host country (Kumar, 1996). At the dyadic (host-home) level, we control for the *geographical distance* between the host and the home country. We also included a binary variable (Border) capturing whether the host country and the home country share a border. Subsidiary-level innovation depends on how effectively can MNEs communicate with their subsidiaries. Language is key factor for effective communication (Liu et al., 2015; Reiche et al., 2015; Schomaker & Zaheer, 2014; Welch & Welch, 2008). Therefore, language proximity between the host and the home country can allow MNEs to effectively communicate with their subsidiaries (Reiche et al., 2015; Schomaker & Zaheer, 2014). We thus include *language distance* as a control variable, which is a 5-point variable that captures the extent to which the main home and the main host country language differ from each other. This measure has been adopted from the study of Dow and Karunaratna (2006). In order to rule out that the estimated effects of IP protection distance are not driven by distance in technology development between the host and the home country, we also controlled for the *Distance in innovation capacity*. We measured the technology development in the countries by the measure of "Capacity for innovation" reported in Global Competitiveness Index (GCI). This is a 7-point scale that captures "to what extent do the firms in the country have the capacity to innovate". This is one of the sub-indices in the innovation pillar in the Global Competitiveness Index, and this measure is independent of "Availability of scientists and engineers" and "Intellectual property protection". We calculated the *Distance in innovation capacity* by subtracting the host country score from that of the home country, therefore, a positive score represents a relatively stronger innovation capacity in the host country. At the industry-level, we included industry concentration calculated by dividing the industry output by the number of establishments in the industry in each host country.[2] Finally, as unobserved industry-specific effects can

[2]We compiled number of establishments and the volume of output for the following industries (2 digit level at ISIC Revision 3 industry classification) for all the countries available in the United Nations Industrial Development Organization's (UNIDO) INDSTAT 2 Database: Food and beverages (15); Tobacco products (16); Textiles (17); Wearing apparel/fur (18) Leather; leather products and footwear (19); Wood products (excl. furniture) (20); Paper and paper products (21); Printing and publishing (22); Coke, refined petroleum products, nuclear fuel (23); Chemicals and chemical products (24); Rubber and plastics products (25); Non-metallic mineral products (26); Basic metals (27); Fabricated metal products (28); Machinery and equipment n.e.c. (29); Office, accounting and computing machinery (30); Electrical machinery and apparatus (31); Radio, television and communication equipment (32); Medical, precision and optical instruments (33); Motor vehicles, trailers, semi-trailers (34); Other transport equipment (35); Furniture; manufacturing n.e.c. (36); and Recycling (37). Due to the differences in reporting formats across countries, we had to combine Food and beverages (15) with Tobacco products (16), and Office, accounting and computing machinery (30) with Radio, television and communication equipment (32) and Medical, precision and optical instruments (33).

determine firm-level innovation, we include a series of industry dummies.[3] Variable names, their measurements and data sources are summarized in Table S2. Further, we checked the validity of our choice of control variables by carrying out a likelihood ratio test, and all control variables passed the test (results are reported in Table S3). The descriptive statistics and correlations are presented in Table 1.

4 | RESULTS

As our dependent variable is a non-negative integer count variable, we estimate our specification based on a Negative Binomial Regression model in a panel data framework. The estimated results of the baseline model are presented in Table 2. Model 2.1 reports the results with the absolute values of IPR distance, i.e., ignoring the directionality of the IPR distance. *IPR-absolute distance* is, as expected, negative and highly significant ($\beta = -0.215$, $p < .01$). Because of the difficulty in directly interpreting the coefficients in non-linear models (e.g., interpreting effect sizes and interaction effects), we also estimated the incident rate ratios (IRR)[4] for the variables of interest. These are presented in Table 3. Estimated IRR (0.81) is significant[5] thus suggesting that one unit increase in *IPR-absolute distance* would result in 19% decrease in subsidiary innovation performance (number of patents). Therefore, we find strong support for our baseline hypothesis, H1. Next, we include the directional variables in our model and the results are reported in Model 2.2. First, downward IPR distance is negative and highly significant ($\beta = -0.268$, $p < .01$). This indicates that MNEs originating from a stronger IP protection regime innovate less in weaker IP protection regimes (i.e., greater inertia to innovate in a weaker IP protection regime than the MNE's home-country IP protection regime). Estimated IRR (0.76) indicates that one unit increase in the IPR distance in the downward direction would result in 24% decrease in subsidiary innovation performance. Therefore, we find strong support for hypothesis H1a. Second, upward IPR distance is also negative and significant ($\beta = -0.0857$, $p < .05$). Estimated IRR (0.92) indicates that one unit increase in the IPR distance in the upward direction would result in 8% decrease in subsidiary innovation performance. This indicates that MNEs originating from a weaker IP protection regime innovate less in a stronger IP protection regime (i.e., greater inertia to innovate in a stronger IP protection regime than the MNE's home-country IP protection regime). Therefore, we also find strong support for H1b. Further, we observe that the size of the negative effect of upward distance is approximately three times lower than in the case of downward distance. We thus compared the estimated effect of downward IP protection distance with the estimated effect of upward IP protection distance based on a t-test, and the results suggest that the negative effect of moving in the downward direction is significantly higher than the negative effect of moving in the upward direction. This finding lends support to H2.

To examine the moderating effect of subsidiary experience on the IPR distance—subsidiary innovation relationship, first we interacted *IPR-absolute distance* with *subsidiary age*, and the estimated results are reported in model 2.3. The interaction term is positive and significant ($\beta = 0.177$, $p < .01$), indicating that the inclination to innovate less in a weaker IP protection regime diminishes with greater subsidiary experience. We also calculated the IRR for different levels of subsidiary age (Table 3). When subsidiary has no experience, one unit increase in absolute IPR distance would result in 51% decrease in subsidiary innovation performance. When this increases to about 7 years,[6] one unit increase in absolute IPR distance would result in 30% decrease in subsidiary innovation performance. Beyond this point, the calculated IRR is not significant as the confidence interval includes 1.0 (Hilbe, 2011). This suggest that the negative effect of absolute IPR distance decreases with subsidiary age and converges to zero effect (as beyond 7 years, the effect is not significantly different from zero). H3 is thus supported. We further interacted the two directional variables with *subsidiary age*, and the estimated results are reported in model 2.4. The interaction term between *downward IPR distance* and *subsidiary age* is positive and significant ($\beta = 0.216$, $p < .01$), indicating that the lower innovation performance with greater downward IP protection distance diminishes with greater subsidiary experience. From the estimated IRRs, we can see that the negative effect of downward IP protection distance diminishes from 57% (no experience) to 34% (logged transformed subsidiary age = 2), and then the effect size becomes non-significant beyond this point. Therefore, we find support to indicate that the negative effect of downward IP protection distance on innovation performance diminishes with greater subsidiary experience. The interaction term between

[3]Industry fixed effects are defined at the two-digit sectoral classification based on the NACE Rev 2 classification.

[4]We calculated the IRR along with the standard errors and confidence intervals based on the formulas in Hilbe (2011). Please see appendix 1 in Hilbe (2011) for the details of these calculations.

[5]If the confidence interval includes 1.0, the predictor is not statistically significant (Hilbe, 2011). Since the confidence interval does not include 1.0, the predictor (IPR-absolute distance) has a significant effect at the $p = .1$ level.

[6]Subsidiary age is logged transformed.

TABLE 1 Descriptive statistics and correlation matrix

Variables		Mean	*SD*	Min	Max	Correlation coefficients				
						1	2	3	4	5
1	Patents	0.75	20.53	0	2736					
2	IPR absolute distance	2.63	1.87	0	8.1	−0.03				
3	Downward IPR distance	2.44	2.01	0	8.1	−0.03	0.95			
4	Upward IPR distance	0.2	0.66	0	7.6	0.02	−0.04	−0.36		
5	Full ownership	0.73	0.44	0	1	0.01	−0.07	−0.07	0.02	
6	Subsidiary size	8.27	2.6	0	17.7	0.08	−0.2	−0.21	0.07	0.22
7	Subsidiary age	2.51	0.84	0	5.7	0.04	−0.23	−0.23	0.05	0.1
8	Intangibles	1.94	6.87	0	100	0.04	−0.07	−0.08	0.03	0.03
9	Parent Innovation	0.75	1.87	0	10.45	0.03	−0.11	−0.11	0	0.08
10	Geographical distance	1.71	1.93	0.12	11.79	0.01	0.01	−0.03	0.09	0
11	Border	0.25	0.43	0	1	0	−0.16	−0.15	0	0.02
12	Cultural distance	2.45	1.08	0.29	6.01	0	0.35	0.34	−0.04	−0.08
13	Language distance	3.42	1.21	1	5	−0.01	0.36	0.36	−0.07	0
14	Industry concentration	0.44	1.14	0	15.04	−0.01	−0.02	0	−0.04	−0.05
15	Host market size	4.89	0.84	2.54	6.8	0.01	−0.07	−0.09	0.1	0.13
16	Distance in innovation capacity	−0.9	1.09	−3.34	3.26	0.03	−0.64	−0.76	0.49	0.06
17	Scientific labor	4.62	0.55	3.52	6.3	0.03	−0.38	−0.42	0.2	0.13

upward IPR distance and *subsidiary age* is positive as expected, however, this is not significant at a 10% level. Similarly, estimated IRRs are not significant as the confidence interval includes 1.0. Therefore, we do not find support to indicate that the negative effect of upward IP protection distance on innovation performance diminishes with greater subsidiary experience.

To examine the moderating effect of ownership type on the IPR distance—subsidiary innovation relationship, first we interacted *IPR-absolute distance* with *full ownership*, and the estimated results are reported in model 2.5. The interaction term is negative but not significant at a 10% level. Looking at the estimated IRRs, we can see that the negative effect of absolute IP protection distance is higher for full ownership (20%) than for partial ownership (16%). Then, we interacted the two directional variables with *full ownership*, and the estimated results are reported in model 2.6. The interaction term between *downward IPR distance* and *full ownership* is negative but not significant at a 10% level. However, looking at the estimated IRRs, we can see that the negative effect of downward IP protection distance is higher for full ownership (24%) than for partial ownership (21%). Therefore, again we find support for H4a. The interaction term between *upward IPR distance* and *full ownership* is negative and significant ($\beta = -0.145$, $p < .10$), and the estimated IRRs suggest that the negative effect of downward IP protection distance is higher for full ownership (46%) than for partial ownership (38%). This indicates that the tendency to innovate less with greater upward IP protection distance is stronger for fully owned subsidiaries. Therefore, we find support for H4a in all three cases.

To examine the moderating effect of cultural distance on the IPR distance—subsidiary innovation relationship, first we interacted *IPR-absolute distance* with *cultural distance* (model 2.7 in Table 2). The interaction term is negative but marginally nonsignificant. However, from the estimated IRRs, we can see that the negative effect of *IPR-absolute distance* increases consistently when cultural distance increases—from 15% (*cultural distance* = 0) to 25% (*cultural distance* = 6). This indicates that the inclination to innovate less with greater IP protection distance is stronger when the cultural distance is larger. Next, we interacted the two directional variables with *cultural distance* (model 2.8 in Table 2). The interaction term between *downward IPR distance* and *cultural distance* is negative and statistically significant ($\beta = -0.0368$, $p < .05$). Similarly, from the estimated IRRs, we can see that the negative effect of downward *IPR distance* increases consistently when cultural distance increases—from 16% (*cultural distance* = 0) to 33% (*cultural distance* = 6). This indicates that the tendency to innovate less with greater downward IP protection distance is stronger when the cultural distance is larger. In contrast, the interaction term between *upward IPR distance* and *cultural distance* is

6	7	8	9	10	11	12	13	14	15	16
0.44										
0.1	−0.04									
0.35	0.15	0.02								
0.22	0.04	0.03	0.31							
0.04	0.08	0.01	−0.12	−0.39						
−0.18	−0.16	−0.07	0.01	0.13	−0.31					
0.04	−0.07	−0.02	0.17	0.21	−0.16	0.29				
−0.17	−0.06	−0.03	−0.09	−0.1	0.02	0.11	0.01			
0.41	0.2	0.1	0.16	0.27	0.1	−0.21	−0.01	−0.24		
0.21	0.17	0.08	−0.01	0.05	0.19	−0.29	−0.28	−0.12	0.35	
0.34	0.26	0.09	0.17	0.09	0.15	−0.22	−0.06	−0.17	0.28	0.38

positive and significant ($\beta = 0.0816$, $p < .05$). However estimated IRRs are only significant when cultural distance is zero. Therefore, we find support for H5 for the cases of absolute IP protection distance and the downward direction, but not in the case of the upward direction.

To examine the moderating effect of Scientific labor on the IPR distance—subsidiary innovation relationship, first we interacted *IPR-absolute distance* with *Scientific labor* (model 2.9 in Table 2). The interaction term is positive and significant ($\beta = 0.108$, $p < .01$). Across the range of *Scientific labor*, IRR is negative, and this negative effect reduces with increases in *Scientific labor*. But the effect is only significant until around the mid-range of *Scientific labor* (around 4.5)—suggesting that the effect size is not significantly different from zero after this point. These results concur with our H6 that the less inclination to innovate in a distant IP protection regime diminishes when the host country has a greater abundance of scientific labor. Next, we interacted the two directional variables with *Scientific labor* (model 2.10 in Table 2). The interaction term between *downward IPR distance* and *Scientific labor* is positive and significant ($\beta = 0.0816$, $p < .01$). Similar to absolute distance, IRRs are negative (i.e., the negative effect reduces with increases in *Scientific labor*) and significant until around the mid-range of *Scientific labor*. This indicates that the inclination to innovate less with greater downward IP protection distance diminishes when the host country has a greater abundance of scientific labor. Similarly, the interaction term between *upward IPR distance* and *Scientific labor* is positive and significant ($\beta = 0.120$, $p < .01$). In line with H6, IRRs are negative (and reduce with increases in *Scientific labor*), however they are not significant. Therefore, we find support for H6 for the cases of absolute IP protection distance and the downward direction, but not for the case of the upward direction.

Among our firm-level control variables, we found that the association between *subsidiary size* and subsidiary innovation is positive and highly significant. Similarly, *subsidiary age* is positive and highly significant. Confirming the importance of firm specific resources for innovation, we found that *Intangibles* is positive and highly significant. Parent Innovation, although it is found to be positive, it is statistically nonsignificant. Among, host country-level control variables, *host market size* is positive and highly significant. *Cultural distance* is negative and significant. *Language distance* is negative, as expected, but not statistically significant. Interestingly, *geographical distance* is positive and significant indicating that subsidiaries of MNEs originating from geographically distant countries would innovate more than those from geographically closer countries. *Border* is negative and significant, suggesting that border-crossing subsidiaries innovate more than the subsidiaries that are located in host countries within the same border as the home country. *Industry concentration* is negative but not significant at a 10% level.

TABLE 2 Estimated results for the baseline models

	(2.1)	(2.2)	(2.3)	(2.4)	(2.5)	(2.6)	(2.7)	(2.8)	(2.9)	(2.10)
IPR absolute distance	−0.215***		−0.710***		−0.174***		−0.164***		−0.720***	
	(0.0216)		(0.0624)		(0.0404)		(0.0441)		(0.126)	
Downward IPR distance		−0.268***		−0.849***		−0.234***		−0.180***		−0.645***
		(0.0248)		(0.0672)		(0.0429)		(0.0463)		(0.132)
Upward IPR distance		−0.0857**		−0.109		0.0277		−0.281***		−0.678***
		(0.0366)		(0.103)		(0.0752)		(0.0828)		(0.219)
Subsidiary age × IPR absolute distance			0.177***							
			(0.0208)							
Subsidiary age × Downward IPR distance				0.216***						
				(0.0227)						
Subsidiary age × Upward IPR distance				0.00703						
				(0.0329)						
Full ownership × IPR absolute distance					−0.0518					
					(0.0432)					
Full ownership × Downward IPR distance						−0.0428				
						(0.0442)				
Full ownership × Upward IPR distance						−0.144*				
						(0.0823)				
Cultural distance × IPR absolute distance							−0.0206			
							(0.0157)			
Cultural distance × Downward IPR distance								−0.0368*		
								(0.0162)		
Cultural distance × Upward IPR distance								0.0816***		
								(0.0311)		

TABLE 2 (Continued)

	(2.1)	(2.2)	(2.3)	(2.4)	(2.5)	(2.6)	(2.7)	(2.8)	(2.9)	(2.10)
Scientific labour × IPR absolute distance									0.108***	
									(0.0263)	
Scientific labor × Downward IPR distance										0.0816***
										(0.0283)
Scientific labour × Upward IPR distance										0.120***
										(0.0432)
Subsidiary age	0.164***	0.148***	−0.117**	−0.0934**	0.163***	0.147***	0.164***	0.145***	0.165***	0.151***
	(0.0334)	(0.0336)	(0.0460)	(0.0464)	(0.0334)	(0.0336)	(0.0334)	(0.0335)	(0.0334)	(0.0336)
Full ownership	−0.0643	−0.0689	−0.0698	−0.0748	0.0471	0.0607	−0.0608	−0.0615	−0.0629	−0.0656
	(0.0731)	(0.0732)	(0.0741)	(0.0743)	(0.118)	(0.120)	(0.0732)	(0.0733)	(0.0732)	(0.0732)
Cultural distance	−0.117***	−0.116***	−0.0874**	−0.0776**	−0.118***	−0.117***	−0.0728	−0.0745	−0.109***	−0.109***
	(0.0337)	(0.0338)	(0.0343)	(0.0345)	(0.0337)	(0.0338)	(0.0477)	(0.0478)	(0.0339)	(0.0339)
Scientific labor	0.210***	0.214***	0.204***	0.197***	0.209***	0.213***	0.212***	0.209***	0.0718	0.0924*
	(0.0350)	(0.0352)	(0.0350)	(0.0351)	(0.0350)	(0.0352)	(0.0351)	(0.0354)	(0.0490)	(0.0501)
Subsidiary size	0.389***	0.394***	0.393***	0.396***	0.390***	0.396***	0.388***	0.394***	0.388***	0.393***
	(0.0150)	(0.0150)	(0.0152)	(0.0153)	(0.0150)	(0.0151)	(0.0150)	(0.0151)	(0.0150)	(0.0151)
Intangibles	0.0173***	0.0172***	0.0164***	0.0164***	0.0174***	0.0173***	0.0173***	0.0170***	0.0175***	0.0174***
	(0.00174)	(0.00175)	(0.00176)	(0.00176)	(0.00175)	(0.00175)	(0.00174)	(0.00175)	(0.00175)	(0.00175)
Parent Innovation	0.0114	0.00517	0.00729	0.00509	0.00973	0.00301	0.0119	0.00629	0.0110	0.00601
	(0.0116)	(0.0117)	(0.0117)	(0.0118)	(0.0117)	(0.0118)	(0.0116)	(0.0117)	(0.0116)	(0.0117)
Geographical distance	0.0359**	0.0307*	0.0431***	0.0363**	0.0366**	0.0318*	0.0388**	0.0325**	0.0372**	0.0321**
	(0.0162)	(0.0162)	(0.0164)	(0.0164)	(0.0162)	(0.0162)	(0.0163)	(0.0163)	(0.0162)	(0.0162)
Border	−0.211***	−0.183**	−0.179**	−0.152*	−0.215***	−0.185**	−0.211***	−0.206***	−0.189**	−0.167**
	(0.0788)	(0.0792)	(0.0794)	(0.0801)	(0.0788)	(0.0792)	(0.0788)	(0.0792)	(0.0790)	(0.0793)
Language distance	−0.0315	−0.0263	−0.0469	−0.0509*	−0.0299	−0.0243	−0.0421	−0.0436	−0.0372	−0.0313
	(0.0289)	(0.0290)	(0.0292)	(0.0293)	(0.0289)	(0.0290)	(0.0300)	(0.0300)	(0.0289)	(0.0290)
Industry concentration	−0.0521	−0.0512	−0.0900	−0.103	−0.0517	−0.0520	−0.0541	−0.0503	−0.0490	−0.0487
	(0.0678)	(0.0675)	(0.0709)	(0.0724)	(0.0678)	(0.0676)	(0.0681)	(0.0681)	(0.0678)	(0.0675)

TABLE 2 (Continued)

	(2.1)	(2.2)	(2.3)	(2.4)	(2.5)	(2.6)	(2.7)	(2.8)	(2.9)	(2.10)
Host market size	0.137***	0.178***	0.161***	0.188***	0.135***	0.174***	0.136***	0.184***	0.142***	0.179***
	(0.0413)	(0.0423)	(0.0416)	(0.0426)	(0.0413)	(0.0424)	(0.0413)	(0.0423)	(0.0414)	(0.0424)
Distance in innovation capacity	0.168***	0.0597	0.156***	0.0833**	0.169***	0.0598	0.165***	0.0562	0.148***	0.0602
	(0.0298)	(0.0386)	(0.0302)	(0.0391)	(0.0298)	(0.0387)	(0.0299)	(0.0387)	(0.0302)	(0.0385)
Constant	−7.209***	−7.454***	−6.552***	−6.762***	−7.305***	−7.554***	−7.267***	−7.477***	−6.575***	−6.882***
	(0.377)	(0.382)	(0.388)	(0.394)	(0.386)	(0.391)	(0.380)	(0.385)	(0.409)	(0.419)
Observations	91,347	91,347	91,347	91,347	91,347	91,347	91,347	91,347	91,347	91,347
Number of subsidiaries	15,246	15,246	15,246	15,246	15,246	15,246	15,246	15,246	15,246	15,246
χ^2	2230***	2235***	2183***	2182***	2235***	2241***	2227***	2236***	2219***	2228***
Log likelihood	−21,311	−21,301	−21,273	−21,247	−21,310	−21,300	−21,310	−21,293	−21,303	−21,295

Notes: Reported parameters are the estimated regression coefficients; Standard errors in parentheses; For reasons of brevity, industry-specific fixed effects are not reported.

$*p < .10$; $**p < .05$; $***p < .01$.

Scientific labor is positive and highly significant, indicating the crucial role that host country scientific labor plays in subsidiary-level innovation. Finally, and unsurprisingly, *Distance in innovation capacity* is positive and significant indicating that when host-country has a better innovation capacity compared to home, subsidiary innovation is higher.

4.1 | Robustness tests and post-hoc analyses

We also carried out a number of robustness tests to check the sensitivity of our findings. First, further to using the index of Papageorgiadis and Sofka (2020), we also use the index that has been developed by (Park, 2008). This index is well-established and incorporates the effects of both national and global developments in IP protection, such as the TRIPS agreement, legislations dealing with emerging technologies (e.g., software and biotechnology), as well as revisions in national patent laws required to conform to international and regional agreements (e.g., NAFTA, Cartagena agreement, among others). Accordingly, we re-estimated our models after calculating IP protection distance based on the index developed by Park (Park, 2008). Results are reported in Table S4, and all our findings remain largely consistent, thus providing further validity to our main analysis.

Second, we also carried out a further robustness test by creating two subsamples: one including all the cases of downward distance and zero distance and another including all the cases of upward distance and zero distance (Table S6).[7] The estimated results for Downward IPR distance and Upward IPR distance remain intact. Estimated results for the moderating effects also remain largely intact.

Third, a key concern that may bias our results is the possible presence of sample selection bias arising from an MNE's location choice. That is, if MNEs' foreign location choice is determined by the IP protection distance, then our estimated effect of IP protection distance on innovation performance may be biased. To deal with this issue, we use a two-stage Heckman correction procedure.[8] Despite the presence of selection bias, our second stage

[7]We also reported the descriptive statistics and correlation tables for these two groups separately in the Table S5.

[8]This procedure involves estimating the location choice in the first stage (selection model) based on a probit model that estimates the MNEs' location choice as a function of our two IPR distance variables and the determinants of location choice and then estimating the second stage (outcome model explaining innovation performance) while including an inverse Mills ratio derived from the probit regression of the first stage.

TABLE 3 Estimated incidence rate ratios (IRR)

		IPR absolute distance				Downward IPR distance				Upward IPR distance			
		IRR	*SE*	90% confidence interval		IRR	*SE*	90% confidence interval		IRR	*SE*	90% confidence interval	
Main effects		0.81	0.02	0.78	0.84	0.76	0.02	0.73	0.80	0.92	0.03	0.86	0.97
Moderating effects													
Subsidiary age	0	0.49	0.04	0.46	0.52	0.43	0.04	0.40	0.46	0.90	0.07	0.80	1.00
	2	0.70	0.06	0.64	0.77	0.66	0.06	0.60	0.73	0.91	0.09	0.78	1.06
	4	1.00	0.09	0.86	1.16	1.01	0.10	0.86	1.20	0.92	0.15	0.72	1.18
	5.7	1.35	0.12	1.10	1.66	1.47	0.14	1.17	1.83	0.93	0.20	0.67	1.30
Full ownership	0	0.84	0.04	0.79	0.89	0.79	0.04	0.75	0.84	0.62	0.28	0.39	0.98
	1	0.80	0.02	0.77	0.83	0.76	0.03	0.73	0.79	0.54	0.36	0.30	0.98
Cultural distance	0	0.85	0.03	0.81	0.89	0.84	0.03	0.80	0.88	0.75	0.05	0.70	0.82
	2	0.81	0.04	0.76	0.87	0.78	0.04	0.72	0.83	0.89	0.08	0.78	1.01
	4	0.78	0.07	0.70	0.87	0.72	0.07	0.64	0.81	1.05	0.13	0.84	1.30
	6	0.75	0.10	0.64	0.88	0.67	0.10	0.57	0.79	1.23	0.19	0.90	1.69
Scientific labor	3.5	0.71	0.13	0.57	0.88	0.70	0.14	0.55	0.88	0.77	0.23	0.53	1.13
	4.5	0.79	0.15	0.61	1.02	0.76	0.16	0.58	0.99	0.87	0.26	0.57	1.34
	5.5	0.88	0.17	0.66	1.17	0.82	0.19	0.61	1.12	0.98	0.29	0.61	1.59
	6.3	0.96	0.19	0.70	1.32	0.88	0.20	0.63	1.23	1.08	0.32	0.64	1.84

estimates are consistent with those reported in model 2.2 in Table 2. Similarly, IP protection distance may also influence the partnership strategy (whether to partner and whom to partner with) (Krammer, 2018) and thus may influence the ownership type. Therefore, we again used a two-stage Heckman correction procedure to address this bias.[9] Again, our results are very similar to those reported in models 2.5 and 2.6 in Table 2.[10]

Fourth, as multiple subsidiaries from the same parent might not be independent, we estimated our models with clustered standard errors by parent, and findings remain largely consistent (Table S7).[11]

Fifth, a limitation of our data is that we cannot test the dynamic and temporal transitioning of MNE investments from one IP protection regime to another. This test would require from us to have yearly data on how and when MNEs establish or dissolve their foreign-based subsidiaries. However, to capture some of the dynamics of these transitioning effects, we proceed to a robustness test. Accordingly, for each subsidiary, we considered the IP protection distance to the parent (home country) and to all other affiliate subsidiaries (countries) and selected the lowest IP protection distance (i.e., we calculated the IP protection distance to the closest subsidiary/parent). The results show that IP protection distance to the closest subsidiary/parent is still negatively related to the innovation performance of the focal subsidiary (see Table S8).[12]

Sixth, instead of using host country scientific labor as a moderator, we use the difference in scientific labor between the home country and the host country (i.e., a measure capturing to what extent the host country scientific labor is superior to the home country scientific labor). The results (see Table S9) show that it is the absolute rather than the relative abundance of scientific labor that matters for mitigating the negative effect of IP protection distance on subsidiary innovation. This is also confirmed by extant research which shows that when it comes to innovation performance of foreign-based subsidiaries, it is the local scientific labor that plays a more important role (Almeida & Phene, 2004; Czarnitzki & Hottenrott, 2009; Mudambi, 2008).

[9]This procedure involves estimating the ownership type in the first stage (as a function of our two IPR distance variables and the determinants of ownership type) based on a probit model, and then estimating the second stage (outcome model explaining innovation performance) while including the inverse Mills ratio derived from the first stage.

[10]For brevity, we do not report these results; however, these are available upon request.

[11]Stata xtnbreg command (negative binomial regression model in a panel data framework) does not facilitate the estimation of clustered standard errors. Therefore, we had to estimate our models with the nbreg command (i.e., without the panel data structure).

[12]We would like to thank an anonymous reviewer for making this important suggestion.

Seventh, we also proceed to a number of post-hoc tests to explore any other conditions that could potentially alleviate/aggravate the negative effect of IP protection distance on subsidiary innovation (see Table S10). Given the important role of geographic distance and other spatial characteristics in cross-border investments (Baaij & Slangen, 2013), we examine whether geographic distance further aggravates the negative effect of IP protection distance on subsidiary innovation. The results show that geographic distance amplifies the negative effect of IPR distance on subsidiary innovation performance in the downward direction. This finding is in alignment with extant literature and the negative effect of geographic distance on subsidiary performance (Boeh & Beamish, 2015). Also, we test the moderating effect of industry concentration on the relationship between IP protection distance and subsidiary innovation. Our logic is based on the assumption that the negative effect of IP protection distance could be aggravated when the industry is more competitive. However, our findings do not provide support for such an effect. A potential explanation for the lack of support is the wide differential effects industry intensity and structure can have between countries. In fact, country-level idiosyncrasies can greatly affect the explanatory power of industry dynamics as an antecedent (or moderating effect) of MNE subsidiary performance (Christmann et al., 1999). Further, we also examined whether parent's innovation experience (proxied by the number of patents owned by the parent) moderates the negative effects of IP protection distance on subsidiary innovation performance. However, we did not find any significant moderating effect. This can be attributed to the possibility that subsidiary (host) experience is comparatively more important than parent experience when it comes to adjusting to a distant IP protection regime. Finally, we acknowledge the possibility that market size can also be an important factor in motivating MNEs toward innovating more in the foreign location (Dubois et al., 2015). Therefore, we test the moderating effect of host market size, and the results show that the negative effect of downward IP protection distance increases with host market size. A potential explanation for this finding is that host market size can be beneficial only as long as these are not compromised by IP protection distance. Innovation-seeking motives thus require a different set of host-country characteristics, such as abundance in scientific labor, as we show previously.[13]

[13]We acknowledge that many of these post-hoc tests have greatly benefitted the article after receiving insightful feedback by the anonymous reviewers.

5 | DISCUSSION AND CONCLUSIONS

5.1 | Discussion of findings and contribution to theory

Our study is one of the very few to argue and test how differences in IP protection regime strength between the MNE's home and host country affect the innovation performance of the foreign subsidiary (Bruno et al., 2021; Filiou & Golesorkhi, 2016; Wu, 2013). By examining the direction of IP protection distance, we also respond to recent calls on issues related to the asymmetry of institutional distance on the strategies/performance of MNEs (Chikhouni et al., 2017; Contractor et al., 2016; Hernández & Nieto, 2015; Konara & Shirodkar, 2018; Trąpczyński & Banalieva, 2016), and therefore contribute to the ongoing debate on the potential benefits and costs of operating in strong vs. weak IP protection regimes insofar as the effects on innovation are concerned (Peng et al., 2017a; Peng et al., 2017b). We suggest that firms develop innovation processes depending on the strength of their home IP protection regime and adapting to a distant IP protection regime in the host country is a challenging task. Thus, MNEs could innovate better in isomorphic foreign locations (in terms of IP regimes) by minimizing the conflicting isomorphic pressures stemming from institutional idiosyncrasies between the home and the host location.

Our findings contribute to the recent discussions around the unique challenges and legitimization pressures related to the direction of institutional distance (Chikhouni et al., 2017, Contractor et al., 2016, Hernández & Nieto, 2015, Konara & Shirodkar, 2018, Trąpczyński & Banalieva, 2016). Using the context of innovation, we suggest that subsidiaries will face higher transaction costs with greater IP protection distance in the downward direction due to the weaker formal institutional support and the needs to adapt to complex informal IP protection mechanisms. These costs add up to the high sunk costs (e.g., research and development, testing, etc.) that a research-intensive subsidiary may have to incur (Gallié & Legros, 2012). In contrast, in the upward direction, MNEs incur fewer transactions costs, despite the conflicts and adjustment costs in adapting to stronger IP regimes (Cuervo-Cazurra, 2016; Cuervo-Cazurra et al., 2015; Stoian & Mohr, 2016). Our finding on the disproportionately stronger negative effect on the downward direction of IP protection distance concurs with Kostova et al. (2020, p. 471)'s observation that "The institution-related challenges are greater for companies moving from a more to a less institutionally developed environment than the other way around".

In line with prior studies on experiential knowledge, our findings show that even in the case of innovation performance, subsidiary experience can act as a buffer, i.e., allow it to lessen institutional shocks or more effectively deal with institutional complexities arising due to a high IP protection distance. Our results, however, also showed that the moderating effect of subsidiary experience is not significant in the case of upward IP protection distance. A possible explanation of this unexpected finding is that the subsidiary's experience could play a more important role in the downward direction, where foreign subsidiaries have to learn more informal and tacit forms of know-how and social mechanisms, whereas in stronger IP regimes, the rules of engagement related to IP protection are in general more explicitly defined and enforced. Thus, subsidiary experience might play a less important role in relatively stronger IP regimes. Further, our results suggest that the negative effect of IP protection distance becomes stronger for fully owned subsidiaries, indicating that foreign subsidiaries can mitigate the dual legitimacy pressures and conflicts in innovation through jointly owning a subsidiary. Although both partial and full ownership pose their unique challenges (Contractor et al., 2016; Gaur & Lu, 2007; Krammer, 2018), our findings reiterate that joint ownership can reduce the costs and conflicts associated with institutional distance in the context of subsidiary level innovation. With regard to the moderating effect of cultural distance, our supposition is supported in the downward direction. However, in the upward direction, we found that the negative effect of IP protection distance was only significant at very low levels of cultural distance. Although counter-intuitive, this is a very interesting finding. This shows that cultural distance interacts differently with formal institutional differences on the innovation performance of subsidiaries depending on the direction of distance. Our findings in this regard contribute to prior arguments on the "cultural distance paradox" (Brouthers & Brouthers, 2001; Morosini et al., 1998), as while cultural distance can increase conflicts and costs, it can also increase comprehensiveness and creativity by bringing together people of different cultural backgrounds, enhancing innovation performance (Wang & Schaan, 2008) and potentially reducing the effects of IP protection distance. Finally, in regard to the moderating effect of availability of scientific labor in the host country, our results provide support for this hypothesis for the cases of absolute IP protection distance and the downward direction. In the upward direction, although we find that the effect size reduces with greater availability of scientific labor in the host country, these effects were not significant. Overall, through all our moderating effects, we provide a more nuanced understanding of the ways through which MNEs can reduce the detrimental effects of IP protection distance on subsidiary outcomes.

Our study provides new insights to the product innovation literature with regard to the role of IP protection on innovation performance. We do so by stressing the important role of distance in the external (institutional) environment, a factor which has not received sufficient attention in this stream of research. So far, research in the product innovation literature has been focusing on issues related to how firms can internally safeguard and manage their innovative activity via adopting alternative IP protection arrangements, especially when new ideation process mechanisms (e.g., crowdsourcing) are being utilized (Mazzola et al., 2018), or even with issues linked to the management of IP through looking into safeguarding mechanisms identified in very specific case studies, such as this of Microsoft (MacCormack & Iansiti, 2009). These studies particularly look into these mechanisms as part of the evolution of a firm's resources and capabilities, while other studies in the product innovation literature have developed theoretical propositions around the theme of IP management in the context of outsourcing relationships, particularly drawing on aspects related to trust, control and verification in the outsourcing relationship (Roy & Sivakumar, 2011). While all these attempts and contributions are critical for advancing our knowledge on the role of IP mechanisms on managing firm innovation, the product innovation literature has been limited to providing insights primarily associated with internal mechanisms. Our approach to focus on both internal (strategic) and external (institutional) factors, adds a new perspective in this theoretical tenet via complementing our knowledge on which additional mechanisms can be bundled with the idiosyncratic IP context of a market in order to increase a firm's innovative performance.

5.2 | Managerial implications

Our findings provide important insights for both MNEs attempting to arbitrage on cross-country differences in the context of IP protection, and for policymakers who are interested in attracting foreign R&D operations. First, our study has practical implications for MNEs investing in R&D activities in foreign locations. Specifically, our findings show that IP protection distance matters for the innovation performance of MNEs' foreign-based subsidiaries, regardless of whether they operate in stronger IP protection regimes or in weaker ones. While the findings provide support for the aforementioned view, there are plenty of examples showing that MNEs are heavily investing in

distant IP protection regimes for R&D purposes. As such, we suggest that when MNEs innovate in foreign locations, they should not only account for the costs incurred due to voids in IP protection, but also for the costs of adapting their innovation processes to a foreign IP regime. Our study provides important intuitions on how MNEs operating in distant IP protection locations could potentially mitigate the risks and costs associated with such a strategy. MNEs will always find a reason to invest in distant IP protection locations (e.g., due to the market being attractive for both sales and for conducting R&D), and they can do so, as long as they have made sure that they have reached the appropriate level of knowledge, gained via operational experience (in the downward direction), in the host country; have entered in the host country via a collaborative form such as a JV; have made sure that they share a similar cultural background with the host location's nation (in the downward direction), as well as they have been operating in host countries with abundance in scientific labour (in the downward direction). Understanding how internal (strategic) and external (institutional) factors can mitigate or aggravate the implications of IP protection distance on subsidiary innovation is important for MNEs, subsidiary managers, and policymakers.

5.3 | Limitations and future research

We believe that our study has some limitations that can be addressed in future research. First, our study's dependent variable was limited to the count of patents each subsidiary has filed. Although this is a widely acknowledged proxy for innovation performance at the subsidiary- or even at the MNE-level, we acknowledge that this may be imperfect. Indeed, other studies have used the count of forward citations each patent has received, to also account for the quality of innovation (Lahiri, 2010; Mudambi et al., 2007; Mudambi & Navarra, 2004), or how related the innovation is to parent innovation (e.g., exploitative vs explorative innovation) (Guan & Liu, 2016). Another issue is that inventions are divided to those that are patented, and those that are not. This aspect mainly applies due to strategic issues (Griliches, 1990; Shu et al., 2015), or simply because the patent is a form of explicit knowledge, while some firms prefer to strategically keep some of their inventions in a tacit form. Also, there is a possibility that firms may choose to patent their innovations in stronger IP regimes. However, the question on where the subsidiary files the patent is not that relevant for our research, as our study focusses on the subsidiary innovation (and not subsidiary patenting behavior). Therefore, we are reasonably certain that the innovation should have taken place at the subsidiary level, as the patent belongs to the subsidiary (and not to the parent firm). Although we acknowledge the alternative proxies for innovation, we do not have data to develop such sophisticated measures, especially given that our study employs big data where information is not as extensive as it could be in a survey-based dataset. For example, hand-collecting and hand-coding forward citation data for a big data set like this one which consists of more than 90,000 firm/year observations is a highly time-consuming task. Second, in relation to our firm-level moderating effects, although subsidiary experience and ownership type can be a good proxy for measuring the MNE's degree of agility or adaptability in idiosyncratic institutional regimes, there can be other internal (strategic) factors that make MNEs more agile in such difficult/different circumstances, e.g., other (non-equity) forms of collaboration with local firms or even management or organizational practices exercised at the subsidiary level. Third, our data do not allow us to assess the effect of IP protection distance on different levels of subsidiary innovation activities. As a result, we have been unable to examine important characteristics of innovation, such as whether innovation is incremental or radical, short- or long-term, among others. Future research could draw on more explicit information with regard to the specific type of innovation taking place at the subsidiary level in an attempt to provide an even more nuanced view on the impact of IP protection regime, not only on the level of innovation, but also on the type of innovation. Despite these limitations, we believe that we make considerable contributions to both theory and practice in the area of innovation management in an international business context.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest. This research was not funded by any corporation or government agency.

ETHICS STATEMENT

The authors have read and agreed to the Committee on Publication Ethics (COPE) international standard for authors.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.
Tables S1-S10

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