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RESEARCH ARTICLE

MNC foreign investment and industrial disasters: The moderating role of technological, safety management, and philanthropic capabilities

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Research Summary: We investigate how industrial disasters can discourage FDI and how MNCs' technological, safety management, and philanthropic capabilities can moderate these effects. Using two unique panel data sets of entry and expansion of U.S. wholly-owned manufacturing subsidiaries overseas, we found that industrial disasters are associated with reduced foreign entry of wholly-owned subsidiaries in the disaster industry, but not for all firms in the host country experiencing the disaster. We also found that MNCs' technological, safety management, and philanthropic capabilities can, in some cases, positively moderate the negative relationships between industrial disasters and the foreign entry and expansion of wholly-owned subsidiaries. Additionally, three-way interactions with government stability suggest that technological and safety management capabilities substitute government stability in managing industrial disasters, while philanthropic capability complements government stability.

Managerial Summary: How can MNCs' technological, safety management, and philanthropic capabilities overcome the effects of industrial disasters such as chemical spills and explosions in host countries? Our results show that industrial disasters are associated with reduced foreign entry of wholly-owned subsidiaries in the industry in which the industrial disaster occurs, but not for other firms operating in the country experiencing the disaster. However, an MNC's technological capability can, in general, lower the negative consequences of industrial disasters in both the entry and expansion of its wholly-owned subsidiaries. Regarding the institutional quality of a host country, the results imply that MNCs should develop philanthropic capability when the government stability of the host country is strong, and develop technological and safety management capabilities when the government stability is weak.

KEYWORDS

industrial disasters, philanthropic capability, safety management capability, technological capability

1 | INTRODUCTION

While increased globalization and continued technological development have brought many societal and business benefits, they may also have negatively impacted businesses and societies by exacerbating the incidence and severity of calamitous industrial disasters (Blanton & Peksen, 2017; Manion & Evan, 2002). *Industrial disasters* refer to human-caused, tragic, and sudden breakdowns in industrial, technological, and organizational systems that cause major disruption and damage to natural and social environments (Gill & Picou, 1998; Shrivastava, Mitroff, Miller, & Miclani, 1988).[1] They include chemical spills, collapses, explosions, fires, gas leaks, poisonings, radiation leaks, and large-scale transportation accidents. Prominent examples of relatively recent industrial disasters include the 2007 Qinghe Special Steel Corporation disaster in China that killed 32 workers (Zio & Aven, 2013), the 2002 ammonium nitrate explosion in an industrial complex in Toulouse, France that killed 30 people (Dechy, Bourdeaux, Ayrault, Kordek, & Le Coze, 2004), and the 2006 Pasta de Conchos mining disaster in Mexico that killed 65 people (Gamboa, 2011).

As foreign direct investment (FDI) increases and international supply chains grow in complexity, it is becoming increasingly important to understand the consequences of these disasters on firms' major foreign investment decisions and to understand how these consequences could be avoided or tempered. Scholars have begun investigating the effects of industrial disasters, as one of the various types of risk, on business operations. Pelling, Özerdem, and Barakat (2002) argued that these disasters can increase risk perceptions and instability, and recent empirical work finds that industrial disasters were associated with reduced foreign investment from European MNCs (Oetzel & Oh, 2014; Oh & Oetzel, 2011). Scholars have also begun identifying factors that could help mitigate these effects, including the size and dispersion of firms' operations (Perrow, 2007), community and workforce welfare programs in host countries (Pelling et al., 2002), country governance (Oh & Oetzel, 2011), and disaster experience (Oetzel & Oh, 2014).

While this prior work takes important steps toward unpacking the impacts of industrial disasters on both MNCs and host countries, it is still in a nascent state. Most importantly, firms' external context (country governance quality) is largely beyond MNCs' control, and experiential learning requires substantial/long-term foreign operations to be exposed to high-impact industrial disasters (whose occurrence is also usually outside the control of most firms). Most importantly, the extant research has not investigated specific capabilities that can be developed and deployed to enable

[1]While we follow England (1988) and Zio and Aven (2013) in adopting the term *industrial disasters* as we feel it better represents the phenomenon of interest, we note that scholars have used a variety of terms to represent similar concepts, including *industrial crises* (Shrivastava et al., 1988), *technological catastrophes* (Baum, Fleming, & Davidson, 1983), and *technological disasters* (Oh & Oetzel, 2011).

firms to proactively prepare to address the negative consequences of industrial disasters. This is an important limitation, as prior work suggests that firm capabilities are an important factor in explaining differences in firms' performance and that they vary across firms (Carmeli & Tishler, 2004). Consequently, drawing on the resource-based view (RBV) of the firm (Barney, 1991; Wernerfelt, 1984), we investigate whether three capabilities—technological, safety management, and philanthropic—positively moderate the relationship between industrial disasters and MNCs' entry and expansion decisions.

Drawing on a unique panel data set consisting of large U.S. manufacturing MNCs and their operations across 87 foreign countries during the period 1999–2007, we found that industrial disasters within the industry causing the disaster (hereafter: the disaster industry) were negatively associated with the entry of MNC wholly-owned subsidiary (WOS) into host countries, but not with their expansion in the host countries. We also found that MNCs' technological, safety management, and philanthropic capabilities can, in some cases, positively moderate the negative relationships between industrial disasters and foreign WOS entry and expansion based on the geographic and industry dimensions of industrial disasters.

Our findings make three major research contributions. First, we build on prior work investigating the effects of industrial disasters on business operations by articulating three mechanisms that can help explain the negative effects of industrial disasters on FDI. Our study also builds on this work by demonstrating that the negative impacts of these shocks are more likely to affect the entry of MNCs belonging to the disaster industry and do not appear to spill over to companies in other industries. Second, by analyzing the moderating effects of technological, safety management, and philanthropic capabilities on the negative effects of industrial disasters on FDI, our study identifies factors within MNCs' control that could help them overcome or preempt the negative effects of industrial disasters. Third, by analyzing the three-way interactions between host country government stability and firm capabilities in managing industrial disasters our study contributes to the RBV literature by clarifying some of the contextual boundary conditions affecting MNCs' ability to remain competitive in the face of industrial disasters.

2 | THEORY AND HYPOTHESES

2.1 | The impact of industrial disasters on FDI

A growing body of research has investigated the effects of catastrophic external shocks, including natural disasters and terrorist attacks, on FDI. According to one perspective, these shocks may be linked to increased FDI and GDP due to factors including the increased demand generated by recovery and reconstruction efforts and the gains in productivity from the accumulation and upgrading of capital and infrastructure (e.g., Albala-Bertrand, 1993; Skidmore & Toya, 2002). It is also possible that governments would respond to these shocks by enacting regulatory and legal changes that may improve the operating environment, increasing FDI.[2] In contrast, other scholars' findings suggest a negative link between catastrophic external shocks and FDI (e.g., Escaleras & Register, 2011; Oetzel & Oh, 2014; Oh & Oetzel, 2017; Rasmussen, 2004). Prior work directly investigating the impact of industrial disasters on FDI, specifically, is limited, finding that host country industrial disasters can reduce FDI (Oetzel & Oh, 2014; Oh & Oetzel, 2011). Importantly, these scholars did not

[2]We thank one of our anonymous reviewers for pointing out this additional potential driver of increased FDI following industrial disasters.

enumerate or identify the mechanisms through which this negative effects can occur, making it difficult to develop specific hypotheses about how MNCs might be able to overcome or preempt them through developing capabilities. We contribute by theorizing three mechanisms—increases in customer and stakeholder management costs, regulatory compliance costs, and operating costs—through which we expect industrial disasters to decrease FDI by all foreign firms operating in the host country, as well as all firms belonging to the disaster industry.

2.1.1 | Industrial disasters and increases in customer and stakeholder management costs

Prior work suggests that industrial disasters are likely to reduce MNCs' FDI because they can result in greater, and more uncertain, demands and concerns from customers and stakeholders, resulting in higher customer and stakeholder management costs. Industrial disasters can cause extensive social-psychological disruption, which can contribute to chronic community stress (Gill & Picou, 1998), give rise to considerable amounts of media attention (Shrivastava, 1994), and cause significant social conflict and uncertainty (Picou, Marshall, & Gill, 2004), particularly among activist groups that may cascade to other more mainstream stakeholders and customers (Dorobantu, Henisz, & Nartey, 2017). They can also fundamentally change the public's perceptions of risks and humans' ability to manage them (Shrivastava, 1994). In a broad sense, such social instability and uncertainty can be important factors influencing firms' overseas investment decisions (Ramos & Ashby, 2017), potentially signaling to firms that development and growth are likely to be uncertain (Agodo, 1978) and driving firms to use avoidance/delay strategies, including divesting or postponing entry into a country (Miller, 1992).

This effect may be more pronounced for firms operating in the disaster industry. Industrial disasters can result in severe criticism of the industries involved, resulting in cutbacks in business operations and investments (Shuen, Feiler, & Teece, 2014). This criticism can manifest itself in protests, heightened concern for the environment, and activism, which can increase the pressure on other companies in the disaster industry to address the public's fears and concerns about the safety of their operations (Bowman & Kunreuther, 1988). For instance, Bowman and Kunreuther (1988, p. 390) described how the U.S. public experienced "chemophobia" following the 1984 Union Carbide explosion in Bhopal, India, which made stakeholders much more interested in advocating for preventative measures in their interactions with chemical companies. These stakeholder reactions can have major effects on firms' operations. Protests, for instance, can negatively affect investors' expectations of firms by raising questions about their future performance, the capacity of their management, and stakeholders' perceptions of them (King & Soule, 2007). Recently, Dorobantu et al. (2017) found that negative stakeholder reactions such as protests and boycotts have the potential to escalate and cascade, with potential adverse effects on targeted firms' stock prices. Protests can also affect firms' overseas investment decisions, as found in the case of Burma, where protests in MNCs' home countries resulted in divestment from the country (Soule, Swaminathan, & Tihanyi, 2014).

The more pronounced negative effects on firms operating in the disaster industry may be due to shared reputational liability that increases customer and stakeholder management costs. Besides their individual reputations, companies in the same industry also share a common industry reputation that, as with other intangible club goods, can be characterized by being nonrival and excludable (Prakash & Potoski, 2007). Industry reputation refers to "the collective judgments of an industry by stakeholders and the general public, where that judgment is based on assessments of the economic, social and environmental impacts attributed to that industry over time" (Winn, MacDonald, & Zietsma, 2008, pp. 36–37). The nonrival aspect of an industry reputation means that an individual firm bears its rewards and/or penalties without limiting these shared reputational benefits and/or costs to other industry peers, while the excludable aspect of an industry reputation means firms in other industries are excluded from the potential consequences of the industry reputation (Prakash & Potoski, 2007; Rivera, Naranjo, Robalino, Alpizar, & Blackman, 2017). Indeed, firms within the same industry are frequently "tarred by the same brush" (King & Lenox, 2000, p. 698). For instance, the Exxon Valdez oil spill tarnished the reputation of the global oil industry, with one oil executive from Amoco reflecting: "We are still an oil company, and we still have to live with the sins of our brothers. We were doing fine until Exxon spilled all that oil. Then we were painted with the same brush as them" (Hoffman, 1997, p. 189). Thus, an industrial disaster caused by a peer firm can smear not only its individual standing, but also the reputation of the other companies in the disaster industry that share a common reputational fate.

Tainted reputations can have wide-ranging implications for firms, including reduced and unstable revenues (Fombrun, 1996), increased proneness to collective backlash (Dorobantu et al., 2017), and a diminished ability to successfully invest abroad (Campbell, Eden, & Miller, 2012). Collectively, we expect that these detrimental effects can make it more difficult for firms in the disaster industry to invest in foreign countries that have experienced industrial disasters.

2.1.2 | Industrial disasters and increases in regulatory compliance costs

We further argue that industrial disasters can impose increased regulatory compliance costs on firms. Industrial disasters are often accompanied by calls for regulatory changes to address their underlying causes (Griffin, Cordery, & Soo, 2016). Some of these regulatory changes apply broadly to the host country economy. For instance, in response to the Union Carbide explosion, the government of the United States responded by creating the Toxic Release Inventory, requiring firms in a variety of industries to report their emissions of toxic chemicals (Konar & Cohen, 1997). These public policy changes can raise the regulatory compliance costs for a broad range of firms operating in a host country experiencing an industrial disaster. These effects of increased regulatory stringency can decrease firms' profit expectations, lowering firms' incentives to undertake FDI (Blonigen, 2005; Xing & Kolstad, 2002).

More commonly, governments and regulators respond to industrial disasters with regulatory changes targeted at the disaster industry. For example, following the 2006 Pasta de Conchos mine disaster, the Mexican government passed a series of laws focused on improving safety conditions in mines and protecting mining workers (Gamboa, 2011). Similarly, following the 2002 Prestige oil spill off the coast of Spain, the European Union made large-scale regulatory changes, including banning the transport of heavy oil in single-hull tankers and banning oil tankers older than 23 years old (European Commission, 2003). These industry-specific public policy changes are likely to raise the regulatory compliance costs for all firms operating within the disaster industry. The double hull design, required after the Prestige oil spill, is approximately 16–18% more expensive than single hull designs (Brown & Savage, 1996). As noted above, by reducing firms' profitability, these regulatory changes are likely to subsequently reduce firms' incentives to undertake FDI.

Industrial disasters can also lead to significant regulatory uncertainty (e.g., Eilperin & Mufson, 2010). This uncertainty can be a critical consideration for MNCs when making FDI decisions because of its potential impact on an MNC's performance (Miller, 1992), and has been found to be negatively associated with foreign market entry (Rivera & Oh, 2013). Collectively, these findings suggest that industrial disasters can result in increases in regulatory compliance costs, deterring MNCs' FDI.

2.1.3 | Industrial disasters and increases in operating costs

Finally, industrial disasters can cause large-scale damage to property and infrastructure in affected countries. For instance, the 2005 chemical plant explosions in Jilin, China resulted in the evacuation of tens of thousands of people; the shutting off of electricity, heat, water, and communications; and widespread water pollution, followed by evacuations and water shutoffs further downstream in other cities (Disasteropedia, n.d.). Total costs of damages brought on by an industrial disaster can be very high, with some estimates ranging from hundreds of millions of dollars to hundreds of billions of dollars (Manion & Evan, 2002). This damage to property and infrastructure can increase operating costs for firms with subsidiaries in the host country. It is likely to affect all firms operating in the vicinity of the industrial disaster. It can also increase operating costs for other firms more indirectly through the destruction of public infrastructure. The quality of infrastructure is an important consideration for firms in making their foreign investment decisions (Asiedu, 2006; Erdal & Tatoglu, 2002; Escaleras & Register, 2011) since poor quality of infrastructure can result in reduced profits (Blonigen, 2005) and firm productivity (Miller, 1992).[3]

2.2 | Hypotheses: Overcoming the impacts of industrial disasters on FDI

2.2.1 | The moderating role of firms' technological capability

Technological capability refers to "the skills—technical, managerial, and institutional—that allow productive enterprises to utilize equipment and technical information efficiently" (Lall, 1993, p. 720). Technological capability can help firms improve their ability to rapidly (re)develop and commercialize products, which we argue can help them overcome the increased regulatory compliance costs and customer and stakeholder management costs brought on by industrial disasters. Technological capability enables firms to be more creative (Moorman & Slotegraaf, 1999), accelerate new product development (Tsai, 2004), expedite the commercialization of such new products (Zahra & Nielsen, 2002), and subsequently, attain first-mover advantage (Franco, Sarkar, Agarwal, & Echambadi, 2009). Finally, technological capability is linked with firms' abilities to forecast and anticipate future requirements (Reed & Walsh, 2002, p. 240) and proactively exploit their own technologies (Rush, Bessant, & Hobday, 2007). These attributes suggest that MNCs with high levels of technological capability will be better at reconfiguring their existing products and processes, and creating and commercializing new products and processes, helping them overcome the increased customer and stakeholder management costs and regulatory compliance costs that can arise from industrial disasters.

Technological capability also enables firms to adapt their operations to new operating conditions, which we argue can help them overcome the increased operating costs brought on by industrial disasters. Technological capability is likely to be a critical resource for success in response to the environmental turbulence caused by such destruction (e.g., Kraatz & Zajac, 2001). MNCs' technological capability may enable them to redefine and reconfigure their operations by exploiting their existing knowledge and know-how across countries in which they operate, as well as assimilate new external knowledge from these countries (Stuart & Podolny, 1996; Zhou & Wu, 2010). Firms with the ability to utilize their equipment more effectively and reconfigure their processes may have built-in efficiency and process redevelopment advantages that make them less prone to suffering financial costs due to the destruction of property and infrastructure brought on by industrial disasters.

[3]These impacts are described well by Devon Energy, a U.S.-based petroleum MNC: "…a portion of our production in any region may be interrupted or shut in from time to time from losing access to plants, pipelines or gathering systems. Such access could be lost due to a number of factors, including, but not limited to, weather conditions and natural disasters, accidents, field labor issues or strikes…. Such interruptions or constraints could negatively impact our production and associated profitability" (Devon Energy Corporation, 2015, p. 26).

Hypothesis 1 (H1) *MNCs' technological capability will positively moderate the negative effect of industrial disasters on MNC entry and expansion into a host country.*

2.2.2 | The moderating role of firms' safety management capability

Scholars have drawn attention to the benefits of firms developing capabilities around safety management (Griffin et al., 2016; Liu & Li, 2014; Shuen et al., 2014). Drawing on this work, we conceptualize safety management capability as a firm's ability to control and manage the safety of its operations through its varied organizational routines.

A variety of studies suggest a range of benefits associated with safety management capability that could enable firms to overcome increased regulatory compliance costs. First, safety management capability enables firms to not only comply with harm prevention legislation (Santos, Barros, Mendes, & Lopes, 2013), but also to remain vigilant and adapt to unexpected events, including responding to changes in regulations following industrial disasters (Griffin et al., 2016). This advantage could help firms quickly adapt to and comply with new laws and regulations following industrial disasters. This is especially important for MNCs compared to purely domestic companies since MNCs need to adapt their organizational practices based on different and sometimes conflicting institutional regulatory conditions across national borders (Kostova & Roth, 2002). Second, safety management capability could act as a strong signal to regulators and governments that firms are committed to secure operations (Fernández-Muñiz, Montes-Peón, & Vázquez-Ordás, 2012) and help improve firms' images in communities (Santos et al., 2013). This signaling and the development of positive relations with public authorities can reduce the public scrutiny from lawmakers and regulators experienced by firms involved in industrial disasters. In addition, safety management capability can also help firms deal with increases in operating costs such that they can prevent occupational risks, which can help reduce material losses and disruptions to firms' activities and processes (Fernández-Muñiz et al., 2012; Santos et al., 2013).

Hypothesis 2 (H2) *MNCs' safety management capability will positively moderate the negative effect of industrial disasters on firm entry and expansion into a host country.*

2.2.3 | The moderating role of firms' philanthropic capability

Philanthropy refers to discretionary actions, such as contributing time and financial resources to social and environmental causes, aimed at fulfilling expectations about good corporate citizenship (Carroll, 1991). We argue that a firm's philanthropic capability can refer to its ability to strategically manage its long-term charitable giving activities. We argue that philanthropic capability can enable MNCs to overcome the increased costs brought on by industrial disasters primarily through two mechanisms.

First, an MNC's philanthropic capability contributes to building and maintaining a positive global reputation among customers and stakeholders, helping them overcome increased customer and stakeholder management costs.[4] Reputations can be highly valuable assets (Teece, Pisano, & Shuen, 1997), which can be particularly important for MNCs as they attempt to enter foreign markets (Frynas, Mellahi, & Pigman, 2006). Firms' engagement in charitable giving can help increase their reputation among stakeholders, including those that were not direct recipients of the charitable gifts (Brammer & Millington, 2005; Fombrun & Shanley, 1990). As their reputations are maintained

[4]A firm's reputation represents "a perceptual representation of a company's past actions and future prospects that describes the firm's overall appeal to all of its key constituents when compared with other leading rivals" (Fombrun, 1996, p. 72).

or improved, MNCs can be better positioned to overcome the increased customer and stakeholder management costs brought on by industrial disasters. This is because firms' positive reputations can buffer them from negative stakeholder reactions, such as rapidly cascading boycotts, while also helping reduce risks stemming from management and corporate crises (Branco & Rodrigues, 2006; Dorobantu et al., 2017). In this sense, MNCs' reputations could buffer them from public backlash that can grow into widespread protests and boycotts following industrial disasters. This effect could be particularly important in foreign countries because stakeholders often have higher levels of scrutiny toward foreign MNCs (Crilly, 2011; Oetzel & Getz, 2012). Firms' reputations can also help them enhance the perceived quality, credibility, honesty, and trustworthiness of their managers and their products (Branco & Rodrigues, 2006; McWilliams & Siegel, 2001). These attributes may make MNCs' products more attractive than those of other firms in their industry that may experience reputational loss in the face of industrial disasters.

Second, philanthropic capability could also allow MNCs to increase their political legitimacy and resources, which can help them overcome the increased regulatory compliance costs brought on by industrial disasters in two ways. First, enhanced political legitimacy and resources may protect firms from facing increased regulatory monitoring following industrial disasters (Adams & Hardwick, 1998). Relatedly, philanthropic activities can result in firms receiving leniency in punishment and sanctions from government agencies because of accumulated goodwill (Godfrey, 2005). Second, the political legitimacy and goodwill gained from philanthropic activities could help firms receive increased support from governments during disaster recovery efforts (Sánchez, 2000) and more easily shape preferred policies and regulations enacted during disaster recovery (Wang & Qian, 2011).

> **Hypothesis 3 (H3)** *MNCs' philanthropic capability will positively moderate the negative effect of industrial disasters on firm entry and expansion into a host country.*

3 | METHODOLOGY

3.1 | Data sources and sample

To test our hypotheses, we used a sample drawn from the 97 U.S. manufacturing MNCs listed as Fortune Global 500 firms (where size is measured in terms of revenue) during any year between 1999 and 2007. From this group of 97 large U.S. manufacturing MNCs, we excluded purely domestic firms, nonpublic firms, and firms that do not provide their subsidiary location(s), which left us with 61 MNCs. We hand-collected the subsidiary locations of the 61 MNCs from each firm's 10K annual reports. The list of firms is available upon request. We included only the firms' WOS due to data availability limitations as many firms did not report partially-owned subsidiaries or their ownership information.

Next, we built two panel data sets from the 61 U.S. Global Fortune 500 manufacturing firms and their WOS operating across 87 countries during the period 1999–2007. Our first panel data set included the initial entry information (25,344 firm-host country-year observations) of those firms. The second panel data set included the expansion information (9,356 firm-host country-year observations) focused on the number of WOS established by those firms after their initial entry into a foreign country. On average, a U.S. manufacturing firm operated in 17 foreign countries (= 9,356 observations/61 firms/9 years).

The source of the industrial disaster information is the Emergency Events Database (EM-DAT) provided by the CRED at the Université Catholique de Louvain in Belgium (Guha-Sapir, Below, &

Hoyois, 2017). The industrial disasters in the database include chemical spills, collapses, explosions, fires, gas leaks, poisonings, radiation leaks, and large-scale transportation accidents. This database provides information about the location and damage of each industrial disaster. A disaster is entered into EM-DAT if the event meets one or more of the following criteria: (a) 10 or more people are reported killed, (b) 100 or more people are reported affected, (c) a state of emergency is declared, or (d) the country places a call for international assistance. Thus, our disaster data do not include minor industrial breakdowns or cybercrimes that do not induce significant impacts on human populations or large physical damage. Advantages of this database include its high levels of use and cross-validation by multiple studies, its high levels of coverage and completeness, and its provision of the best available information on disaster incidents and reported fatalities from around the world (Guha-Sapir et al., 2017; Skidmore & Toya, 2002). Table 1 shows the number of incidents, total deaths, injured, and affected by year starting from 1990, and thus, implies no specific trends over the years. It is important to note that, except for the number of incidents, the data contain a large amount of missing information, and thus, information about deaths, injured, and affected is

TABLE 1 Industrial disasters by year

Year	Incidents	Total deaths	Injured	Affected	Total affected
1990	27	905	1,113	7,540	8,653
1991	52	1,700	2,781	68,144	78,925
1992	25	1,385	2,876	150	18,026
1993	36	1,244	6,185	1,600	7,785
1994	34	779	1,423	14,605	19,328
1995	45	513	969	26,100	27,069
1996	35	674	11,853	3,533	15,387
1997	35	1,055	5,156	108,200	113,356
1998	43	1,942	1,985	60,000	62,885
1999	**37**	**740**	**1,273**	**2,475**	**323,748**
2000	**51**	**1,807**	**2,683**	**14,359**	**17,142**
2001	**54**	**1,281**	**4,095**	**15,000**	**19,345**
2002	**48**	**1,112**	**594**	**1,084**	**1,678**
2003	**52**	**1,444**	**1,401**	**644,881**	**646,282**
2004	**81**	**1,797**	**2,938**	**153,558**	**156,556**
2005	**76**	**2,281**	**1,642**	**10,758**	**16,400**
2006	**64**	**1,870**	**1,742**	**123,056**	**160,798**
2007	**53**	**1,669**	**1,226**	**2,176**	**3,402**
2008	38	776	445	13,771	14,216
2009	44	947	694	4,941	5,635
2010	36	1,061	913	18,495	26,528
2011	32	727	500	29	595
2012	25	787	3,663	47	3,710
2013	25	1,907	2,010	6,340	8,380
2014	28	891	633	283,744	284,377
2015	30	956	1,907	19,640	25,266
2016	26	626	549	12,000	12,549

Note. Source: Guha-Sapir, D., Below, R., Hoyois, Ph. 2017, EM-DAT: The CRED/OFDA International Disaster Database. Université Catholique de Louvain: Brussels, Belgium. www.emdat.be. (accessed May 15, 2017). The bold letterings indicate the years included in our empirical analysis.

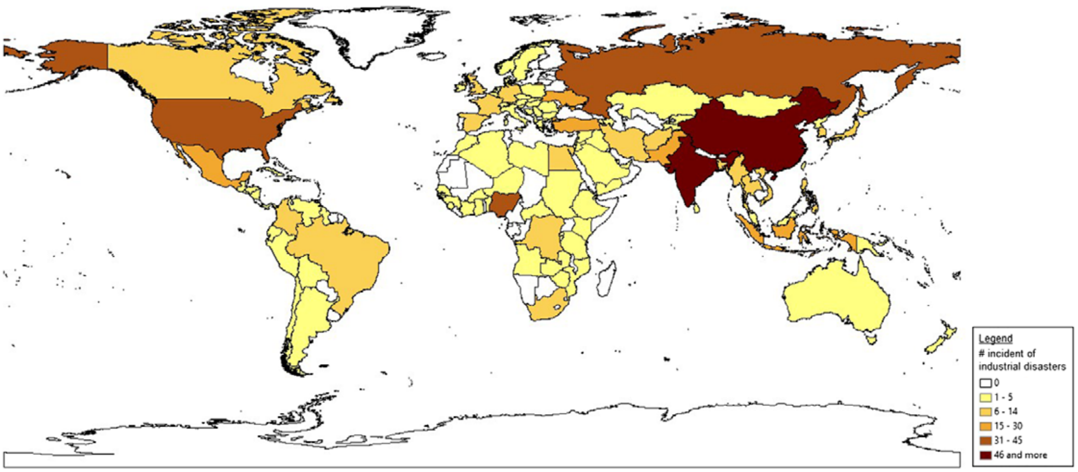

FIGURE 1 Incidents of industrial disasters: 1990–2016. Source: Guha-Sapir, D., Below, R., Hoyois, Ph. 2017, EM-DAT: The CRED/OFDA International Disaster Database. Université Catholique de Louvain: Brussels, Belgium. www.emdat.be. (accessed May 15, 2017). Authors' graphical illustration

downwardly biased. Figure 1 maps the number of incidents around the world, and indicates that China, India, the U.S., Russia, and Nigeria are the top five countries affected by industrial disasters from 1990 to 2016.

Regarding the three capability variables, the source of firm technological capability is the Patent Data Project by the National Bureau of Economic Research (NBER). The NBER's patent database contains detailed information on all utility patents granted in the U.S. between 1976 and 2006. The sources of safety management and philanthropic capabilities are, respectively, the Kinder, Lydenberg, and Domani Database (KLD) database by the RiskMetrics Group, and the Foundation Directory Online (http://foundationcenter.org/), which are widely used in academic research.

Regarding our control variables, we included firm- and country-level variables known to determine MNCs' entry and expansion. The sources for the firm-level variables were the Compustat North America Fundamental Annual by Standard & Poor's and annual reports from sample firms. The sources for the host country-level variables are the World Development Indicators database produced by the World Bank for geo-demographic and economic characteristics, the Political Constraints Index to measure policy stability (Henisz, 2000), the Government Stability Index in the International Country Risk Guide by the PRS Group to measure the government's ability to carry out its declared programs, the Property Rights Index in the Index of Economic Freedom by the Heritage Foundation to measure the degree to which a country's laws protect private property rights and the degree to which its government enforces those laws, the Database of Political Institutions for information on political regime change (Cruz, Keefer, & Scartascini, 2016), the Uppsala Conflict Data Program for information on armed conflicts, the Bureau of Economic Analysis for ownership restriction information, and the Database on Economic Integration managed by Jeffrey Bergstrand (http://www3.nd.edu/~jbergstr/) for data on institutional closeness (preferential trade agreements) between the host country and the United States.

3.2 | Dependent variables

We used MNCs' WOS entry and expansion information for each country as our dependent variables. To measure an MNC's WOS entry into a host country, we used a binary variable, which equaled one when the MNC invested in a WOS in a country for the first time and zero otherwise. We treated data recorded after the MNC entered the host country as missing because we were only interested in the initial entry information. To measure an MNC's WOS expansion into a host country, we used the number of WOS in the host country after entry. Changes in investment (expansion or contraction) are measured in terms of the increase or decrease in the number of an MNC's WOS in a given host country. These binary and count variables, although they have some limitations, are widely used dependent variables in MNC entry and expansion research (e.g., Arregle, Beamish, & Hébert, 2009; Perkins, 2014).

3.3 | Independent variables of interest

We used two sets of independent variables of interest in this study. The first set of independent variables relates to the severity of industrial disasters in a host country in a given year. Following the literature on this topic, we measured the severity of industrial disasters by the number of incidents because it is a common measure used by scholars working on the topic of disaster risks (e.g., Desai, 2016). From the list of industrial disasters in EM-DAT, we searched news articles from Dow Jones News Retrieval and Factiva, and found industry information related to the disaster for 99% of disasters. Comparing the industry information of disasters and focal firms, we divided industrial disasters into three geographic and industry dimensions: (a) inside the host country but originating outside the industry in which a focal firm operates (ID_HC), (b) inside the host country and originating within the industry in which a focal firm operates (ID_HC_WI), and (c) outside the host country and originating within the industry in which a focal firm operates (ID_WI). These three dimensions of industrial disasters enable us to test spillover effects across industry sectors and across country borders.

The second set of independent variables is our three hypothesized capabilities. Technological capability is measured by the average number of citations and number of patents as these are common measures used in research on technological capability, innovativeness, and knowledge transfers at the firm-, region- and country-levels (Phene, Fladmoe-Lindquist, & Marsh, 2006; Thompson & Fox-Kean, 2005). Safety management capability is measured by the summation score of KLD's health and safety concern, product safety concern, and hazardous waste concern (all reverse coded) to consider different dimensions of safety in MNC operations.[5] Philanthropic capability is measured by the annual amount of corporate foundations' donations. We used a logarithm transformation for these measures to lower the skewness of the raw data.

3.4 | Control variables

As mentioned above, we associated three sets of control variables following the literature in MNCs' entry, expansion, and survival (e.g., Henisz & Delios, 2001; Oetzel & Oh, 2014). At the firm-level, we included firm size (log of total assets), sales growth (annual sales growth), R&D intensity (R&D expenditure divided by sales), marketing intensity (advertising expenditure divided by sales), financial resources (tangible assets divided by total liabilities), international orientation (foreign-to-total sales), international expansion wave (total number of foreign WOS), and performance (return on

[5]We used concern ratings rather than strength ratings in measuring safety management capability because the strength rating of health and safety is only available for recent years and product safety strength is not available. The original ratings are binary variables indicating whether the company has recently been involved in major issues relating to health and safety, the safety of product and services, and waste management controversies. These concern ratings from KLD have been widely used in prior work (e.g., Chatterji, Levine, & Toffel, 2009).

sales). Second, at the country-level, we controlled for income (log of per-capita GDP), market growth (annual GDP growth), property protection (Property Rights Index), government stability (Government Stability Index), political constraints (Political Constraint Index), trade openness (the sum of imports and exports divided by GDP), political regime change (dummy for changes in political chief executive), armed conflicts (log of the number of armed conflicts), foreign firm ownership restriction (portion of the number of U.S. majority owned subsidiaries out of all U.S. subsidiaries in a host country), and preferential trade agreements (involving common preferential trade agreements). Finally, we controlled for firm, year, and country fixed effects to capture unobserved heterogeneity. The summary of the descriptive statistics and correlation matrix for the variables appear in the Appendix S1, which shows that multicollinearity is not a statistical issue in our analysis.

3.5 | Model

Since our dependent variables consist of a binary variable (for entry) and a count variable (for expansion), we used logistic and negative binomial regression models for estimating the entry and expansion decisions, respectively. Specifically, we used unconditional logit and negative binomial regression models with firm, country, and year fixed effects. To reduce the possible presence of heteroskedasticity and autocorrelation, we used the Huber-White standard errors with clustering by the MNC and host country.

We controlled for the foreign ownership restriction variable, as mentioned above, because we only used WOS as a measure of entry and expansion. In the expansion model, we include a selection parameter (i.e., *IM*; inverse mills ratio from a presence model) because of the possibility of self-selection bias for the expansion model. Besides controlling for selection bias in the expansion model, we used one-year lagged independent and control variables to lower concerns regarding additional endogeneity and reverse causality in both the entry and expansion models. We provided detail information about our statistical models and information in the Appendix S1.

4 | RESULTS

Table 2 presents the results. In Columns 1 and 2, we included the control variables in the entry and expansion models. Our findings regarding our control variables are consistent with prior literature on market entry and survival (Dai, Eden, & Beamish, 2013; Delios & Henisz, 2003; Henisz & Delios, 2001). The three dimensions of industrial disasters and three capability variables are included in Columns 3 and 4 of Table 2. All three variables for the dimensions of industrial disasters were negative for the entry model (for ID_HC, $\beta = -0.0017$, $p = .9046$, *s.e.* = 0.0145; for ID_HC_WI, $\beta = -0.1947$, $p = .0051$, *s.e.* = 0.0696; for ID_WI, $\beta = -0.1611$, $p = .0000$, *s.e.* = 0.0219) and expansion model (for ID_HC, $\beta = -0.0019$, $p = .4391$, *s.e.* = 0.0025; for ID_HC_WI, $\beta = -0.0265$, $p = .4417$, *s.e.* = 0.0344; for ID_WI, $\beta = -0.0066$, $p = .2060$, *s.e.* = 0.0052). The likelihood of entry is reduced by 0.02, 0.11, and 1.10% when we increase one standard deviation (SD) of ID_HC, ID_HC_WI, and ID_WI, respectively, from their mean values. Considering the mean value of entry (2.3%), the changes are substantial and economically meaningful for ID_HC_WI and ID_WI. Regarding expansion, the number of subsidiaries is reduced by around 0.05 when we increase one SD of ID_HC, ID_HC_WI, and ID_WI, respectively, from their mean values. Compared to the mean value of expansion (3.40), this change is relatively very small. The results show that the magnitude of the hypothesized variable is economically meaningful when its statistical significance is high.

The technological capability variable is positive and significant for the entry model ($\beta = 0.8548$, $p = .0000$, *s.e.* = 0.1869), but was marginally significant and positive for the expansion model ($\beta = 0.0720$, $p = .0570$, *s.e.* = 0.0379). Safety management capability is positive and significant for the entry model ($\beta = 0.4769$, $p = .0003$, *s.e.* = 0.1313), but insignificant for the expansion model ($\beta = -0.0033$, $p = .7909$, *s.e.* = 0.0125). Philanthropic capability is negative and significant for the entry model ($\beta = -0.1208$, $p = .0000$, *s.e.* = 0.0278) and for the expansion model ($\beta = -0.0121$, $p = .0002$, *s.e.* = 0.0033). The last row reports the likelihood ratio (LR) of the test statistics of the estimation fit for the inclusion of industrial disasters and three capability variables. It shows the statistical significance of the entry model ($p < .0003$; Column 3) and the expansion model ($p < .0002$; Column 4). These test results indicate that these variables should be included in the U.S. MNCs' location decision model.

In Columns 5 and 6, we included an interaction term between each dimension of industrial disasters and technological capability to test Hypothesis 1. For ID_HC, the moderating effect is not significant. For ID_HC_WI, only the moderating effect in the expansion model is positive and significant ($\beta = 0.0697$, $p = .0373$, *s.e.* = 0.0335). The interaction with technological capability is positive and significant for ID_WI for both entry ($\beta = 0.0678$, $p = .0000$, *s.e.* = 0.0155) and expansion ($\beta = 0.0154$, $p = .0001$, *s.e.* = 0.0039). These results partially support Hypothesis 1 for both entry and expansion.

Columns 7 and 8 show the results for safety management capability. Safety management capability positively moderates the negative effect of ID_HC ($\beta = 0.0056$, $p = .0168$, *s.e.* = 0.0024) and ID_WI ($\beta = 0.0078$, $p = .0042$, *s.e.* = 0.0027) for the expansion model. The moderating effect of safety management capability for entry was insignificant for all three dimensions of industrial disasters. It is important to note that the direct effect of safety management capability on foreign expansion is insignificant, while the interaction between safety management capability and industrial disasters is positive and significant for ID_HC and ID_WI for expansion. This implies that industrial disasters will discourage MNC expansion in a country only when MNCs have lower safety capability. Thus, Hypothesis 2 is supported for expansion but not for entry.

In Columns 9 and 10, we tested the moderating effect of philanthropic capability. Philanthropic capability has a positive moderating effect with ID_HC_WI ($\beta = 0.0272$, $p = .0153$, *s.e.* = 0.0112) and ID_WI ($\beta = 0.0188$, $p = .0000$, *s.e.* = 0.0035) for the entry model. The moderating effect of philanthropic capability is not significant for the expansion model. Hypothesis 3 is accordingly supported for entry but not for expansion.[6]

Due to the nonlinear nature of our models, we used Zelner's (2009) simulation approach to further analyze the interaction effect of technological capability on the relationship between industrial disasters and foreign entry and expansion, and found about the same conclusions as those from the statistical results in Table 2. We provide the simulation approach for ID_WI in the Appendix S1.

5 | ROBUSTNESS CHECKS

We checked the robustness of our findings in multiple ways. First, we used the number of patents instead of the average number of patent citations to measure technological capability. Second, one may argue that government policymaking plays an important role in a country's recovery from

[6]The last row of Table 2 reports the LR test results that compare the model fit of the interaction model with the non-interaction model. The statistics show that adding the interaction terms improves the model fit for both the entry model and the expansion model, except for safety capability in the expansion model (Column 7).

TABLE 2 Industrial disasters, technological capability, safety management capability, and philanthropic capability

Model	Control only		Direct effects		Two-way interactions					
	Entry (1)	Expansion (2)	Entry (3)	Expansion (4)	Entry (5)	Expansion (6)	Entry (7)	Expansion (8)	Entry (9)	Expansion (10)
Industrial disaster incidents inside the host country outside the industry a focal firm operates			−0.0017	−0.0019	−0.0027	−0.0016	−0.0019	−0.0034	0.0005	−0.0032
			(.9046)	(.4391)	(.8496)	(.5766)	(.8976)	(.2186)	(.9732)	(.3000)
(ID_HC)										
Industrial disaster incidents inside the host country within the industry a focal firm operates			−0.1947	−0.0265	−0.1871	−0.0538	−0.2218	−0.0092	−0.1731	−0.0126
			(.0051)	(.4417)	(.0000)	(.0005)	(.0078)	(.8019)	(.0045)	(.7267)
(ID_HC_WI)										
Industrial disaster incidents outside the host country within the industry a focal firm operates			−0.1611	−0.0066	−0.1653	−0.0045	−0.1593	−0.0028	−0.1739	−0.0083
			(.0000)	(.2060)	(.0000)	(.2921)	(.0000)	(.6084)	(.0000)	(.1640)
(ID_WI)										
Technological capability			0.8548	0.0720	0.8505	0.0790	0.8483	0.0675	0.8472	0.0717
			(.0000)	(.0570)	(.0000)	(.0505)	(.0000)	(.0747)	(.0000)	(.0583)
Safety management capability			0.4769	−0.0033	0.4762	0.0011	0.4835	−0.0227	0.5302	−0.0007
			(.0003)	(.7909)	(.0006)	(.9099)	(.0002)	(.1186)	(.0000)	(.9521)
Philanthropic capability			−0.1208	−0.0121	−0.1112	−0.0118	−0.1198	−0.0110	−0.1545	−0.0142
			(.0000)	(.0002)	(.0000)	(.0000)	(.0000)	(.0012)	(.0000)	(.0001)
ID_HC × Technological capability					0.0035	0.0020				
					(.3915)	(.6106)				
ID_HC_WI × Technological capability					−0.0971	0.0697				
					(.1474)	(.0373)				
ID_WI × Technological capability					0.0678	0.0154				
					(.0000)	(.0001)				
ID_HC × Safety capability							−0.0023	0.0056		
							(.6603)	(.0168)		
ID_HC_WI × Safety capability							−0.0735	−0.0349		
							(.5815)	(.2091)		

TABLE 2 (Continued)

Model	Control only		Direct effects		Two-way interactions					
	Entry (1)	Expansion (2)	Entry (3)	Expansion (4)	Entry (5)	Expansion (6)	Entry (7)	Expansion (8)	Entry (9)	Expansion (10)
ID_WI × Safety capability							0.0091	0.0078		
							(.8057)	(.0042)		
ID_HC × Philanthropic capability									−0.0002	0.0006
									(.8061)	(.2304)
ID_HC_WI × Philanthropic capability									0.0272	−0.0110
									(.0153)	(.0627)
ID_WI × Philanthropic capability									0.0188	0.0008
									(.0000)	(.1039)
Firm size	−0.5150	0.1275	−0.6576	0.1373	−0.4935	0.1598	−0.6477	0.1492	−0.5409	0.1348
	(.0076)	(.0001)	(.0021)	(.0001)	(.0130)	(.0000)	(.0034)	(.0000)	(.0123)	(.0001)
Sales growth	−0.0577	−0.0414	0.3141	−0.0317	0.2346	−0.0487	0.3060	−0.0398	0.3014	−0.0298
	(.8188)	(.2407)	(.2101)	(.3803)	(.2827)	(.2187)	(.2302)	(.2666)	(.2191)	(.4072)
R&D intensity	−13.2232	−0.1321	−7.1361	−0.0318	−5.5016	0.0300	−6.9385	−0.0083	−7.5269	−0.0412
	(.0002)	(.6136)	(.0642)	(.9045)	(.1264)	(.9114)	(.0677)	(.9747)	(.0478)	(.8779)
Marketing intensity	23.9541	4.8850	27.9750	5.1935	32.8705	5.7135	27.8459	5.0926	33.6935	5.1883
	(.0001)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)
Financial resources	−0.0097	0.0013	−0.0082	0.0013	−0.0087	0.0012	−0.0082	0.0013	−0.0079	0.0013
	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)
International orientation	0.0265	0.0054	0.0306	0.0053	0.0224	0.0041	0.0305	0.0052	0.0235	0.0054
	(.0084)	(.0086)	(.0016)	(.0074)	(.0172)	(.0083)	(.0017)	(.0104)	(.0139)	(.0065)
International expansion wave	−0.0420	0.0090	−0.0588	0.0083	−0.0682	0.0080	−0.0581	0.0085	−0.0734	0.0082
	(.0000)	(.0000)	(.0000)	(.0001)	(.0000)	(.0155)	(.0000)	(.0000)	(.0000)	(.0001)
Performance	1.4907	0.3541	2.4423	0.3735	2.7589	0.3894	2.4395	0.3734	2.6627	0.3731
	(.0021)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)
Income	0.7126	0.1443	0.7659	0.1417	0.8073	0.1364	0.7593	0.1455	0.7863	0.1465
	(.0069)	(.0524)	(.0043)	(.0566)	(.0049)	(.1071)	(.0046)	(.0500)	(.0032)	(.0469)
Market growth	0.0408	−0.0042	0.0475	−0.0047	0.0505	−0.0047	0.0471	−0.0046	0.0482	−0.0045
	(.0382)	(.1716)	(.0197)	(.1277)	(.0244)	(.2502)	(.0204)	(.1352)	(.0184)	(.1394)

TABLE 2 (Continued)

Model	Control only: Entry (1)	Control only: Expansion (2)	Direct effects: Entry (3)	Direct effects: Expansion (4)	Two-way interactions: Entry (5)	Two-way interactions: Expansion (6)	Two-way interactions: Entry (7)	Two-way interactions: Expansion (8)	Two-way interactions: Entry (9)	Two-way interactions: Expansion (10)
Property protection	0.3257	0.1463	0.3369	0.1493	0.3164	0.1495	0.3398	0.1445	0.3226	0.1444
	(.2464)	(.0871)	(.2426)	(.0829)	(.2768)	(.1433)	(.2390)	(.0965)	(.2615)	(.0909)
Government stability	0.5755	−0.0711	0.6031	−0.0662	0.5813	−0.0534	0.6020	−0.0655	0.6096	−0.0626
	(.1519)	(.3294)	(.1421)	(.3627)	(.0999)	(.5143)	(.1429)	(.3665)	(.1356)	(.3884)
Political constraints	−0.1148	0.0258	−0.0352	0.0336	−0.0361	0.0351	−0.0374	0.0299	−0.0690	0.0349
	(.7985)	(.7784)	(.9384)	(.7106)	(.9218)	(.6193)	(.9346)	(.7395)	(.8790)	(.7014)
Trade openness	0.0115	0.0015	0.0124	0.0015	0.0127	0.0015	0.0123	0.0016	0.0124	0.0015
	(.0009)	(.0742)	(.0004)	(.0713)	(.0000)	(.2754)	(.0004)	(.0570)	(.0004)	(.0642)
Political regime change	0.2832	0.0177	0.2488	0.0176	0.2104	0.0195	0.2493	0.0169	0.2292	0.0183
	(.0872)	(.4167)	(.1417)	(.4170)	(.2089)	(.3285)	(.1408)	(.4371)	(.1768)	(.3983)
Armed conflicts	−0.2953	−0.0230	−0.2733	−0.0240	−0.2789	−0.0276	−0.2721	−0.0258	−0.2484	−0.0279
	(.2015)	(.5206)	(.2394)	(.5059)	(.0473)	(.5191)	(.2419)	(.4707)	(.2837)	(.4379)
Foreign firm ownership restriction	−0.1645	−0.2221	−0.1846	−0.2311	−0.1947	−0.2416	−0.1815	−0.2452	−0.1349	−0.2400
	(.7631)	(.2040)	(.7361)	(.1874)	(.7249)	(.2653)	(.7406)	(.1636)	(.8069)	(.1721)
Preferential trade agreement	−1.0160	0.0365	−1.0102	0.0353	−0.9981	0.0326	−1.0089	0.0313	−1.0019	0.0329
	(.0013)	(.4933)	(.0011)	(.5055)	(.0018)	(.4440)	(.0011)	(.5550)	(.0012)	(.5325)
Selection parameter		0.1387		0.1410		0.1398		0.1413		0.1362
		(.3441)		(.3361)		(.5983)		(.3349)		(.3528)
Overexpansion parameter		−1.5447		−1.5487		−1.5551		−1.5555		−1.5543
		(.0000)		(.0000)		(.0000)		(.0000)		(.0000)
Log likelihood	−2,600.80	−17,947.30	−2,535.8	−17,941.2	−2,526.5	−17,931.3	−2,535.5	−17,927.8	−2,521.3	−17,933.6
AIC	5531.7	36,224.50	5,409.7	36,224.5	5,227.0	36,038.6	5,419.1	36,197.6	5,392.6	36,215.2
Log likelihood ratio test			Against (1)	Against (2)	Against (3)	Against (4)	Against (3)	Against (4)	Against (3)	Against (4)
Chi-square			129.98	12.04	18.64	19.88	0.60	26.84	29.06	15.32
(*p*-value)					(.0003)	(.0002)	(.8954)	(.0000)	(.0000)	(.0016)

Note. N = 25,344 for the entry model and N = 9,356 for the expansion model. Nonstandardized coefficients are shown and p-values are in the parentheses. Two-tailed test. Constant, firm-, country-, and year-fixed effects are estimated but not reported here. *p*-values are in parentheses. Heteroskedasticity and autocorrelation robust standard errors clustered by MNC and host country are used but not shown.

industrial disasters. Therefore, to reduce the possibility of an alternative explanation, we controlled for the interaction between industrial disasters and government stability. Third, we used conditional fixed effects logit and negative binomial regressions instead of unconditional models in Table 2. Fourth, rather than using continuous variables for our three types of firm capability, we operationalize dichotomous variables by dividing each capability into high and low levels of capability. Fifth, to treat the rare event nature of industrial disaster occurrence, we used a complementary log–log logistic regression for the entry model (Buckley & Westerland, 2004). Sixth, to check whether endogeneity could pose a serious issue in our analysis, we performed a robustness check without correcting for self-selection bias. Seventh, another type of endogeneity may pose a bias if sample companies directly or indirectly caused the industrial disasters. To lower this concern, we removed the ID_HC_WI variable and its interaction terms from the model. Lastly, industrial disasters should have a longer-term effect on entry and expansion. To check the longer-term effect, we used two-year and three-year cumulative effects of industrial disasters instead of the industrial disasters from the previous year. All the checks mentioned above provided consistent results with those in Table 2. Thus, we conclude that our results are robust. The Appendix S1 provides detailed information about these robustness checks and their results.

6 | POST-HOC ANALYSES

We also performed a set of post-hoc analyses. We do not provide the results and detailed explanation here due to space limitations, but these are available in the Appendix S1.

Most notably, because we did not find strong supporting evidence for the moderating effects of philanthropic capability (H3) in the expansion model, we investigated whether host country institutional stability affects this result. We added three-way interactions with government stability (i.e., interactions among each capability, industrial disasters, and government stability). We found that, while all three-way interaction terms are insignificant for the entry model, some three-way interaction terms are significant for the expansion model.

Specifically, the three-way interaction of government stability with ID_HC and technological capability is negative and marginally significant and that with ID_WI and safety management capability is negative and significant for the expansion model. This suggests that once a firm enters a host country, more stable governments will be better able to manage the unintended consequences of technological and industrial development, and thus, lower the burdens toward private sectors and enhance investments. In other words, firms' technological and safety management capabilities and host government stability substitute each other in managing industrial disasters and recovering from their consequences. Regarding philanthropic capability, the three-way interactions with ID_HC_WI and with ID_WI are positive and significant. This suggests that, once a firm enters a host country, it should improve its philanthropic capability when the host government is more stable.

Second, to identify the specific types of technology that lower the negative consequences of industrial disasters, we divided total patents into six subtechnology categories following Hall, Jaffe, and Trajtenberg (2001): chemical, computer & communication, drugs & medicals, electrical & electronics, mechanical, and others. The results showed that capabilities in each category of technology positively moderate the negative effect of ID_WI on foreign entry and expansion, while computer & communication, electrical & electronics, mechanical, and other technologies positively moderate the effect of ID_HC on the expansion.

Third, we investigated differential effects across technology characteristics. We used five green technology classes identified by the United States Patent Office (2009): environmental purification, protection or remediation, environmental conservation, alternative energy production, environmental friendly farming, and other nongreen technology. For entry, we found that environmental conservation technology positively moderates the negative effect of ID_WI. For expansion, we found that environmental purification and nongreen technology positively moderate the effect of ID_WI; environmental farming technology positively moderates the effect of ID_HC; and environmental conservation and alternative energy production technology positively moderate the effect of ID_HC_WI.

Fourth, we divided the sample into five subsamples based on the industry membership of sample MNCs: automotive & parts, chemical, computer & electronics, food manufacturing, and natural resource manufacturing MNCs. We found a positive moderating effect for: first, technological capability on chemical and computer & electronics sectors; second, safety management capability on natural resource manufacturing, food, chemical, and computer & electronic sectors; and, third, philanthropic capability on natural resource manufacturing, food, and computer & electronics sectors.

7 | DISCUSSION

Our study makes at least three major contributions to the growing body of research on disasters and strategic management. First, our study contributes to ongoing work unpacking the impacts of industrial disasters on business operations (Oetzel & Oh, 2014; Oh & Oetzel, 2011; Pelling et al., 2002; Perrow, 2007; Shrivastava et al., 1988). We build on these prior studies by articulating three mechanisms—increases in customer and stakeholder management costs, regulatory compliance costs, and operating costs—that can explain the negative linkage between industrial disasters and reduced FDI. Our study also adds to this work by demonstrating that the negative impacts of these external shocks are more likely to affect the entry of MNCs belonging to the disaster industry and do not appear to spill over to companies in other industries. This is an important finding because prior work has suggested more general negative spillover effects of industrial disasters on MNCs' foreign entry and expansion into host countries, including those caused by firms in other industries (e.g., Oetzel & Oh, 2014; Oh & Oetzel, 2011). We suggest that these effects may be limited to the disaster industry because increases in customer and stakeholder management, regulatory compliance, and operating costs are likely to be industry specific. For instance, negative stakeholder reactions (e.g., Bowman & Kunreuther, 1988), tarnishing of firms' collective reputation (e.g., Hoffman, 1997; Rees, 1997), regulatory changes (e.g., Shrivastava et al., 1988), and damage to physical infrastructure (e.g., Dechy et al., 2004), tend to most directly affect firms in the disaster industry.

Second, our study identifies factors within MNCs' control that could help them overcome or preempt the negative effects of industrial disasters. Prior literature has found that host country governance quality (Oh & Oetzel, 2011) and firm experience in managing disasters (Oetzel & Oh, 2014) can mitigate the negative effects of disasters. The governance quality of a host country is largely outside of a firm's control, whereas firm disaster management experience develops after the occurrence of disasters. Drawing on the RBV, we argued that three capabilities could enable MNCs to overcome the negative effects of industrial disasters by addressing our proposed cost increase mechanisms in unique ways. These findings are important as capabilities are resources that firms can invest in and develop prior to experiencing the effects of industrial disasters. We find that technological capability can help MNCs overcome both the negative effects on entry and expansion brought on by industrial disasters. In particular, our post-hoc analyses suggest that some technological categories such as chemical, communication, and mechanical and some technological classes such as environmental conservation technologies may be more important for both entry and expansion than the other technological categories and classes. Our finding that philanthropic capability is more likely to help MNCs overcome the negative effects of industrial disasters on entry, but not on expansion, suggests that corporate-level philanthropic capability helps lower the initial hurdle of entry; however, once a firm enters, more localized philanthropic activities will be likely required for the firm to gain a comparative advantage in the local market (Ballesteros, Useem, & Wry, 2017). Our finding that safety management capability is more likely to help MNCs overcome the negative effects of industrial disasters on expansion, but not on entry, suggests that when a foreign country experiences increases in regulatory compliance and operating costs, safety management capability can be a comparative advantage in further growth in the country. Finally, our findings suggest that MNCs' prioritization of the development and accumulation of technological and safety management capabilities is particularly important when operating in countries with lower levels of government stability. On the other hand, MNCs should give priority to developing philanthropic capability when planning to expand in countries with higher levels of government stability.

Third, our study contributes to the RBV literature by clarifying some of the contextual boundary conditions affecting MNCs' ability to remain competitive in the face of industrial disasters. RBV theorists have long stressed that the competitive value of resources and capabilities is context dependent (Barney, 1991, 2001). Yet, some of the criticism of this theory focuses on its limited specification of boundary conditions (e.g., Armstrong & Shimizu, 2007; Klier, Schwens, Zapkau, & Dikova, 2017; Priem & Butler, 2001). Our findings support prior work that finds that the value of firm resources is often industry specific (e.g., Armstrong & Shimizu, 2007; Rouse & Daellenbach, 1999). Furthermore, while country context has been suggested as an important factor that can affect the value of resources (Armstrong & Shimizu, 2007), we still know little about how it can affect the value of resources with respect to their ability to overcome the costs brought on by industrial disasters. Our findings stress the importance of host country government stability in influencing the moderating effects of technological, safety management, and philanthropic capabilities on the link between MNCs' foreign expansion and industrial disasters. The key logic behind the RBV was developed for industrialized countries whose governments show comparatively very high levels of stability (Barney, 1991, 2001). Under these conditions, nontraditional capabilities such as philanthropic and safety management capabilities may not be as valuable, rare, inimitable, and nonsubstitutable for MNCs facing industrial disasters. Assuming relatively high government stability, such as that found in the United States, takes for granted the important role played by governments in industrial disaster response and in shaping subsequent recovery that simultaneously promotes increased business investment. In the aftermath of a disaster, governments' role is critical for emergency responses, cleanup, and mitigation. Most importantly from an international business perspective, stable governments also can play a critical role in screening out arbitrary regulatory responses that may hurt industry investment and long-term economic recovery in the aftermath of an industrial disaster. Lacking these conditions, in countries with unstable governments, businesses with technological and safety management capabilities can not only help affected communities, but also gain valuable competitive advantage. Our study stresses the importance of taking into account contextual factors when investigating the benefits of capabilities in international contexts.

7.1 | Implications for practice

In addition to having implications for MNC managers that we alluded to above, our findings also have implications for governments and policymakers by highlighting the negative effects of the occurrence of industrial disasters on MNCs' foreign entry and expansion. The adverse consequences of industrial disasters found in our study provide an additional reason for countries to increase their policy efforts to prevent the occurrence of industrial disasters, particularly those countries that depend heavily on foreign investment to spur economic growth and development. Manion and Evan (2002), among others, highlighted the need for government agencies and administrators to become more involved in properly understanding the causes and effects of industrial disasters and to make engineers and scientists more aware of their roles in reducing the occurrence of industrial disasters. Our study indicates that MNCs with more advanced capabilities may be more likely to overcome the effects of industrial disasters. Thus, our findings suggest that multisectorial partnerships between public and private sectors may help societies and communities not only recover from industrial disasters, but also discover ways to prevent them, by for instance, analyzing their root causes.

7.2 | Limitations and future research

Our study also had limitations that set the stage for future research. First, an important limitation is our selection of large U.S. manufacturing firms' WOS for our analysis. Due to data availability limitations, we were not able to collect data on other forms of entry modes. It is possible that firms with different organizational forms, such as joint ventures and alliances, may respond differently to industrial disasters. Theoretically, the establishment of a WOS brings substantial responsibility, commitment, and greater risks to MNCs' headquarters (Hill, Hwang, & Kim, 1990). A joint venture (JV) may be less responsive to risks such as industrial disasters because partners in the JV could be strategically inflexible and have conflicts in decision making due to sharing ownership and responsibility (Madhok, 2006). Although we controlled for ownership restrictions in host countries and specified a selection model for the expansion of WOS, our variable for entry may represent later-stage expansions made by MNCs that were previously limited to other ownership structures.[7] Future research can also improve the measures for entry and expansion by using measures such as the size of investments into host countries and the size of facilities rather than the conventional measures we used, namely, the binary measure for entry and the number of subsidiaries for expansion. Hence, our results should not be applied to non-WOS entry and expansion investment modes. Likewise, since we only studied large manufacturing MNCs from the United States, our findings cannot be generalized to MNCs of other nationalities. Future research can collect data for MNCs from other home countries to confirm or refine our findings.

Second, we characterized industrial disasters as exogenous shocks. Yet, this might not be the case for a very small fraction of observations involving the individual companies directly causing the industrial disasters. Through an extensive search for news articles, we were able to find names of individual companies responsible for industrial disasters for only about 10% of data, and none of them were our sample companies. Thus, we are unable to completely eliminate this type of endogeneity due to this lack of information. However, since we controlled for potential selection bias and used lagged variables in our analysis, we do not think that endogeneity posed a serious concern in our empirical analysis.

Third, it would have been ideal to complement our MNC-level philanthropy data with more fine-grained figures for donations given to groups operating in foreign host countries. Unfortunately, actual MNC donation figures inside specific host countries are not consistently publicly available for most corporations in our sample. This is because U.S. firms are not required to publicly disclose details about their donations that would allow us to establish the charity recipients' missions and

[7]We thank an anonymous reviewer for pointing out this possibility.

their foreign activities locations (Brown, Helland, & Smith, 2006). Future research could seek to collect corporate donations in foreign countries through survey research and/or local media reports. However, since FDI investment decisions are usually made at MNCs' headquarters, we posit that considering firm-year level corporate foundation giving is still useful as a proxy for corporations' overall long-term philanthropic capability. Also, before entry, MNCs seldom make charity donations in a foreign country, and after entry, charitable giving is linked to the economic importance of a host country and may still be relatively small compared with the MNCs' overall philanthropic resources (Ballesteros et al., 2017; Brown et al., 2006).

Relatedly, firms' charitable giving can also be seen as a disguised form of bribery to obtain preferential treatment from host governments. Such preferential treatment could enable the bribing firms to lower concerns regarding increased stakeholder management and regulatory compliance costs, and thus, increase investment in a host country affected by industrial disasters. We presume that this is less likely in our study because our sample firms, U.S. MNCs, are obligated to follow the Foreign Corrupt Practices Act. Additionally, our three-way interaction models show that government stability positively interacts with philanthropic capability and industrial disasters, implying that countries with more stable governance require more charitable giving when managing or facing industrial disasters. Because less stable country governance should favor bribery, our results do not support the alternative mechanism of philanthropy as a disguised form of bribery. Future studies can focus on the use of MNC charity donations as a form of camouflaged bribery.

8 | CONCLUSION

Although industrial development has provided benefits to firms and society, the occurrence and impact of industrial disasters have also increased. The aim of this article was to analyze the impact of industrial disasters on firms' FDI, with a particular focus on foreign entry and foreign expansion in the form of WOS. We argued that industrial disasters lead to increases in customer and stakeholder management, regulatory compliance, and operating costs, which in turn lower the incentive for firms to invest in foreign countries. We hypothesized that MNCs' technological, safety management, and philanthropic capabilities enable them to overcome these increased costs. Using a unique panel data set consisting of 61 large U.S. manufacturing MNCs and their operations across 87 foreign countries during the period 1999–2007, we found that industrial disasters within the disaster industry were negatively associated with MNCs' entry into host countries, but not for their expansion in the host countries. We also found that MNCs' technological, safety management, and philanthropic capabilities can, in some cases, positively moderate the negative relationships between industrial disasters and foreign entry and expansion.

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SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

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