INTELLECTUAL PROPERTY INSTITUTIONS AND INNOVATION OF EMERGING MULTINATIONAL COMPANIES

Jie Wu

University of Aberdeen, UK

Jie.wu@abdn.ac.uk

ABSTRACT

Using a panel data of Chinese firms’ internationalization activities, we assess whether intellectual property (IP) institutions in a host country benefits or impedes innovation of emerging multinational companies (EMNCs). We show that IP institutions in a host country enable an EMNC to obtain critical technologies for innovation, and moderate IP institutions are optimal levels for innovation development in this context. Moreover, the efficiency of EMNCs in benefiting from IP institutions for innovation increases when EMNCs develop strong absorptive capacity. Our findings integrate institutional logics, which views institutional environment as the key factor for innovation, and the resource-based view, which notes that firm-specific capabilities have critical influences on firm performance and competitive advantage. We discuss the implications of these findings on institutional environments and firm innovation research in emerging economies.

Keywords: Intellectual property, institutional environment, innovation, absorptive capacity, knowledge transfer capability, emerging markets
INTRODUCTION

The globalization of innovation has evolved dynamically over the past two decades. This trend has further accelerated in recent years largely from the active participation of emerging economies in countries such as Brazil, India, and China (Cha, Wu & Kotabe, 2021; Kim, Wu, Schuler & Hoskisson, 2020). For example, the number of patents filed by Chinese companies in which at least one of the inventors was based in the U.S. has increased dramatically from 2 in 2002 to 910 in 2014. In addition, the number of patents filed by Chinese companies in which at least one of the inventors was based in a foreign country (e.g., Japan or Germany) has also increased significantly (Thomson Reuters, 2015). Despite the significant increase in offshore R&D by emerging multinational companies (EMNCs), such companies often face obstacles in exploiting these benefits because of institutional difficulties. As institutional environments in emerging economies are less developed than those in Western economies, many EMNCs expand to foreign markets to find discrepant institutional environments. Researchers have recently revisited the role of institutional environments in host countries, focusing on whether such environments may stimulate multinational companies’ (MNC) competitive advantage (Cuervo-Cazurra, 2008; Cuervo-Cazurra & Genc, 2008; Luo & Tung, 2007; Wu, Zhou, Park, Khan, & Meyer, 2021). However, the way that institutional quality of host countries affect EMNCs’ innovation has received less attention.

Institutional quality of host countries has become steadily more important for MNCs, particularly with the advent of the knowledge-based economy and increasing globalization (Wu, Wood & Khan, 2021). The rise of interconnectedness between different business activities across markets results not only in more frequent global sourcing of various intermediate inputs (as well

1 In this study, we define MNCs as the sum total of all their value-creating activities over time (Cantwell, Dunning, & Lundan, 2009).
as production, marketing, and distribution activities), but also in more uncertainties than those faced by MNCs a few decades ago. MNCs respond to the more profound complexities embedded in the global marketplace by engaging in institutional hedging to reduce uncertainty in innovation activities (Almeida, 1996; Cantwell & Iammarino, 2000; Kim, Wu, Schuler & Hoskisson, 2020).

According to the conventional international business view (Kostova, 1999; Kostova & Zaheer, 1999), which is mostly rooted in the Western context, as MNCs expand overseas to exploit advanced technologies and management practices, they unavoidably encounter distinct institutional environments in host counties. Such environments heighten the challenges for establishing and maintaining internal and external legitimacy, as well as the transnational transfer of strategic organizational practices within MNCs (Kostova, 1999). According to this view, it seems that EMNCs, depicted as having a lack of advanced technologies and management practices, are less likely to be affected by institutional environments in host countries as they develop innovation.

In reality, however, many EMNCs have expanded to host countries to boost their innovation (Wu & Park, 2017). Huawei and ZTE, two leaders in telecommunication equipment manufacturing industry, for example, have aggressively expanded to Western economies like the U.S. to develop new technologies and products. This is partly due to the fact that, in accordance with a Sino-U.S. investment treaty, the U.S. offers preferential taxes for Chinese investors. U.S. state governments have set up some offices, aiming to attract foreign investments from China and help investors find potential local partners, lawyers, accounting firms, and so forth. In addition, the same officers are cautious in protecting their core technologies.

In this paper, we theorize that better-developed intellectual property (IP) institutions of host countries could enable EMNCs to obtain advanced technologies for innovation, and that over-strict
IP institutions decrease EMNCs’ ability to transform new technologies into innovation output. Thus the IP institutions of a host country may have an inverted U-shaped relationship with an EMNC’s innovation such that moderate IP institutions would enable the EMNC to achieve the highest innovation output. Moreover, we examine important contingencies related to the role of IP institutions that may have differential effects on innovation across various firm-specific absorptive capacity (ACAP) and knowledge transfer capability. We propose that a strong ACAP will increase the positive impact of IP institutions on innovation performance, and that strong knowledge transfer capability can help EMNCs to more efficiently transfer new technologies across markets and promote innovation.

THEORY AND HYPOTHESES

IP Institutions of Host Country and EMNC Innovation

With the growing interest in EMNC internationalization, business scholars have devoted sustained attention to such countries’ expansion into foreign markets (e.g., Cuervo-Cazurra, 2008; Cuervo-Cazurra & Genc, 2008; Luo & Tung, 2007; Tsang & Yip, 2007; Wu, Zhou, Park, Khan, & Meyer, 2021). The institutional aspects of the business environment, which include regulatory systems, intellectual property regimes, tort laws, and antitrust laws, are widely deemed critically important for EMNCs’ international activities (Wu & Vahlne, 2020), and such institutional environments vary significantly across regions and markets. These different institutional/policy settings, although not entirely firm specific, constitute a firm’s institutional assets and shape its firm-level strategic posture (Teece et al., 1997).

In this study, “IP institutions” refers to a host country’s institutional environment that enables cultivating new technologies, prevents piracy, and protects new inventions (Wu, Wood & Khan,
Prior studies have argued that EMNCs face higher transaction costs in their home markets than in developed-country MNCs, which operate in environments with better governance and institutions (Prahalad & Hammond, 2002; Wu & Park, 2017). In their home markets, EMNCs face weak IP institutions accompanied by a lack of efficient market for cultivating new technologies, serious piracy, and ineffective invention protection, all of which make innovation costly (Chan, Isobe, & Makino, 2008). For example, EMNCs must protect their assets (especially the threat of expropriation of their intellectual property), from expropriation, prevent illegal dissemination, and defend against infringements of their property rights (Rodriguez, Uhlenbruck, & Eden, 2005). They must also commit substantial resources and managerial attention to dealing with local governments, which are powerful and capricious, and with hostility from non-governmental organizations (Wu, Zhou, Park, Khan, & Meyer, 2021). Moreover, searching for and gaining access to complementary technologies and assets, as well as market information, is costly because of EMNCs’ underdeveloped and inefficient intermediary institutions (Khanna & Palepu, 1997). Obtaining information on such issues as customer demand, competitor moves, qualified suppliers, and effective intermediaries entail enormous search costs, which further strain firms’ limited resources (North, 1990). These costs leave fewer resources and less attention to allocate to innovation, which stimulate firms to expand into countries with strong IP institutions where they could acquire advanced technologies, reduce innovation costs and protect new inventions (Wu & Ang, 2020).

In contrast, expanding into a foreign country with better-developed IP institutions enable EMNCs to overcome home-country IP institutional constraints. The knowledge spillover literature suggests that firms in markets with a good science base, a more skilled workforce, and a solid legislative systems of protecting IP rights are more likely to acquire advanced technologies and
develop new technologies (Almeida, 1996; Cantwell & Iammarino, 2000; Jaff, Trajtenberg, & Henderson, 1993). Viewed from this perspective, EMNCs expanding to a foreign country with better-developed IP institutions gain more exposure to advanced technologies that have been developed and concentrated. Exposure to advanced technologies stimulate EMNCs’ interaction with local partners from which EMNCs can learn more sophisticated process and product technology (Gong & Keller, 2003). Expanding to host countries with better-developed IP institutions also reduce transaction costs, which allows EMNCs to allocate more resources to reinforce their technological advantages and explore new available technologies (Makino et al., 2007). Reinforced technological capabilities make EMNCs easier to learn or adopt most valuable technology and to find or develop the expertise needed to further enhance their technological capabilities, which can inspire EMNCs to introduce new products and increase their response to local markets (Wu, Zhou, Park, Khan, & Meyer, 2021). Therefore, as IP institutions of a host country increase from low to moderate levels, EMNCs are able to access technological resources in institutional environments to complement their own technological developments (Cantwell & Mudambi, 2005).

As IP institutions increase from moderate to high levels, however, the technological-access advantages increase rather incrementally, but the punishment for intellectual property right (IPR) infringements in these countries may be too costly for technological learning and acquisitions by EMNCs (Wu, Zhuo & Wu, 2017). At the low to moderate level of IP protection, EMNCs could acquire knowledge through adaptation, imitation, and reverse engineering and enjoy some learning-by-doing (Suthersanen, 2006). However, overly strong IPR institutions in host countries will increase the punishment cost to piracy prevention and infringements, which in turn inhibits effective learning and beneficial imitation by EMNCs (Wu, Zhuo & Wu, 2017). Using Korean
firm-level data as a case study, Kim et al. (2012) found that IPR protection contributes to innovation and economic growth in developed economies, but not in emerging economies. Patent protection for industrial activities begins to matter only after countries have achieved a threshold level of indigenous innovative capacity along with an extensive science and technology infrastructure (Kim, 1997). More recently, Wu et al. (2016) found that strong IPR protection in leading innovator countries has a negative impact on emerging innovator countries’ national innovative capacity, because low to moderate IP protections can help EMNCs that are still in the early stages of building technological capabilities by permitting effective imitation and reverse engineering, and overly strict IP institutions stifle such learning (Lall and Albaladejo, 2001). Thus, we predict that a moderate level of IP institutions is most beneficial to EMNC innovation.

**Hypothesis 1.** Host countries’ IP institutions have an inverted U-shaped impact (first increasing and then decreasing) on EMNCs’ innovation, such that moderate IP institutions of a host country generate the most innovation output.

**Contingencies**

While prior studies on the links among institutions, strategies, and performance suggests that the value of international strategies is correlated with the level of institutions in a foreign country (Kostova & Zaheer, 1999), an international network perception of MNCs has stressed the importance of dynamic capabilities in facilitating the extent to which MNCs acquire new knowledge and capture the opportunities provided by the institutional environment of a host country. Dynamic capabilities refer to a firm’s “ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” (Teece et al., 1997, p. 516). For example, gaining innovation benefits from the institutional environment of a host country not only require that such institutional differences exist, but also that an MNC develop dynamic connectedness between local knowledge creation and exchange in each node of the network.
ACAP and knowledge transfer capability are the two most important dynamic capabilities relevant for EMNCs’ high-value creation and innovative activity.

**Moderating Effect of ACAP**

Analysis of prior research reveals four major definitions of ACAP.² Cohen and Levinthal (1990) offer the most widely cited definition of ACAP, viewing it as a firm’s ability to value, assimilate, and apply new knowledge. Mowery and Oxley (1995) offer a second definition of ACAP as a broad set of skills needed to deal with and modify the tacit component of transferred knowledge. Zahra and George (2002, p. 185) offer a third definition of ACAP as “a dynamic capability pertaining to knowledge creation and utilization that enhances a firm’s ability to gain and sustain a competitive advantage.” They further propose potential and realized ACAP. Potential ACAP enables firms to identify and acquire new external knowledge and assimilate knowledge obtained from external sources, while realized ACAP helps firms combine existing and newly acquired knowledge and incorporate transformed knowledge into operations. Tilton (1971) observes this phenomenon in the semiconductor industry and concludes that ACAP is important for keeping firms abreast of the latest technological developments and facilitating their assimilation. Lane, Koka, and Pathak (2006) offer a fourth definition of ACAP as a firm’s ability to sequentially recognize, assimilate, and apply externally held knowledge.

Consistent with previous studies (e.g., Lane et al., 2006; Zahra & George, 2002)³, we conceptualize ACAP as a firm-specific capability that enables the firm to reconfigure its resource base to recognize, assimilate, and use external knowledge to create new knowledge and products

---

² Although Kim (1997) also defines ACAP as the capacity to learn and solve problems, we believe that learning capability and problem-solving skills reside in the domain of Cohen and Levinthal’s (1990) stream of thought.

³ In this study, we regard Mowery and Oxley’s (1995) view of ACAP as the ability to deal with the tacit component of transferred knowledge inside the organization as closer to a firm’s knowledge transfer capability, and we further extend it to cross-market tacit knowledge transfer.
that help it adapt to changing market conditions. In general, ACAP is developed through continuous funding of and engaging in research and development (R&D) over time (Cohen & Levinthal, 1990; Wu & Vahlne, 2020). High ACAP is achieved when firms accumulate internal learning at a point that they can value, assimilate, and apply external knowledge to specific product designs for product innovation (Carlile, 2004; Smith, Collins, & Clark, 2005). Prior research has highlighted the critical role of ACAP in innovation activities. Cohen and Levinthal (1990) show that ACAP promotes organizational learning and innovative activities. Moorman and Slotegraaf (1999) find that ACAP not only fosters new product creativity, but also facilitates product development speed.

Although expanding into a host country with a better-developed IP institutions can provide EMNCs access to advanced technologies, the extent to which they can effectively acquire and exploit those technologies is, however, highly dependent on firm-specific ACAP. Mere exposure to valuable external knowledge is not sufficient to ensure successful internalization (Jansen, Van Den Bosch, & Volberda, 2005). EMNCs need to develop strong ACAP that enables them to effectively screen new technological trends, recognize new external knowledge, assimilate valuable external knowledge into the existing knowledge base, and apply assimilated external knowledge to emerging designs (Lane et al., 2006; Mowery, 1983).

When expanding into a host country with developed IP institutions, strong ACAP enables EMNCs to more effectively use new technology and available knowledge in a developed institutional environment (Wu & Vahlne, 2020). An EMNC with strong ACAP can analyze, process, interpret, and understand new external knowledge presented in an IP institutionally developed host country and identify the most valuable new technology and knowledge for its innovative activities (Kim, 1997; Szulanski, 1996). Strong ACAP also helps an EMNC more
effectively assimilate valuable external knowledge and apply it to its own product innovation (Arora & Gambardella, 1994; Rothaermel & Alexandre, 2009; Wu & Ang, 2019), thus increasing product innovation performance.

**Hypothesis 2.** The positive effect of a host country’s IP institutions on EMNC innovation is stronger when EMNCs develop strong ACAP.

**Moderating Effect of Knowledge Transfer Capability**

Knowledge is sticky, which results from the additional costs incurred during the adoption of complex technology and business processes, and involves conscious reconstruction, diffusion, and integration into new routines in an organization (Von Hippel, 1994; Wu, Zhang, Zhuo, Meyer, Li & Yan, 2020). Such stickiness causes knowledge, particularly its tacit component, to lie inert in an organization, where it is not readily accessible or retrievable and therefore not deployable or convertible into value (Whitehead, 1929). As a result, “organizations may not necessarily know all that they know” (Szulanski, 2000, p. 10) and fall short of fully exploiting their know-how (Von Hippel, 1994). The source of competitive advantage thus resides in socially complex tacit knowledge diffused throughout the firm (Kogut & Zander, 1993). Although it is possible to convert some tacit knowledge into explicit knowledge (Nonaka & Takeuchi, 1995), most tacit knowledge is difficult, if not impossible, to codify and can never be made explicit (Berman, Down, & Hill, 2002; Wu, Zhang, Zhuo, Meyer, Li & Yan, 2020). The two types of tacit knowledge are individual tacit knowledge (e.g., an individual’s skills) and group- or team-based tacit knowledge (e.g., collective skills) (Berman et al., 2002). Although the stock of tacit knowledge accumulates over time as an individual learns a particular skill or as team members learn to interact (Berman et al., 2002), the transfer of tacit knowledge confronts various difficulties (Von Hippel, 1994). For example, the act of solving a problem rests on how the phenomena function; the formal expression
of the solution is unlikely to fully capture this procedural knowledge leading to a solution. The ability to transform tacit capabilities into a comprehensible code that is understood by large numbers of people resides in the collective experiences of firm members organized by maintained rules of coordination and cooperation (Zander & Kogut, 1995; Wu, Zhang, Zhuo, Meyer, Li & Yan, 2020). Even in the area of problem identification and solving, the know-how of heuristic search precedes the formal knowledge of the solution (Kogut & Zander, 1993). The ability of accumulated experience to facilitate the communication and understanding of a new technology is a consistent finding in studies on the transfer of technology (Wu & Vahlne, 2020; Teece, 1977).

Knowledge transfer capability in this study refers to the ability to deal with the components of knowledge inside the firm by transferring tacit knowledge to subsidiaries across different markets, as well as the ability to modify a foreign-sourced technology for domestic applications (Mowery & Oxley, 1995). Knowledge transfer capability represents a key capability for EMNCs that transfer tacit knowledge contained in one subsidiary to other subsidiaries and markets (Wu & Ang, 2019).

Despite EMNCs expanding into a host country with strong IP institutions are likely to be exposed to advanced technologies, sufficient funding, and professional expertise, to what extent they diffuse new technology depends on knowledge transfer capability. While “objective” knowledge (e.g., product development) can be taught or acquired in international expansion, tacit knowledge is typically implicit and therefore can be secured only through experience—that is, learn by doing (Barkema & Vermeulen, 1998; Davidson, 1980). EMNCs with strong knowledge transfer capability can realize greater innovation benefits by transferring the tacit components of advanced technology and know-how obtained in a host market with strong IP institutions to other markets (Szulanski, 1996; Von Hippel, 1994).
When expanding simultaneously into a host country with IP institutions, strong knowledge transfer enables EMNCs to transfer advanced technology and tacit knowledge obtained in the former to subsidiaries in the latter (Birkinshaw & Hood, 1998; Cantwell & Mudambi, 2005). According to organizational learning theory (Levitt & March, 1988), institutionalization learning takes place through organizational codes, procedures, and routines in which inferences about past successes and failures are embedded (Luo & Tung, 2007; Wu & Ang, 2019). It requires EMNCs to develop knowledge transfer capability to secure tacit knowledge and transfer it back to the home market or other foreign markets, not just in terms of production and distribution, but also in other areas in which internationally competitive standards must be achieved (Child & Rodrigues, 2005; Simonin, 2004). Moreover, EMNCs with strong knowledge transfer capability can effectively transfer advanced knowledge, particularly tacit know-how, acquired in a host country with strong IP institutions back to the home country and combine it with home-country resources to offer new products at a competitive price (Wu, Wood & Khan, 2021). All of these factors contribute to better product innovation performance.

**Hypothesis 3.** The positive effect of a host country’s IP institutions on EMNCs’ innovation is stronger when EMNCs develop strong knowledge transfer capability.

**DATA AND METHODS**

**Data and Sampling**

We tested the hypotheses on a panel data about Chinese multinational companies (MNCs). The data collection administration quizzed the Chinese MNCs about their international expansion and product innovation during the period from 2011 to 2013. China is a particularly suitable setting for examining these research questions for two key reasons. First, China is the preeminent emerging market (Wu et al., 2016). Although substantial research exists on Chinese context and
companies, additional empirical research is likely to be of interest to scholars and practitioners alike, particularly if the research addresses a new question or adopts a novel perspective. Second, the empirical context of innovation strategies of Chinese MNCs offers us significant variation in the key aspects. A high degree of internationalization by active Chinese MNCs results in variations in IP institutions of a host country (Thomson Reuters, 2015). Innovation outcomes are distinct among Chinese MNEs. The significant variation in the dependent variable and key independent variables will enhance our confidence in the estimates arising from the statistical analysis.

We implemented a random sampling method to identify 362 Chinese firms that had expanded internationally prior to the administration of the data collection. We contacted their top managers to explain the purpose of this study and to obtain their agreement for participation. In the first round of primary data collection, we hand-delivered the questionnaires to the top managers of companies that had agreed to participate, with an introduction letter explaining the purpose of the study. A follow-up telephone contact was made within two weeks to make appointments for onsite interviews. Our method ensured access to the appropriate respondents, that the terms used were correctly understood, and that a high response rate (65%) was provided. We compared the characteristics between 235 responses and 127 non-responses in terms of firm age, firm size, and respondents’ age, gender, position, and so forth. We found no nonresponse bias. The data collection administrators (the authors of the paper) determined whether the respondents had provided the complete information in accordance with the instructions.

The first set of questionnaires sought information about firm characteristics and internationalization strategies. The questions included the year of establishment, the size of the firm in terms of number of total employees, the industry to which the firm belonged, and the competitive intensity in the product markets. We also asked the respondents to provide
information about their firms’ internationalization strategies, including into which foreign markets the firm expands (provide specific market names), the year, the amount of investment, the type of foreign entry mode (e.g., wholly owned or joint venture), and so forth. A year after we collected the first questionnaire set, we contacted the same companies and delivered the second questionnaire set to a different set of respondents who were knowledgeable about the innovation performance of their firm. The questionnaire included questions about the sales of the company and the percentage of sales derived of new products, among others. Our method of delivering two questionnaires to separate respondents within each firm and quizzing them about different aspects of our model (e.g., internationalization strategy to one set and innovation performance to the other set) was designed to reduce the common method variance, which often affects data gathered from questionnaire surveys (Eisenhardt & Tabrizi, 1995).

After excluding 38 responses with missing values from 235 responses, the sample consisted of 197 Chinese manufacturing companies. A majority (58%) of the respondents were male and had 11 years of average working experience. To further check the issue of potential common method bias, we combined the two surveys and performed a Harmon-factor test. The results of the Harman one-factor test clearly showed that the first factor explained less than 41% of the variance, indicating that common method bias was not a serious concern in this study.

**Measures**

We measured product innovation performance by the sales value of new products a firm had successfully introduced. The survey was conducted in two waves. The first wave was related to firm internationalization in 2013, while the second wave, one year later, related to innovation performance in 2014. The respondents provided information about innovation performance over the recent two years (2013 and 2014, respectively). In the analyses, the dependent variable,
innovation performance in 2014, was one year lagged behind independent variables in 2013 (e.g., internationalization strategy, ACAP, and knowledge transfer capability etc.) We believe that revenue from new products is a better indicator of successful product innovation than alternative measures, such as the number of new products or patents granted, because it reflects the commercial significance of a firm’s innovation activities related to a specific market (Katila, 2002). Prior studies have shown that introducing new products tends to increase market share and market value (Chaney & Devinney, 1992), improve firm performance (Roberts, 1999), and enhance a firm’s survival likelihood (Banbury & Mitchell, 1995).

The rate of product innovation may depend on a firm’s size and the industry segments in which it operates. To account for this, we adjusted this measure by the total number of a firm’s R&D personnel to arrive at a firm-size-adjusted measure of innovation performance. Moreover, we included firm size and industry dummies in the analyses. In any case, without commercialization, even the most innovative development loses its value and meaning. To check the validity of this measure, we randomly selected five sampled firms and conducted in-depth interviews on the percentage of sales that new products have contributed, given that the respondents provided information on the percentage of sales contributed by new products. These interviews revealed that this measure of innovation performance correctly reflects the innovativeness outcome of these firms.

Following prior studies (Mansfield, 1994; Maskus, 2000), we measured IP institutions by a composite measure consisting of three indicators: (a) to what extent the host country pushes for technical and financial assistance, including an international fund (1= little; 2 = less moderate; 3= moderate; 4= hard; 5 = very hard); (b) to what extent the host country reduces piracy and counterfeiting through awareness, fines, and penalties (1= little; 2 = less moderate; 3= moderate;
and (c) to what extent the host country has a strong protection of intellectual property rights (1= little; 2 = less moderate; 3= moderate; 4= rigorous; 5 = highly rigorous). The respondents answered the three questions with a mean value of 3.7, indicating that Chinese MNCs tend to expand to host countries with relatively developed IP institutions, rather than less-developed IP institutions. The values of these answers were aggregated at the country-level to arrive at the value of the IP institutions of a host country. We divided the values of each indicator by the highest value of the respective dimension to convert the original value to fall between zero and one. We then subjected these ratios to an exploratory principal factor analysis with varimax rotation; the results provide support for a single factor with an eigenvalue greater than 1 explaining 81.9% of the variance. The factor loadings of all three indicators were well above the accepted cutoff point of 0.70 (0.82, 0.85, and 0.88, respectively) and were highly significant ($p \leq 0.001$), indicating good construct validity. To account for different variances of the three IP institutional indicators, we transformed the ratios into standardized values with a mean of zero and a standard deviation of one. We then summed the standardized values of these indicators and averaged them to obtain one composite value that constitutes the index of IP institutions. We matched IP institution scores with the host country data of which the sampled Chinese MNCs were involved.

Building on prior studies (Cohen & Levinthal, 1989, 1990; Lane et al., 2006; Zahra & George, 2002), we developed the measure of a firm’s ACAP based on responses to three questions: (a) does the firm have the ability to effectively screen new technological trends, recognize new external knowledge, assimilate valuable external knowledge into the existing knowledge base, and apply them? (Yes/No); (b) does the firm have the ability to combine its existing with newly acquired knowledge and incorporate transformed knowledge into operations? (Yes/No); and (c)
does the firm have the ability to reconfigure its resource base to recognize, assimilate, and use external knowledge to create new knowledge and products? (Yes/No). Overall, the proportion of “Yes” answers across all questions was about 66%. The “Yes” answer for first question was about 62%, the “Yes” answer for the second question was 63%, and the “Yes” answer for the last question was 71%. We used the average score of the sub-items to measure the intended construct.

Drawing on prior studies on knowledge transfer (Kogut & Zander, 1993; Mowery & Oxley, 1995), we measured knowledge transfer capability as a compound factor consisting of multiple responses provided by the respondents: (1) does the firm have the ability to transfer tacit knowledge from firm headquarters to subsidiaries across different markets? (Yes/No); (2) does the firm have the ability to transfer tacit knowledge from the subsidiaries back to the headquarter? (Yes/No); and (3) does the firm have the ability to transfer tacit knowledge from one subsidiary to other subsidiaries across different markets? (Yes/No). Overall, the proportion of “Yes” answers across all the questions was about 22%. The “Yes” answer for the first question was about 23%, the “Yes” answer for the second question was 21%, and the “Yes” answer for the last question was 20%. We used the average score of the sub-items to measure knowledge transfer capability.

We also checked the phrasing of questions by administering the data instrument to a group of ten individuals. The score from the first round test and the score from the second round test were highly correlated (e.g., p=0.95 for ACAP; p=0.96 for technology transfer capability), indicating a high stability of the measures over time. For internal consistency, we checked average inter-item correlation for each construct. The average of the correlation coefficients for ACAP was 0.95, while the average of the correlation coefficients for technological transfer capability was 0.94. These results indicated a high level of internal consistency. To check construct validity, we
used a panel of experts\(^4\) who are familiar with these constructs to assess each construct. The experts examined the items and determined what each specific item was intended to measure. Ninety-two percent of the panel agreed that the items adopted were actually assessing the intended construct, indicating high construct validity. By computing Raykov’s reliability rho (\(\rho\)) (Raykov, 1998), the reliability of the multiple-item constructs was assessed. The results were greater than the recommended 0.70 (\(\rho = 0.84\) for ACAP, \(\rho = 0.85\) for technology transfer capability. search, \(\rho = 0.81\) for market search), indicating high reliability for these measures.

We included several variables to take account of alternative explanations. First, prior studies have suggested that the host country’s economic and cultural effects will affect product innovation (Wu, Pangarkar, & Wu, 2016; Shenkar, Tallman, Wang & Wu, 2021). To control for the effect of the level of the host country’s economic development, we created a variable, *level of economic development*, using the host country’s gross domestic product per capita. We applied a natural logarithm transformation in the modeling (Tsang & Yip, 2007). We also controlled for *cultural distance* between China and each foreign country using Kogut and Singh’s (1988) formula based on Hofstede’s (2001) four cultural dimensions:

\[
Cul\_dist\_j = \frac{\sum_i \left[ \left( I_{ij} - I_{ip} \right)^2 / V_i \right]}{I},
\]

where *Cul\_dist\_j* is the cultural distance of foreign country \(j\) from China, \(I_{ij}\) refers to cultural dimension \(i\) in country \(j\), \(p\) denotes China, \(V_i\) is the variance of cultural dimension \(i\), and \(I\) is the sum of cultural dimensions, which is the average of all the pairs of cultural distance.

---

\(^4\) Experts consist of managers with rich international experiences and established scholars with decent publication records in international business field.
Second, geographic distance between the home and host countries is another factor that affect innovation performance (Stringfellow, Teagarden, & Nie, 2008). We thus included *geographic distance* and measured it by the number of kilometers separating Beijing from a particular foreign country.\(^5\) We used the logarithm of the averaged distance based on pairs in the analysis. Third, prior studies show that government ownership can have a negative effect on innovation performance (Zhou et al., 2017), so *government ownership* was another control, which was measured by the percentage of a firm owned by the Chinese government. Fourth, as prior studies have provided different predictions of the effect of firm age on innovation performance (e.g., Sorensen & Stuart, 2000), we included firm age in the analyses, which was measured by the number of years since establishment. Fifth, larger firms may have more resources to devote to innovative activities (Eisenhardt & Tabrizi, 1995), so we controlled for *firm size*, which is measured by the logarithm of the number of employees. In addition, because the sample included firms from five manufacturing industries, we created four *industry dummy* variables. Finally, the study included four *location dummy* variables.

**Statistical Modeling**

Our primary objective was to examine the effect of host country IP institutions on firm innovation performance. Firms would self-select into a host country that provides a better match with their innovation capabilities to enhance innovation performance. In other words, firms choosing to enter host countries with more developed IP institutions may have particular capabilities that can enhance their innovation performance, whereas firms of countries with less-developed IP institutions may not have these capabilities. Specifically, innovativeness may prompt a firm to seek host countries with better-developed IP institutions that offer better innovation

\(^5\) Available at [http://www.cepii.fr/anglaisgraph/bdd/distances.htm](http://www.cepii.fr/anglaisgraph/bdd/distances.htm).
returns. Therefore, the IP institutions of a host country could be an endogenous variable. A popular econometric approach to deal with endogeneity is to obtain an exogenous proxy for the independent variable of interest (Larcker & Rusticus, 2010; Reeb, Sakakibara, & Mahmood, 2012). Thus, this study applied a two-stage least square (2SLS) with instrumental variables to deal with the endogeneity problem associated with the IP institutions of a host market.

The 2SLS approach centers on finding a variable or a set of variables (the preferred case), called an instrument or instruments, which influences the independent variable (the right-hand-side variable), but is unlikely to affect the dependent variable (the left-hand-side variable) except through its effect on the independent variable (Reeb et al., 2012). In other words, we needed to find some variable that correlates with the host country IP institutions, but not with the dependent variable. Research has proposed several approaches, such as industry averages and lagged endogenous regressors, to deal with the endogeneity problem. For example, Fisman and Svensson (2007) argue that if the endogeneity problem is specific to firms, but not to industries or locations, using industry-location level measures as instruments can net out this firm-specific component, thus yielding the industry-location measure that only depends on the underlying characteristics inherent to particular industries and/or locations. However, according to Larcker and Rusticus (2010, p. 196), “using industry aggregates as instrumental variables does not generally resolve direction of causality or correct for omitted variables…. The endogenous aspect of the variable will not average out when aggregating to the industry level.” In contrast, other scholars have proposed using lagged endogenous regressors as instruments in the analyses (e.g., Wang, Hong, Kafouros, & Wright, 2012). The rationale behind the selection of lagged variables is that, because the events and decisions related to these variables occurred in the past, they are not correlated with the error term in the present (Gujarati & Porter, 2009; Wooldridge, 2009). Following this, we used
the one-year lagged number of patents a firm received (i.e., 2012) as the instrumental variable for the IP institutions of a host country (2013). To assess the validity of the instrumental variable, we conducted Hansen’s test of over-identifying restrictions and the Hausman test. The results consistently provide support for the validity of the instrumentation strategy.

The estimated function of 2SLS is expressed as follows. The first-stage model has the structure: \[ IP_{i,j,t-1} = a_0 + a_1 Patent_{i,j,t-2} + a_2 Age_{i,t-2} + a_3 Size_{i,t-2} + a_4 Foreign_{i,t-2} + \varepsilon, \]
where \( IP_{i,j,t-1} \) represents the IP institutions of a host market \( j \) in year \( t-1 \), \( Patent_{i,j,t-2} \) is the number of patents firm \( i \) received in year \( t-2 \), \( Age \) represents firm age, \( Size \) represents firm size, \( Foreign \) represents the percentage of foreign ownership, and \( \varepsilon \) is the normally distributed error term. The second model has the structure:

\[
\text{Product innovation}_{i,t} = \beta_0 + \beta_1 IP_{i,j,t-1} + \beta_2 AC_{i,t-1} + \beta_3 KTC_{i,t-1} + \beta_4 IP_{i,j,t-1} \times AC_{i,t-1} + \\
\beta_5 IP_{i,j,t-1} \times KTC_{i,t-1} + \beta_6 Age_{i,t-1} + \beta_7 Size_{i,t-1} + \\
\beta_8 (R&D intensity)_{i,t-1} + \beta_9 Government_{i,t-1} + \beta_10 Foreign_{i,t-1} + \\
\beta_{11} (Economic distance)_{i,j,t-1} + \beta_{12} (Geographic distance)_{i,j} + \\
\beta_{13} (Culture distance)_{i,j} + \sum_{m=14}^{17} \beta_m \text{industry}_i + \sum_{n=18}^{21} \beta_n \text{city}_i + \omega,
\]
where \( \text{Product innovation}_{i,t} \) refers to innovation performance of firm \( i \) in year \( t \), \( IP_{i,j,t-1} \) is the IP institutions of a host market \( j \) in year \( t-1 \), \( Age \) represents firm age, \( Size \) represents firm size, \( R&D intensity \) represents R&D intensity related to foreign market \( j \), \( Government \) represents the percentage of government ownership, \( Foreign \) represents the percentage of foreign ownership, \( Economic distance \) represents the economic distance between the home and host markets, \( Geographic distance \) represents the geographic distance between the home and host markets, \( Culture distance \) represents the cultural distance between the home and host markets, \( industry \) represents the industry dummy, \( city \) represents the city dummy, and \( \omega \) is the...
normally distributed error term.

We evaluated the explanatory variables at t-1 and associated them with product innovation at t, accounting for a possible delay before the effects of firm-, institution-, and industry-level factors would be reflected in product innovation. We implemented the analyses in Stata 12 and assessed the “robust” correct standard errors for heteroskedasticity bias using the Huber–White sandwich estimator.

RESULTS

Table 1 reports descriptive statistics for the variables used in the analyses. A review of the correlations among the independent variables suggests that multicollinearity is not a major concern. This was confirmed by the analysis of the variance inflation factor (VIF). The VIF values ranged from 1.143 to 4.318, well below the cutoff threshold of 10, indicating no serious multicollinearity problems in the models (Hair, Anderson, Tatham, & Black, 1998).

Table 2 provides the estimation results testing Hypotheses 1, 2, and 3. Model 1 includes the controls; Model 2 adds the main effect of IP institutions of host country and its square term; Model 3 adds the main effect of ACAP and knowledge transfer capability (KTC); Model 4 adds a term representing the interaction between IP institutions and absorptive capability (IP Institutions × ACAP); Model 5 adds a term representing the interaction between IP institutions and knowledge transfer capability (IP Institutions × KTC); and Model 6 is the full model, including all the main effects and their interactions. To reduce the potential for multicollinearity, we mean-centered the predictor and moderator variables before creating the interaction terms (Aiken & West, 1991). The adjusted R-square values in Models 2 through 6 indicate significant explanatory power, and the
changes in R-square in Models 3, 4, 5, and 6 indicate significant increases in explanatory power in those restricted models compared with Models 2, 3, 4, and 5, respectively. As such, we use Model 6 to discuss the results of hypotheses testing.

[Insert Table 2 about here]

Hypothesis 1 predicts the IP institutions of a host country have an invert-U shaped impact on innovation performance. The coefficient of IP institutions in Model 6 is positive and significant ($\beta = 1.694, p = 0.002$), indicating that strong IP institutions of a host country promote innovation performance; whereas the coefficient of the squared term, IP institution$^2$, is negative and significant ($\beta = -1.531, p = 0.012$). Therefore IP institution has an inverted U-shaped relationship with innovation performance, with a turning point at 0.553. Thus, Hypothesis 1 receives support.

Hypothesis 2 predicts that the positive effect of a host country’s IP institutions on innovation performance is stronger when EMNCs develop strong ACAP. The coefficient of the interaction term, IP Institutions $\times$ ACAP, is positive and significant ($\beta = 1.625, p = 0.034$), indicating that ACAP enhances the positive effect of strong IP institutions and innovation performance. To gain more insight into the interaction effect of Hypothesis 2, we plot the significant interaction effect in Fig. 1 following Aiken and West’s (1991) suggested procedure. The horizontal axis represents the quality of the host country’s IP institutions, and the vertical axis represents the EMNC’s innovation performance. We split the firms into two groups according to their ACAP: strong (one standard deviation above the mean) and weak (one standard deviation below the mean). The figure shows that the IP institutions of a host country have a nonlinear relationship with innovation performance in the way that innovation performance initially increases with the level of the host country’s IP institutions and then decreases. Moreover, the upward slope is much steeper for firms with strong ACAP, as Hypothesis 2 predicts.
Hypothesis 3 suggests that the positive effect of IP institutions on innovation performance is stronger when EMNCs develop strong knowledge transfer capability. The coefficient of the interaction term, IP Institutions × KTC is positive and significant ($\beta = 2.342, p = 0.142$), indicating that strong knowledge transfer capability does not significantly enhance the observed positive effect of IP institutions on innovation performance. As such, Hypothesis 3 does not receive support.

**Additional Analyses**

We conducted two tests to assess the appropriateness of the instrumental variable. First, we performed the standard Hausman test to assess the endogeneity of the instrumented variable. As Table 2 shows, the Hausman test strongly rejects the exogeneity of IP institutions (e.g., M6: $F = 14.447, p = 0.001$), indicating that the 2SLS estimate is preferable to the ordinary least squares (OLS) estimate. Second, we performed Hansen’s test of over-identifying restrictions to assess whether the instrumental variable was uncorrelated with the error term. Lack of correlation is an essential condition for the validity of the instrumental variable. The results of the over-identifying restrictions test could not reject the null hypothesis that the instrument is valid in the model specifications. Together, the Hausman test and the over-identifying test suggest that the selected instrument is of good quality and thus likely to produce better estimates and inferences than the OLS (Larcker & Rusticus, 2010).

Moreover, we took several steps to test the robustness of these results. First, to reduce concerns that the sample contained observations without any new products, we re-estimated the models with a sub-sample of 175 firms, all of which had introduced at least one new product during the period studied. The results did not change in any substantial way. Second, in addition to 2SLS
with instrumental variables, we estimated all models with a two-step generalized method of moments and LIMIL estimators. The results are consistent across estimation methods. In addition, one could argue that the pattern of overseas expansion in regulated industries (the transportation industry) may differ from that in unregulated industries, such as electronic equipment, because the Chinese government exerts more policy constraints on the former, creating more hurdles for transnational technology transfer. To eliminate this concern, we used the *Catalogue of Industries for Guiding Foreign Investment in 2010*, an official guideline issued jointly by China’s Ministry of Commerce and National Development and Reform Commission, to exclude the vehicle sector from the sample analyses. The results remain consistent, providing additional evidence of their robustness.

**DISCUSSION AND CONCLUSION**

Building on institutional theory and the resource-based view of capability, this study assesses the effect of a host country’s IP institutions on EMNCs’ innovation. Several questions were posed in the beginning of the article that are important to reconsider. The first question asked whether and how the host country’s IP institutions affect EMNC innovation. The second question concerned its boundary conditions. The data of Chinese EMNCs’ internationalization activities and innovation outcomes were collected to test the hypotheses. We found that the host country’s IP institutions have an inverted U-shaped impact on EMNC innovation. Strong ACAP enhances the positive effect of IP institutions on EMNC innovation. These results contribute to the literature in several important ways.

**Theoretical Implications**

This study contributes to the institutional approach to international business by emphasizing
the role of IP institutional environments. Prior studies have discussed institutional environments of host countries in a general way. While scholars in international business have examined how institutions constrain MNCs’ strategies and structure, as well as their impact on the transnational transfer of organizational practices throughout MNCs (Kostova, 1999; Kostova & Zaheer, 1999), others have explored the impact of institutional environments on firm performance and competitive advantages (Cuervo-Cazurra, 2008; Wu, 2011). However, very limited efforts have been devoted to exploring the role of IP institutions of host country that are most relevant for MNCs’ cross-border innovation. We extend this stream of studies to examine a host country’s IP institutions for EMNC innovation. We develop a new framework of IP institutions to explain its implications for innovation. By considering both the technology-access advantage and knowledge-integration disadvantage encountered by EMNCs when gaining benefits associated with host country IP institutions, our framework provides a more complete understanding of the role of IP institutions on EMNC innovation.

This study also extends the resource-based view of capability by providing a more nuanced understanding of the roles of firm-specific capabilities for EMNC innovation performance. The theory highlights the importance of firm-specific ACAP in helping EMNCs utilize a host country’s institutional advantages to improve the likelihood of innovation success. The results show that strong ACAP enhances the positive effect of expanding to a host country with a better-developed IP institutional environment. This is because ACAP enables a firm to identify and value new technology and integrate it with existing knowledge. These findings add insight to the recent studies on the international expansion of EMNCs by shifting the focus from how to transfer homegrown technology and capabilities to the host country, to how to acquire new knowledge and capabilities in a host country and integrate them with the existing knowledge base. This study thus
advances the existing research by going beyond documenting the direct effect of firm-specific capabilities, to providing evidence that firm-specific ACAP interacts with the host country’s IP institutional advantage to promote knowledge acquisition and innovation.

**Practical Implications**

The arguments and findings of this study offer some important implications for managers and policy makers. First, when making foreign-country expansion decisions, EMNCs should consider entering host countries with better-developed IP institutions that enable them to acquire advanced technological and critical resources for innovation. However, to what extent they could gain more innovation benefits from such international expansions depends on their own absorptive capacity. EMNCs should strive hard to build strong ACAP to identify valuable technologies in new markets and integrate them with their own technologies more effectively. Although we do not find the enhancing effect of knowledge transfer capability, the findings reveal that knowledge transfer capability has a positive and significant impact on EMNC innovation performance. This result draws managers’ attention to tacit knowledge underlying cross-border knowledge transfer. Therefore, EMNCs need to develop strong knowledge transfer capability that will boost their innovation.

Second, the findings also have valuable implications for public policy makers. The governments of many emerging market countries (e.g., China, India) have developed preferential policies to encourage their indigenous firms to participate in global competition. The results of this study provide support for such policies by showing that expanding into host countries with developed IP institutions can significantly improve their MNCs’ innovation performance. Equally importantly, the improvement of IP institutions in home countries will alleviate the difficulties of the home countries’ MNCs who tend to encounter institutional disadvantages, as the home
institutions is far behind the host institutions. Thus, policy makers should endeavor to strengthen IP institutions. In the long run, strong IP institutions along with the efficiency of important factor markets offering critical resources at home, and in conjunction with improved firm-level technological capabilities, may help EMNCs gain more innovation competitiveness from participating in global competition.

**Limitations and Further Research**

Further research could improve and build on this study in several ways. First, our measurement of innovation performance relies on new product innovation. Although some forms of innovation are clearly related to process innovation, these were ignored in this research. Future studies could examine the role of IP institution of host country in such other forms of innovation performance. Research could also further develop our model to examine the impact of other types of institutions (e.g., inequality, incest taboo) on innovation outcomes. Second, this study attaches great importance to firm-specific ACAP and knowledge transfer capability. However, firms have other, equally important capabilities such as operation capability or marketing capability. Researchers might explore in greater depth the interplay of institutional environment and other types of firm-level capabilities and their impact on EMNC performance. Third, this study employed a sample of Chinese MNCs’ internationalization activities and innovation. Although China is one of the largest emerging economies and the processes observed in China appear similar to those in other emerging market contexts, there may be some peculiarity of organizational structure, government action, or institutional setting associated with China or the period used. As such, the models could be extended by using data from firms in other emerging markets to establish their generalizability.
REFERENCES


Simonin, B. L. (2004). An empirical investigation of the process of knowledge transfer in


<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Innovation performance</td>
<td>4.220</td>
<td>12.748</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2  IP institutions</td>
<td>0.713</td>
<td>0.175</td>
<td>0.112*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3  Absorptive capacity</td>
<td>0.644</td>
<td>0.120</td>
<td>0.561*</td>
<td>0.020</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4  Knowledge transfer capability</td>
<td>0.270</td>
<td>0.640</td>
<td>0.181*</td>
<td>0.035</td>
<td>0.023</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5  Economic distance</td>
<td>9.089</td>
<td>1.489</td>
<td>0.127*</td>
<td>0.321*</td>
<td>0.029</td>
<td>-0.013</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6  Cultural distance</td>
<td>2.760</td>
<td>1.733</td>
<td>0.015</td>
<td>0.163*</td>
<td>0.020</td>
<td>-0.045</td>
<td>0.041</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7  Geographic distance</td>
<td>2.654</td>
<td>3.226</td>
<td>-0.005</td>
<td>-0.054</td>
<td>0.003</td>
<td>0.041</td>
<td>-0.224</td>
<td>0.317*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8  Firm age</td>
<td>2.447</td>
<td>0.835</td>
<td>0.124*</td>
<td>-0.050</td>
<td>-0.146</td>
<td>0.180</td>
<td>0.066*</td>
<td>0.040</td>
<td>0.056</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9  Firm size</td>
<td>6.190</td>
<td>1.251</td>
<td>0.093</td>
<td>-0.184*</td>
<td>-0.095</td>
<td>0.250</td>
<td>-0.116</td>
<td>-0.031</td>
<td>0.080</td>
<td>0.303*</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 State ownership</td>
<td>18.750</td>
<td>35.970</td>
<td>-0.092</td>
<td>-0.08*</td>
<td>-0.035</td>
<td>0.172*</td>
<td>-0.092*</td>
<td>-0.016</td>
<td>0.048</td>
<td>0.438*</td>
<td>0.184*</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>11 Foreign ownership</td>
<td>28.560</td>
<td>35.630</td>
<td>0.140</td>
<td>0.120</td>
<td>0.060</td>
<td>0.22*</td>
<td>0.043</td>
<td>-0.016</td>
<td>-0.120</td>
<td>-0.120</td>
<td>-0.110</td>
<td>-0.292*</td>
<td>1.000</td>
</tr>
</tbody>
</table>

* indicates significance at the 0.05 level of confidence.
TABLE 2 Hypothesis testing

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Innovation performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP Institutions</td>
<td>1.651**</td>
<td>1.682**</td>
<td>1.648**</td>
<td>1.667**</td>
<td>1.694**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.002)</td>
<td>(0.001)</td>
<td>(0.003)</td>
<td>(0.002)</td>
<td></td>
</tr>
<tr>
<td>IP institutions²</td>
<td>-1.221*</td>
<td>-1.232*</td>
<td>-1.232*</td>
<td>-1.221*</td>
<td>-1.531*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.013)</td>
<td>(0.012)</td>
<td>(0.013)</td>
<td>(0.012)</td>
<td></td>
</tr>
<tr>
<td>Absorptive capacity (ACAP)</td>
<td>16.813*</td>
<td>15.460*</td>
<td>16.159*</td>
<td>15.591*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.013)</td>
<td>(0.011)</td>
<td>(0.012)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge transfer capability (KTC)</td>
<td>4.601*</td>
<td>4.009*</td>
<td>4.423*</td>
<td>4.864*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.026)</td>
<td>(0.022)</td>
<td>(0.024)</td>
<td>(0.024)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP institutions × ACAP</td>
<td>1.447*</td>
<td></td>
<td>1.625*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.035)</td>
<td></td>
<td>(0.034)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP institutions × KTC</td>
<td>2.155</td>
<td>2.342</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.146)</td>
<td>(0.142)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm age</td>
<td>0.852</td>
<td>0.811</td>
<td>0.824</td>
<td>0.843</td>
<td>0.890</td>
<td>0.872</td>
</tr>
<tr>
<td></td>
<td>(0.113)</td>
<td>(0.171)</td>
<td>(0.179)</td>
<td>(0.176)</td>
<td>(0.178)</td>
<td>(0.177)</td>
</tr>
<tr>
<td>Firm size</td>
<td>0.625</td>
<td>0.652</td>
<td>0.660</td>
<td>0.744</td>
<td>0.716</td>
<td>0.663</td>
</tr>
<tr>
<td></td>
<td>(0.312)</td>
<td>(0.314)</td>
<td>(0.323)</td>
<td>(0.313)</td>
<td>(0.332)</td>
<td>(0.316)</td>
</tr>
<tr>
<td>State ownership</td>
<td>-0.491</td>
<td>-0.470</td>
<td>-0.465</td>
<td>-0.479</td>
<td>-0.468</td>
<td>-0.484</td>
</tr>
<tr>
<td></td>
<td>(0.137)</td>
<td>(0.139)</td>
<td>(0.140)</td>
<td>(0.138)</td>
<td>(0.141)</td>
<td>(0.148)</td>
</tr>
<tr>
<td>Foreign ownership</td>
<td>0.228</td>
<td>0.224</td>
<td>0.235</td>
<td>0.239</td>
<td>0.223</td>
<td>0.253</td>
</tr>
<tr>
<td></td>
<td>(0.121)</td>
<td>(0.126)</td>
<td>(0.124)</td>
<td>(0.123)</td>
<td>(0.129)</td>
<td>(0.127)</td>
</tr>
<tr>
<td>Economic development</td>
<td>0.525*</td>
<td>0.518*</td>
<td>0.554*</td>
<td>0.560*</td>
<td>0.616*</td>
<td>0.652*</td>
</tr>
<tr>
<td></td>
<td>(0.041)</td>
<td>(0.042)</td>
<td>(0.040)</td>
<td>(0.046)</td>
<td>(0.043)</td>
<td>(0.042)</td>
</tr>
<tr>
<td>Cultural distance</td>
<td>-0.127</td>
<td>-0.125</td>
<td>-0.174</td>
<td>-0.163</td>
<td>-0.154</td>
<td>-0.118</td>
</tr>
<tr>
<td></td>
<td>(0.255)</td>
<td>(0.253)</td>
<td>(0.258)</td>
<td>(0.254)</td>
<td>(0.253)</td>
<td>(0.265)</td>
</tr>
<tr>
<td>Geographic distance</td>
<td>-0.032</td>
<td>-0.035</td>
<td>-0.043</td>
<td>-0.052</td>
<td>-0.047</td>
<td>-0.039</td>
</tr>
<tr>
<td></td>
<td>(0.132)</td>
<td>(0.131)</td>
<td>(0.130)</td>
<td>(0.089)</td>
<td>(0.132)</td>
<td>(0.108)</td>
</tr>
<tr>
<td>Industry dummy</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Location dummy</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.093</td>
<td>0.149</td>
<td>0.210</td>
<td>0.282</td>
<td>0.335</td>
<td>0.399</td>
</tr>
<tr>
<td>R² change</td>
<td>0.056*</td>
<td>0.061**</td>
<td>0.072**</td>
<td>0.053*</td>
<td>0.064**</td>
<td></td>
</tr>
<tr>
<td>F-test</td>
<td>0.000***</td>
<td>0.000***</td>
<td>0.000***</td>
<td>0.000***</td>
<td>0.000***</td>
<td>0.000***</td>
</tr>
<tr>
<td>Over-identifying test</td>
<td>36.812</td>
<td>39.516</td>
<td>39.322</td>
<td>41.127</td>
<td>43.245</td>
<td>44.192</td>
</tr>
<tr>
<td>p-value</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

*** statistically significant at 0.1%; ** statistically significant at 1%; * statistically significant at 5%.

p-values are in parentheses. Intercept is not shown.
Figure 1. IP Institutions of host country, absorptive capacity and innovation performance.