The influence of market and cultural environmental factors on technology transfer between foreign MNCs and local subsidiaries: A Croatian illustration

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Abstract
Technology transfer from multinational corporations to local subsidiaries is essential for successful local market operations. In this study, the environment-strategy-performance framework is used to investigate the effects of market and cultural environmental factors on international technology transfer, and resultant performance. The relative influence of two factors of the market environment, i.e., competitive intensity and market dynamism, and the relative influence of two factors of the cultural environment, i.e., national cultural distance and organizational cultural distance, are examined. The results of a survey of 131 managers of subsidiaries of foreign multinational corporations indicate the direct effects of market and cultural environmental factors on international technology transfer, with market dynamism found to be a more influential market environmental factor than competitive intensity and organizational cultural distance found to be a more influential cultural environmental factor than national cultural distance. Further, a significant positive relationship between technology transfer and subsidiary performance was found. Theoretical and practitioner implications are discussed.

Multinational corporations (MNCs) increasingly rely on technology to establish competitive postures in the global marketplace. As MNCs expand into new markets, their success is in part determined by the ability to transfer competitive technologies to local subsidiaries (Chen, 1996; Chung, 2001). As MNC subsidiaries reside in increasingly diverse environmental contexts, understanding the factors influencing the transfer of technology becomes more and more important. Despite the growing interest among scholars and the business community, there is a lack of research on those factors influencing technology transfer between MNCs and their subsidiaries.

A review of the literature reveals several shortcomings that have limited our understanding of how the environment a firm operates in influences its strategies, such as technology transfer, and ultimately performance. First, with few exceptions (e.g., Simonin, 1999), most prior research on international technology transfer focuses on macro-economic or institutional factors as determinant of technology transfer (Contractor & Sagafi-Nejad, 1981; Marton, 1986). As such, these studies overlook the important influence of micro-issues such as market or cultural environment. For example, as Luo and Park (2001) demonstrated under the environment-
strategy-performance framework, market environment directly influences a firm’s selection of strategic orientation. As such, their work highlights the theoretical importance of investigating micro-issues on managerial strategic choice. Further, their work suggests the need to investigate specific strategic initiatives, such as technology transfer, under the environment-strategy-performance framework if we are to advance our understanding of international business strategy development.

Second, when exploring the impact of environment on strategy issues, researchers have tended to employ environmental factors as moderators of strategy and performance (e.g., Jaworski & Kohli, 1993; Singh, 2003). This view, while incorporating the role of environment, fails to incorporate the issue of managerial strategic choice in response to environmental factors as demonstrated by Luo and Park (2001). Strategic initiatives directly result from the environmental context in which a firm operates and environmental factors are inseparable considerations in firms’ strategic decisions. The failure to examine the direct effects of environmental influences on strategy inhibits the understanding of firms’ strategic decisions related to international technology transfer.

Third, while different environmental factors have been identified in the literature, the relative influences of these factors have not been investigated, thus leaving academics and practitioners without a clear understanding of the relative importance of each environmental factor. For example, when studying market environment, although researchers have identified two market environmental factors, i.e., competitive intensity and market dynamism (e.g., Grewal & Tansihaj, 2001; Jap, 1999; Jaworski & Kohli, 1993), researchers have yet to compare their effects. Similarly, although national and organizational cultural distance have been theorized as important cultural environmental factors influencing firms’ strategic initiatives, few studies have theorized or empirically tested their relative influence. The lack of a relative influence perspective is a noteworthy limitation in the literature given that the relative effects of environmental factors on strategic decisions have substantial theoretical and empirical implications. As technology transfer is a costly strategic initiative for firms, understanding the relative influence of environmental factors can help firms make more effective decisions that ultimately enhance firm performance.

Given these limitations, an important contribution of this study is that we investigate the environment-strategy-performance relationship, with technology transfer as the central strategy element, under a relative environmental influence perspective. We begin by presenting a conceptualized model. A method section specifies the research design, sample frame and measurement instrument. Results are then presented. We conclude with a discussion of the results, their implications for managers and directions for future research.

1. Conceptualization

Fig. 1 presents the proposed conceptual model. The model depicts the influence of two sets of environmental factors: (1) market environmental factors of competitive intensity and market dynamism, and (2) cultural environmental factors of national cultural distance and organizational cultural distance on technology transfer and ultimately performance under the environment-strategy-performance framework advanced by Luo and Park (2001).

Luo and Park (2001) put forth the theoretical framework of environment-strategy-performance which argues that the environment shapes the context of business and that firms, reacting to their environments, set forth upon strategic paths which determine their performance. Specifically, Luo and Park (2001) theorized and empirically verified that firms’ choice of generic strategies (i.e., Miles and Snow’s (1978) typology of strategic orientation) is in response to its market environment conditions, and that through co-alignment of specific generic strategies with the conditions of the market environment enhanced firm performance. The linkage between firms’ strategic profile and its external environment is a basic characteristic of the strategy paradigm (Astley & Van de Ven, 1983). This linkage has significant implications for firm performance (Hofer, 1975; Miller & Friesen, 1983). Empirical studies in the strategy literature support the contention that firms need to adjust their strategies according to the environment in which they operate (e.g., Hofer, 1975; Miller & Friesen, 1983; Venkatraman & Prescott, 1990). In an international context, environmental factors have a substantial influence on the strategy and success of MNC subsidiaries operating in foreign markets (Carpano, Chrisman, & Roth, 1994). Country-specific environments shape the nature and intensity of competition, influence the mechanisms of interorganizational transactions, and affect the input-output dynamics of local industries. As such, it is important to understand the local environment to evaluate MNC subsidiary strategic requirements (Ghoshal & Nohria, 1993). While the generic strategies investigated by Luo and Park (2001) demonstrate general strategic responses of MNC
subsidiaries, they did not examine a subsidiary’s choices related to specific strategic initiatives necessary for success, such as technology transfer.

Technology transfer is a fundamental strategic initiative employed by MNCs and their subsidiaries during international expansion. Technology transfer is defined as the transmission of know-how to suit local environments, with effective absorption and diffusion both within and across countries (Chung, 2001; Tihanyi & Roath, 2002). Firms (MNCs and subsidiaries) capable of effectively employing the strategic initiative of technology transfer benefit from improved manufacturing productivity (Gisselquist & Grether, 2000), alliance efficiency and adaptability (Dyer & Nobeoka, 2000), international expansion (Ofer & Polterovich, 2000), and sustainable competitive advantage (Dyer & Nobeoka, 2000). Technology transfer encompasses a complex process involving the MNC’s capability of teaching, the subsidiary’s capability of learning, and the complex interaction between the two organizations (Griffith, Kiessling, & Dabic, 2005). Technology transfer in the international context, when compared to the domestic context, is subjected to more diversified environmental conditions, inclusive of cultural differences, thus creating greater challenges for MNCs and their subsidiaries. This necessitates the understanding of how environmental factors influence a firm’s ability to transfer technology in an international environment.

2. Hypotheses

2.1. Market environment

Environmental market factors shape the nature and intensity of competition and influence the dynamics of local industries. The importance of environmental factors for influencing strategic initiatives is enhanced in markets where competition is high and where underlying market mechanisms fluctuate continuously (Ghoshal & Nohria, 1993; Luo & Park, 2001; Porter, 1980). Two environmental market factors, i.e., competitive intensity and market dynamism, have been identified as significant influences on strategic initiatives (e.g., Grewal & Tansihaj, 2001; Jap, 1999; Jaworski & Kohli, 1993).

2.1.1. Competitive intensity

Competitive intensity is the degree of competition a firm faces in the market (Grewal & Tansihaj, 2001; Jaworski & Kohli, 1993). The level of competitive intensity is related to the competitive activities of firms in the market, including price competition, promotion competition, etc. When entering a highly competitive foreign market MNCs face the challenge of acquiring market share and establishing a competitive position in the market via subsidiaries. Providing local customers unique and high quality products is a key to building competitive advantage in the market. Technology...
transfer from MNCs enables subsidiaries to improve product quality, adapt product design to local market demand, and reduce production costs and prices to compete for market share. At the same time, technologies related to supporting and management activities improve information processing efficiency, which helps subsidiaries to become competitive. As such, we theorize:

**H1.** Competitive intensity in the market environment is positively related to technology transfer between foreign MNC and local subsidiaries.

### 2.1.2. Market dynamism

Market dynamism refers to frequent changes in the industry, including changes of market elements such as customer demand, technology, competitor structure, etc. (Achrol & Stern, 1988; Jap, 1999). Frequent change in an industry decreases strategic certainty and increases the difficulty of accurate planning, forecasting and cost reductions (Sheth & Parvatiyar, 1992). In highly dynamic markets, frequent changes in customer demand, business practices, etc., require firms to quickly modify their products or services to remain competitive in the market (Jap, 1999). Production related technologies provide firms the capability of changing product design to adjust to new market demand. Technologies related to supporting and management activities facilitate the processes of information processing and decision-making in MNC subsidiaries, which gives MNC subsidiaries the flexibility of quickly adjusting to market change. Moreover, technology allows MNC subsidiaries to implement proactive competitive strategies, which gives the subsidiaries significant advantage in a highly dynamic market. Therefore, we theorize:

**H2.** Market dynamism in the market environment is positively related to technology transfer between foreign MNC and local subsidiaries.

### 2.1.3. Relative influence of competitive intensity and market dynamism

While both competitive intensity and market dynamism are influential environmental market factors, we theorize that their relative influence on technology transfer is not equal. Competitive intensity captures the degree of competition in the market, but does not account for changes in market competition. Alternatively, market dynamism is related to the change of the market overtime and captures the dynamic aspect of competition. Although technology is a basis for competition, it is tied closely to change. Technology provides firms the ability to continuously improve techniques/processes and the flexibility to adapt to markets, which are directly related to the change of market environment, as opposed to the intensity of competition in the market. In a market with frequent and unpredictable change, quick reaction to the market is necessary for the success of a firm. This requires a higher level of technology transfer than in a highly competitive but stable market, where technology transfer can happen gradually over time. Further, technology is more important in a highly dynamic market, where continuously changing customer demand requires firms to continuously modify products/services and adjust operation and competition strategy accordingly, thus necessitating a greater strategic focus on technology transfer as technology provides firms the basis of creativity and proactiveness in competition. More formally stated:

**H3.** Compared to competitive intensity, market dynamism has a stronger positive influence on technology transfer between foreign MNC and local subsidiaries.

### 2.2. Cultural environment

Cultural environment refers to the cultures in which a firm operates. Culture is the patterns of beliefs and values that are manifested in practices, behaviors, and various artifacts that distinguish the members of one group or category of people from another (Hofstede, 1980; Trice & Beyer, 1993). Culture operates at both the national level, i.e., national culture as put forth by Hofstede (1980), and the organizational level, i.e., organizational culture (Garsten, 1993; Hamada, 1989). When considering culture in international transactions it becomes most important to speak of the cultural environment in terms of cultural distance, where cultural distance refers to the differences between cultures. Cultural distance has been demonstrated to influence the effectiveness of communication and information sharing between organizations, therefore being applicable to the study of technology transfer between an MNC and its subsidiaries.

#### 2.2.1. National cultural distance

National cultural distance refers to the underlying differences in national cultures between a home and a host country (Shenkar, 2001). Given the underlying distinctions between cultures throughout the world, understanding the similarities and differences, or
relative “distance” between cultures becomes important from a management standpoint as these similarities and distinctions form the foundation from which managers operate and make strategic decisions (Barkema, Bell, & Pennings, 1996; Brouthers & Brouthers, 2001). As the national cultural distance between MNCs and their subsidiaries increases, the underlying gap in the norms, values and institutions that govern exchange between the parties increases. Increased national cultural distance increases the complexity of operations and reduces communication effectiveness. As increased cultural distance produces difficulties and challenges in communication, national cultural distance has the potential of influencing every aspect of collaboration, including the processes of technology transfer (Tiemessen, Lane, Crossan, & Inkpen, 1997). For example, national cultural distance increases conflicts and misunderstandings, decreases the flow of information and learning between partners, therefore constitutes an obstacle to technology transfer between MNCs and their local subsidiaries (Lyles & Salk, 1996; Mowery, Oxley, & Silverman, 1996). Based on these arguments we theorize:

**H4.** National cultural distance is negatively related to technology transfer between foreign MNC and local subsidiaries.

2.2.2. Organizational cultural distance

MNC and local subsidiaries are not only embedded in different national cultures, but are also characterized by organizational cultures. Organizational cultural distance refers to the underlying differences in organizational cultures between two firms. Organizational cultural distance has been observed to impact the success of interorganizational interactions (Garsten, 1993; Hamada, 1989). When two or more organizations are communicating with each other, the relative level of consistency of core elements between organizational cultures can directly influence the effectiveness of communication. Two diverse organizational cultures can lead to differences in expectations and mismatch in the communication processes (Harvey & Griffith, 2002; Jablin, Putnam, Roberts, & Porter, 1987). As technology transfer builds on numerous individual exchanges that rely on effective communication, organizational cultural distance between an MNC and its local subsidiary can hinder information exchange and increase the potential of misunderstanding and conflicts, which not only increases the difficulty of technology transfer but can also lead to the deterioration of joint efforts needed for successful technology transfer (Fey & Beamish, 2001; Simonin, 1999). Based on these arguments we theorize:

**H5.** Organizational cultural distance is negatively related to technology transfer between foreign MNC and local subsidiaries.

2.2.3. Relative influence of national cultural distance and organizational cultural distance

While both organizational cultural distance and national cultural distance can influence technology transfer between MNC and local subsidiaries, we theorize that their relative influence is not equal. National cultural differences reside mostly in values, less in practice; while organizational cultural differences reside mostly in practice, less in values (Hofstede, 1991). While values are deeper manifestation of culture, practice is more directly related to people’s behavior and activities (Hofstede, 1991). The core of an organizational culture is the shared perceptions of daily practice (Hofstede, 1991). Therefore, although organizations engaged in international relations are embedded different national cultures, it can be argued that individuals in an organization behave more closely according to the specific organizational culture than the general national culture. Correspondingly, the influence of organizational culture is more dominant than the influence of national culture. For example, in a study of joint venture performance, Pothukuchi et al. (2002) found that organizational culture differences account for more of the negative effects of partner dissimilarity on joint venture performance than national culture. They argued that when two organizations interact with each other in a business context, the processes of communication and information sharing are more directly affected by the organizational cultures of the two firms compared to national cultures. As such, we theorize:

**H6.** Compared to national cultural distance, organizational cultural distance has a stronger influence on technology transfer between foreign MNC and local subsidiaries.

2.3. Technology transfer and performance

Technology is embodied in every value activity of a firm and is involved in achieving linkages of the activities (Porter, 1980). By improving efficiency of these activities, technology helps to reduce production cost and increase manufacturing productivity (Gisselquist & Grether, 2000). Technology also contributes to the quality and uniqueness of products, which enhances product differentiation and increases market demand.
and sales. At the same time, technology is closely related to the supporting management activities in a firm. For example, information technology improves the efficiency of information processing in an organization, which supports management decision-making and strategy implementation. Cost reduction and increased product demand directly contribute to firms’ financial performance; improved management activities enhance the implementation of effective competition strategies and contribute indirectly to firm performance.

In the expansion of MNCs, technology transfer to local subsidiaries is essential for successful operation of the subsidiaries in the local market (e.g., Chen, 1996; Chung, 2001; Ofer & Polterovich, 2000). Technologies that have provided MNCs competitive advantage in the home country, if leveraged to the host country, enable local subsidiaries to establish a competitive advantage in the local market. The transfer of technology to MNC subsidiaries contributes to production efficiency and product quality, and therefore helps local subsidiaries acquire market share. Application of technology also enables local subsidiaries to make necessary modifications of the product to adapt to local market demand. At the same time, technology transfer improves local subsidiaries’ capabilities of management information processing and increases the efficiency of management activities. The enhancement of both production efficiency and management efficiency improves MNC subsidiaries performance. Formally stated:

H7. Technology transfer between MNC and local subsidiaries are positively related to the performance of MNC subsidiaries.

3. The study

To test the hypotheses, we examined MNC subsidiaries operating in Croatia. We selected this setting for three specific reasons. First, much of the research conducted on environmental influences, with a few exceptions (e.g., Luo & Park, 2001), has been conducted in Western markets. As such, Croatia was selected as an opportunity to extend our application of the theory under study to a non-Western market. Second, Croatia offers a market characterized by a variety of competitive and market conditions and is marked by a diversity of foreign MNCs establishing subsidiaries, thus providing for diversity in national and organizational cultural distance. Given the transitional nature of the economy, a significant amount of MNC technology transfer exists. These factors, taken together, provide a context directly related to the issues under study. Third, Central and Eastern European (CEE) transitional economies have become major business opportunities, though complex socio-economic problems (e.g., high inflation and debt, high unemployment, organized crime) hinder MNC’s subsidiaries performance (Tihanyi & Roath, 2002). Even with these issues, CEE economies have attracted considerable foreign direct investment (i.e., $110 billion by 1999 (UNCTAD, 2000) with another 27 billion alone in year 2001 (UNCTAD, 2003)). Croatia, as a former socialist republic, offers significant opportunities for business and is reflective of CEE transitional economies. Continued legislative efforts to open Croatia to foreign investment are increasing its attractiveness to foreign businesses resulting in a stream of significant investments since its post-war independence, reaching over US$ 1 billion in 2000 alone (Ministry of Economy, 2000; UN, 1999) and growing to US$ 1.5 billion in 2001 (UNCTAD, 2003). Given these three factors, we believe Croatia is appropriate from both a theoretical and practitioner perspective.

3.1. Sample

The sample frame consists of 500 firms engaging in FDI on file with the Croatian National Bank. The sample was reduced to 300 firms by restricting the MNC subsidiaries to those with the largest amount of FDI in the marketplace, since companies with substantial foreign investment are more likely to be involved in technology transfer. The three hundred subsidiary firms were initially contacted via mail. The person most knowledgeable about the operational interactions between the foreign MNC and the subsidiary was asked to complete the survey. Multiple follow-up phone calls and e-mails were then used to increase the response rate. This resulted in 131 responses to the questionnaire for a response rate of 43.7%. Respondent firms averaged 1075 employees, 20 years of international experience and over $1 million USD of annual sales revenue. The sample covers a wide range of industries including agricultural, biotech, chemical, electric equipment, leather, naval technology, plastics, printing, rubber manufacturing and electronics. Respondent managers averaged 41 years of age and 14 years of international experience. Twenty-seven percent of the respondents were senior executives (e.g., Vice-President level or above) with the remaining 63% being senior managers.

3.2. Pre-test

The initial survey was developed based upon previous measures developed for and used within the
United States. Refining of the English version of the survey was done before translation. The proposed survey packet was examined and modified by international market researchers, business professionals and translators. The survey instrument was then translated into Croatian by an independent translator and back-translated by committee (cf., Sperber, Devellis, & Boehlecke, 1994). The survey instrument was checked for form and meaning equivalence with adjustments being made as necessary (cf., Sperber et al., 1994).

3.3. Measures

Competitive intensity was conceptualized as the level of competition in a market. Following Grewal and Tansihaj (2001) and Jaworski and Kohli (1993), a four-item, seven point Likert-type scale assessed the extent of competition in terms of (1) general competition, (2) promotional wars, (3) price competition, and (4) new competitive moves (α = .90).

Market dynamism was conceptualized as encompassing environmental demands and business practices. Market dynamism was measured via a two-item, seven-point, Likert-type scale derived from Jap (1999). The two items assessed the extent to which (1) the environment demands on the firm are constantly changing and (2) the business practices in the industry are constantly changing (α = .76).

National cultural distance was conceptualized as the underlying differences in national cultures between a home and a host country. Following Simonin (1999), national cultural distance was measured with two items: (1) the national culture of our primary business partner greatly differs from ours, and (2) language difference is a major obstacle in communication with our primary business partner. During the analysis, it was found that the second item did not correlate with the first item. One explanation could be that language obstacles do not capture differences in national culture in this setting, i.e., Croatia. As language is only one element of the greater construct of national cultural distance, and the first item of the measure captures the construct being measured more broadly, only the first item was employed for the analysis.

Organizational cultural distance was conceptualized as the underlying differences in organizational cultures between two firms. Organizational cultural distance was measured by Simonin’s (1999) two-item scale: (1) the business practice and operational mechanisms of our primary business partner are very similar to ours, and (2) the corporate culture and management style of our primary business partner are very similar to ours (α = .74). Since the items are based on similarity of organizational cultures rather than difference of organizational culture, the scale is a reverse scale.

Technology transfer was conceptualized as the transmission of know-how to suit local environments, with effective absorption and diffusion both within and across countries. Technology transfer was measured via Simonin’s (1999) three-item scale and included the items: (1) learning about the technology/process know-how of primary business partner; (2) reducing initial technological reliance or dependence on primary business partner; and (3) technology/process know-how held by our primary partner has been assimilated by the firm and has contributed to other projects developed by the firm (α = .79).

Performance was conceptualized as consisting of both internal and competitive dimensions. Following Jaworski and Kohli (1993), performance was measured via a two-item scale assessing whether (1) the firms overall performance last year was greater than expected and (2) the firm outperformed its major competitors in the last year (α = .78).

4. Analysis and results

Confirmatory factor analysis (CFA) was conducted to establish the measurement of the constructs in the model. Table 1 shows the results of confirmatory factor analysis for the measurement model. The adequacy of the measurement model is evaluated on the criteria of overall model fit with the data, convergent validity, discriminant validity, and reliability. The overall fit of the measurement model was deemed appropriate with a χ² value of 105.72 with 63 d.f.; CFI = .947; IFI = .949; SRMR = .058; RMSEA = .072. All measure items loaded significantly on their intended constructs, demonstrating convergent validity. As shown in Table 1, the t-values for all the items are high, with the lowest at 5.398. The standardized λs are reasonably high, with the lowest at .612.

Table 2 presents the correlations between the latent constructs (as shown in the phi matrix). The highest correlation coefficient (.561, between market dynamism and competitive intensity) is significantly less than 1, demonstrating discriminant validity of the constructs. The reliability of the measures, as indicated by Cronbach’s α, is greater than .70.

To initially explore each hypothesis we examined the pair-wise correlations between the individual constructs (Table 2). As hypothesized, the correlation matrix of the latent constructs shows positive associations between technology transfer and market environmental factors
including competitive intensity and market dynamism, and negative associations between technology transfer and cultural environment including national cultural distance and organizational cultural distance. Further, technology transfer is positively related to performance (.463). These results provide initial support for the hypotheses.

The model was then tested with structural equation modeling in EQS. The model demonstrated good overall fit with a $\chi^2$ value of 129.133 with 70 d.f.; CFI = .927; IFI = .929; SRMR = .108; and RMSEA = .081. Results for the hypotheses are shown in Table 3.

Hypothesis 1 theorized that competitive intensity in the market environment would be positively related to technology transfer between foreign MNC and local subsidiaries. The results do not support H1 (standardized $\beta$ = .138, $p > .05$). However, supportive of H2, market dynamism was found to be positively related to technology transfer (standardized $\beta$ = .435, $p < .01$). Although the correlation matrix showed that both

Table 1

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Item-construct loading</th>
<th>Cronbach’s $\alpha$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standardized $\lambda$</td>
<td>$t$-value</td>
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<tr>
<td><strong>Competitive intensity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The level of competition in the industry in high</td>
<td>.862</td>
<td>12.08</td>
</tr>
<tr>
<td>2. This industry has many promotional wars</td>
<td>.702</td>
<td>8.965</td>
</tr>
<tr>
<td>3. Price competition in this industry in great</td>
<td>.933</td>
<td>13.735</td>
</tr>
<tr>
<td>4. There are many new moves by our competitors in the industry</td>
<td>.837</td>
<td>11.528</td>
</tr>
<tr>
<td><strong>Market dynamism</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The environment demands on our firm are constantly changing</td>
<td>.709</td>
<td>8.221</td>
</tr>
<tr>
<td>2. The business practices in our industry are constantly changing</td>
<td>.867</td>
<td>10.124</td>
</tr>
<tr>
<td><strong>National cultural distance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The national culture of our primary business partner greatly differs from ours</td>
<td>1.00</td>
<td>16.125</td>
</tr>
<tr>
<td><strong>Organizational cultural distance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The business practice and operational mechanisms of our primary business partner are very similar to ours</td>
<td>.612</td>
<td>5.398</td>
</tr>
<tr>
<td>2. The corporate culture and management style of our primary business partner are very similar to ours</td>
<td>.967</td>
<td>6.741</td>
</tr>
<tr>
<td><strong>Technology transfer</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Our firm has learned a great deal about the technology/process know-how of our primary business partner</td>
<td>.772</td>
<td>9.452</td>
</tr>
<tr>
<td>2. Our firm has reduced its initial technological reliance or dependence on our primary business partner since beginning to work together</td>
<td>.648</td>
<td>7.613</td>
</tr>
<tr>
<td>3. The technology/process know-how held by our primary partner has been assimilated by our firm and has contributed to other projects developed by our firm</td>
<td>.840</td>
<td>10.510</td>
</tr>
<tr>
<td><strong>Performance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The overall performance last year was greater than expected</td>
<td>.679</td>
<td>7.342</td>
</tr>
<tr>
<td>2. Overall, we outperformed our major competitors last year</td>
<td>.936</td>
<td>9.687</td>
</tr>
</tbody>
</table>

Note: $x^2 = 105.72$ (d.f. = 63); CFI = .947; IFI = .949; SRMR = .058; RMSEA = .072. Because there is only one item measuring national cultural distance, the standardized $\lambda$ for this item is 1.

Table 2

<table>
<thead>
<tr>
<th>Correlations between constructs</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Competitive intensity</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Market dynamism</td>
<td>.561*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. National cultural distance</td>
<td>.195*</td>
<td>.272*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Organizational cultural distance</td>
<td>.126</td>
<td>.258*</td>
<td>.046</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Technology transfer</td>
<td>.384*</td>
<td>.553*</td>
<td>.219*</td>
<td>.382*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6. Performance</td>
<td>.395*</td>
<td>.538*</td>
<td>.187*</td>
<td>.277*</td>
<td>.463*</td>
<td>1</td>
</tr>
</tbody>
</table>

*a Note: Correlations are significant at the .05 level.
competitive intensity and market dynamism were positively related to technology transfer, when considered jointly, only market dynamism has a positive effect on technology transfer. Further, to examine H3, a t-test was conducted to statistically examine the relative influence of competitive intensity and market dynamism. The t-test indicated that the coefficient of market dynamism on technology transfer is significantly larger than that of competitive intensity (t-value = 25.53, p < .01), thus providing support for H3.

Hypothesis 4 argued that national cultural distance would be negatively related to technology transfer between foreign MNC and local subsidiaries. Results do not support H4 (standardized β = -.135, p > .05). However, supportive of H5, organizational cultural distance was found to be negatively related to technology transfer (standardized β = -.333, p < .01). Although the correlation matrix showed that both organizational and national cultural distances were negatively related to technology transfer, when considered jointly, only organizational cultural distance has a significant effect on technology transfer. A t-test was conducted to further examine the relative influence of national cultural distance and organizational cultural distance. The t-test showed that the coefficient of organizational cultural distance on technology transfer was significantly larger than that of national cultural distance (t-value = 26.18, p < .01), thus providing support for H6.

Finally, Hypothesis 7 argued that technology transfer between MNC and local subsidiaries would be positively related to the performance of MNC subsidiaries. The results are supportive of H7 (standardized β = .497 and p < .01).

5. Discussion and conclusion

This study was motivated by a desire to understand how the specific strategic initiative of technology transfer between MNC and its subsidiaries was influenced by environmental factors. Our findings offer initial insights into these issues and provide concrete directions for future research and managerial guidelines.

First, the results indicate that, when the two market environmental factors of competitive intensity and market dynamism are examined jointly, market dynamism influenced MNC subsidiaries strategic initiative toward technology transfer, while competitive intensity in the market did not. As such, we can conclude that market environmental factors have a direct effect on technology transfer, but when comparing the effects of different market environmental factors, dynamic markets require more technological proficiency of MNC subsidiaries than a market characterized with high competition but low dynamism. This finding is somewhat surprising as prior research suggests that competitive intensity is a market environmental factor influencing strategic initiatives. Comparison of the correlation analysis with the structural analysis suggests that prior research may have confounded results given individual assessment of each market environmental factor rather than testing these factors jointly. As such, the findings of this study highlight the necessity and importance of examining the two market environmental factors, i.e., competitive intensity and market dynamism, jointly in future research.

Next, the results indicate that, when the cultural environmental factors of national and organizational
cultural distances are examined jointly, organizational cultural distance influenced MNC subsidiaries strategic initiative toward technology transfer, but national cultural distance did not. This suggests that organizational culture differences are more important compared to national cultural differences in influencing technology transfer between MNCs and their local subsidiaries. These results once again are somewhat surprising in that prior research on technology transfer has found national cultural distance (or environmental factors) to be influential. However, most of these studies failed to include organizational cultural distance in their models. It can be argued that organizational cultural issues are more influential than national culture when operating in an MNC subsidiary relationship. This finding thus provides some empirical support for arguments made in the literature contending that findings related to national cultural distance may actually be artifacts of other issues, e.g., organizational cultural distance.

Taken together, these results demonstrate, building on Luo and Park (2001), the direct effect of environmental factors (both market and cultural) on specific strategic initiatives of MNC subsidiaries. As such, this study departs from much of the prior research in that it explicitly examines the direct effect rather than the moderating effect of environmental factors on strategy relationships. Moderating effects suggest the influence of environment on the strength of technology transfer and performance relationship, and imply that environment only provides for contextual influence on strategic decision-making. The findings of this study, however, indicate that environmental factors operate as antecedents to specific firm strategic initiatives, specifically technology transfer, thus extending the current literature and are supportive of strategic choice theory.

Further, this study extends the understanding of the environment-strategy-performance theoretical framework proposed by Luo and Park (2001) by investigating the relationships in the context of international technology transfer. The results of this study suggest that strategic initiatives, such as technology transfer, are managerial strategic choices related to environmental market assessment, and that such a choice results in enhanced performance. As such, this research not only provides a more complete understanding of the relative influence of environmental factors on firm strategy, but also provides insights into specific strategic initiatives as well as support for the environment-strategy-performance framework.

From a managerial perspective, the findings of this study shed light on subsidiary’ strategic decisions related to technology transfer. Technology transfer is a complex and costly strategic initiative. As the importance of technology transfer is different under differing environmental conditions, it is necessary for firms to understand under what specific environmental conditions it is most advantageous to become proactive in their approach to technology transfer from their MNC. The results indicate to managers that when operating in dynamic markets technology transfer appears to be more beneficial than costly, and thus subsidiaries working with their MNCs toward technology transfer may be able to achieve enhanced performance gains. Alternatively, in markets where competitive intensity is high, but market dynamism is low, the costs of investing in technology transfer may exceed the benefits. This is not to suggest that technology transfer is not necessary in highly competitive markets, but rather to indicate that firms need to understand the relative influence of market environmental factors on the need for the technology transfer.

Further, differing influences of organizational cultural distance and national cultural distance on technology transfer also raise important managerial implications for international technology transfer. Though managers have been aware of the national culture differences between MNC and their local subsidiaries, greater managerial attention is needed in recognizing the influence of differences in organizational culture, most notably between MNCs and their subsidiaries. The results of this study suggest that firms should consider how differences in organizational cultures can influence the effectiveness of their underlying strategies. Further, one could argue that working toward the development of similar or compatible organizational cultures between an MNC and its subsidiaries can improve effective technology transfer and ultimately performance of local subsidiaries for firms, thus supportive of expansion to diverse cultural environments overcoming national cultural differences.

5.1. Limitations and directions for future research

While this research has provided a number of new insights, as with prior studies, it has its limitations. First, perceptual measures were used in this study. Though some researchers contend that objective measures are more appropriate (Sawyerr, 1993), a substantial research history exists supportive of the fact that managers operate based upon perceptions and that therefore perceptual measures of issues such as environmental factors are appropriate (e.g., Luo &
Intensity and market dynamism, and two factors of the market environment, i.e., competitive advantages, and two factors of the two factors of the market environment, i.e., competitive advantages, and two factors of the environment can also contribute to the understanding of the relationship. The field could substantially benefit by understanding the dynamic nature of this relationship. Finally, although the context of Croatian subsidiaries of MNCs provided an illustration of the model for testing purposes, the context itself presents a limitation. The study was conducted in a single country, i.e., Croatia, a country in transition. The restriction of the data collection to a single country limits the generalizability of the results. Thus, although we can argue that the theoretical model would hold in additional markets, only future research can adequately address this issue.

This research suggests that a firm’s strategy choice is contingent on the specific environmental conditions the firm faces. More research efforts are needed to understand the direct effects of environmental factors on firms’ international business strategy. Future research could investigate the impacts of environmental factors on firm’s other strategic initiatives in international competition, such as product standardization, the development of knowledge management capabilities, and partnering strategies, etc. Studying the direct effects of environment can also contribute to the understanding of firms’ globalization strategy. For a firm, whether to localize or not and the extent of globalization are contingent decisions based on specific environmental factors. Considering the existence of both costs and benefits of globalization, environmental factors directly determine the level of globalization a firm should choose.

In conclusion, this research utilized the environment-strategy-performance framework of Luo and Park (2001) to model the direct and relative influence of two factors of the market environment, i.e., competitive intensity and market dynamism, and two factors of the cultural environment, i.e., national cultural distance and organizational cultural distance, on the specific strategic initiative of technology transfer and resultant subsidiary performance. While the results provide considerably new insights, a continued research effort is needed for a greater understanding of the environment-strategy-performance relationship.

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References


