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Uneven Geographies of Organizational Practice: Explaining the Cross-National Transfer and Diffusion of ISO 9000

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Abstract: There is growing recognition that organizational innovations can have a major influence on the geography of economic activity. Yet, little is known about the mechanisms and geographic preconditions underlying their diffusion, particularly at the global level. In this article, we test a series of hypotheses about the conditions under which organizations are most likely to adopt ISO 9000, the internationally recognized set of standards for quality management, using panel data for 130 countries from 1995 to 2001. Our findings support the idea that transnational networks that connect different countries at the international level provide conduits for the cross-national transfer of new organizational practices. Thus, exports to the European Union, local involvement of transnational corporations (TNCs), European colonial ties, and the availability of telecommunications all emerge as statistically significant determinants of ISO adoptions. Our findings also underscore the importance of national environmental conditions in influencing the receptiveness of organizations to new practices. A low regulatory burden, a high share of manufacturing activity, high rates of secondary school enrollment, and low levels of productivity are positively correlated with the number of ISO 9000 certificates. We conclude by discussing the implications of our findings for current debates about the mechanisms, preconditions, and scales of organizational transfer, diffusion, and convergence.

Key words: ISO 9000, standards, cross-national diffusion, globalization, institutionalism.

The aim of this article is to explain cross-national variations in the diffusion of ISO 9000, a series of voluntary private standards developed and promoted by the Geneva-based International Organization for Standardization (ISO). Following the release in 1987 of ISO 9000, take-up advanced most rapidly in the European Union (EU). Many other developed and developing countries have since adopted the standards, such that by December 2001, the end of our study period, 161 countries were host to ISO 9000-

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certified facilities. Yet, despite their geographic spread, the number of certified facilities remains highly uneven throughout the world.

For geographers, such cross-country variations in the take-up of ISO 9000 are of particular interest because they provide a unique opportunity to investigate the factors that shape the cross-national transfer, diffusion, and convergence of organizational innovations at the global level. There is growing recognition that such innovations—ideas, practices, and strategies—can have a profound influence on the geography of economic activity. Thus, productivity levels, competitiveness, the structure of firms, buyer-supplier relations, and the geographic distribution of supply chains are all shaped by organizational innovations (Storper 1997; Alänge, Jacobsson, and Jarnehammar 1998; Thrift 1998; Bryson 2000; Bathelt and Glückler 2003; Sturgeon 2003).

Despite their obvious importance, relatively little is known about the mechanisms and geographic preconditions that underpin the diffusion of organizational innovations (Gertler 2001). This gap is particularly acute at the global scale. Hence, although a number of studies have examined the cross-national transfer of corporate practices, they have been based largely on case-study evidence from a small number of nation-states (Florida and Kenney 1992; Gooderham, Nordhaug, and Ringdal 1999; Kollman and Prakash 2001; Clark, Mansfield, and Tickell 2002). What is more, few of these studies have sought to identify generic facilitators and/or barriers (Sturdy 2001), focusing instead on nationally idiosyncratic institutions that promote and/or inhibit the acceptance of "imported" ideologies, practices, and strategies (Pauly and Reich 1997; Argent 2002; Christopherson 2002). In fact, only a handful of studies have empirically investigated the cross-national transfer of organizational innovations at the global scale, with the result that many questions about the generic mechanisms and preconditions for organizational convergence remain unanswered.

A major reason for this gap in the literature is the lack of reliable data. Unlike many technological innovations, such as steel furnaces and telecommunications (Perkins and Neumayer forthcoming), little comparable data exist on the take-up of organizational innovations across multiple countries. An important exception is ISO 9000. The ISO has collected data on national certification counts since 1993 that have provided valuable insights into the cross-national diffusion of organizational practices at the global scale.

Given this coverage, it is perhaps surprising that only one previous study investigated the global diffusion of ISO 9000. Adopting a new institutionalist framework, Guler, Guillén, and Macpherson (2002) used regression analysis to examine the influence of several hypothesized factors on national certification counts. They found that the number of ISO 9000 certificates is positively correlated with levels of inward foreign direct investment (FDI), governmental consumption, wealth, and size of the labor force. Moreover, suggesting that organizational practices diffuse within networks of social influence, they reported that countries that have close trade ties and/or are similar in the products they trade are more likely to have a similar number of ISO 9000 certificates.

In this article, we follow a similar approach but extend Guler, Guillén, and Macpherson's (2002) analysis in three important ways. First, whereas they hypothesize that the take-up of ISO 9000 is primarily governed by institutionalized pressures for organizational conformity, our analytical framework recognizes that adoption decisions may also be influenced by efficiency motives. Besides social influence through network ties, therefore, we test for the influence of several geographic factors that are commonly hypothesized to influence the profitability of ISO 9000 certification. Second, in contrast to Guler, Guillén, and Macpherson, we use a lagged dependent variable that facilitates the identification of the geographic determinants of adoption by helping us to control for self-reinforcing

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bandwagon dynamics. And third, our data set includes a far-larger number of countries (N = 130), providing a more globally representative test of the determinants of organizational diffusion. Data limitations mean that Guler, Guillén, and Macpherson are forced to omit a substantial number of countries from the analysis (N = 85), opening up the possibility of sample selection bias in their estimations.

The rest of this article is organized as follows. The next section outlines the origins, nature, and requirements of ISO 9000. The third section briefly reviews the existing theoretical literature on the diffusion of technological and organizational innovations. The fourth section develops a series of hypotheses regarding the determinants of national certification counts. The fifth section describes the data and methods used in the study, and the sixth section presents the results. The discussion and conclusions are presented in the final section.

The Nature and Implications of ISO 9000

One of the defining features of the global business environment over the past two decades has been the emergence of quality as a key factor in competitive success (van der Wiele, Dale, and Williams 2000; Withers and Ebrahimpour 2000). Accompanying this so-called quality revolution has been a succession of organizational innovations that have been designed to assist firms in quality management. Originally, these innovations—for example, quality circles, total quality management (TQM), and just-in-time (JIT) principles—were based on loosely codified principles that were articulated by consultants and management texts. More recently, however, standardized systems of quality management have been developed, first at the national level and subsequently at the international level.

Quality-management standards have not emerged in isolation. Rather, these standards are part of a broader trend toward governance through standardization (Abbott and Snidal 2001; Sturgeon 2003). This trend has been especially pronounced at the global level, where growing cross-border economic integration has heightened the need for common standards to facilitate cooperation and coordination among firms. In the absence of a global state, the task of designing, implementing, and enforcing standards has been increasingly assumed by various regional and/or global institutions, some of which are governmental organizations, but many others of which are nongovernmental. The involvement of nongovernmental organizations in standard setting has gone hand in hand with a more general shift toward private-sector involvement in areas of governance that have traditionally been occupied by the state (Brunsson and Jacobsson 2000; Coe and Yeung 2001; Sassen 1999).

The ISO is the largest and perhaps best-known private standard-setting body at the global level. Comprising national standard institutes from 130 countries, its overarching goal has been to facilitate international trade and investment by harmonizing otherwise diverse and conflicting national standards with international ones (Stevenson and Barnes 2001). The majority of the ISO's standards are technical, defining the specifications that various products should possess. The ISO 9000 series of standards, by contrast, are procedural. Rather than standardizing technical specifications, the standards define a comprehensive set of quality-management practices. Their chief purpose is to provide external quality assurance to customers by demonstrating a supplier's compliance with a formalized quality-management system.

The ISO 9000 series was originally released in 1987 and subsequently revised and updated in 1994 and 2000. It consists of five individual standards. Two of these standards (ISO 9000 and ISO 9004) are so-called guidance standards that are designed to assist applicants of ISO 9000 in improving the quality of their systems. The other three (ISO 9001, ISO 9002, and ISO 9003) are contractual standards that define the basic requirements for establishing, maintaining,

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and documenting a certifiable quality-management system. As of December 2000, these three standards were replaced by a single one, ISO 9000: 2000. A parallel set of procedural standards for environmental management systems, ISO 14000, was released in 1996.

ISO 9000 is based on a number of principles for achieving quality. These principles—for example, customer satisfaction, continual improvement, and preventive action—are highly generalized, allowing ISO 9000 to be readily adapted to the needs of a wide range of organizations, regardless of their function, ownership, or size (Casper and Hancke 1999; Furusten 2000). An organization that wants to become certified to a chosen standard must first undergo an audit. Administered by an approved third-party registrar, the audit verifies whether the facility's operations comply with the documented procedures that are described in its quality-management system. Subject to a satisfactory inspection, a certificate is issued by the registrar that qualifies the organization to declare itself ISO 9000 accredited. Periodic surveillance audits are required to ensure continued compliance with the standards (Mendel 2002).

The business value of ISO 9000 has been extensively debated in the management literature (Dick 2000; van der Wiele, Dale, and Williams 2000; Stevenson and Barnes 2001). Supporters have pointed to several benefits that accrue to ISO 9000-certified organizations, foremost among which are the external benefits of increased customer satisfaction and market share, followed by the internal benefits of improved operational efficiency and productivity. In fact, even though the ISO 9000 standards were conceived primarily as a tool for achieving external quality assurance, firm-level surveys have revealed that the internal benefits that certified companies enjoy are often greater than external ones (Larsen and Häversjö 2001). Critics, however, have questioned the alleged benefits of ISO 9000. They have pointed to the high financial costs of certification and have questioned whether the standards actually contribute to the improved quality of products and market competitiveness. Suffice it to say, while many studies have found a positive correlation between certification and business performance (e.g., Withers and Ebrahimpour 2000), several others have found that ISO 9000 has little or no impact on long-term profitability (e.g., Wayhan, Kirche, and Khumawala 2002). Thus, it is perhaps not surprising that doubts persist over the efficiency of the standards.

What is clear, however, is that ISO 9000 has proved a spectacular success. At the end of 2001, the end of our study period, more than 510,000 certificates had been issued in 161 countries around the world. Yet a striking feature of certification activity is its geographically uneven distribution. Europe and the Far East are host to the largest number of certificates and account for the bulk of the world's total (see Table 1). On a country basis, with more than 66,000 certificates, the United Kingdom has the highest number of ISO 9000-certified facilities, followed by China, with over 57,000. Several EU countries, Japan, the United States, Australia, and South Korea also feature in the top 10 (see Table 2). A number of rapidly industrializing countries in Asia and Latin America have comparatively high national ISO 9000 counts as well. Elsewhere, enthusiasm for the standards has been far lower. Iran, for example, has only 618 certified facilities, and Bangladesh has a mere 38. Relative to population size, Australia has the highest number of ISO 9000 certificates, followed by the United Kingdom and various other EU member states. A handful of smaller countries, including Israel and Singapore, also have high per capita certification counts.

The goal of this article is to explain these variations in national certification counts and, in doing so, to advance the understanding of the mechanisms and geographic preconditions that underpin the uneven transfer, diffusion, and convergence of organizational innovations at the global level. To achieve this goal, we depart from previous cross-

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Table 1

Regional Share of ISO 9000 Certifications (2001)

Region	Number of Certifications	Share of World Total (% of Absolute Numbers)
Africa/West Asia	19,751	3.87
Central and South America	14,423	2.83
North America	50,894	9.97
Europe	269,950	52.87
Far East	126,779	24.83
Australia and New Zealand	28,819	5.65
World	510,616	100.00

Source: ISO (2002).

Table 2

Top 10 Countries, by ISO 9000 Certification Count (2001)

Country	Number of Certifications (Absolute Numbers)	Number of Certifications (per 1 Million Inhabitants)	Share of World Total (% of Absolute Numbers)
United Kingdom	66,760	1,135.4	13.07
China	57,783	45.5	11.32
Italy	48,109	830.9	9.42
Germany	41,629	505.8	8.15
United States	37,026	129.9	7.25
Japan	27,385	215.6	5.36
Australia	26,750	1,378.9	5.24
France	20,919	353.3	4.10
Spain	17,749	431.8	3.48
South Korea	17,676	373.7	3.46
Total	361,786		70.85

Sources: ISO (2002); World Bank (2003).

national diffusion studies, which were based largely on qualitative evidence from a handful of nation-states, and take a quantitative approach, using econometric techniques to estimate the influence of several hypothesized variables on certification counts for a sample of 130 countries.

Before we present our theoretically derived hypotheses, it is important to note that ISO 9000 is a specific type of organizational practice, meaning that our findings may not be fully generalizable to other ideas, practices, and strategies that help to shape the geography of economic activity. In particular, because its content and implementation are standardized in a set of written rules, we might expect ISO 9000 to be more geographically mobile than are less-codified organizational innovations.[1] In addition, the central importance of customer requirements as a motive for adoption (Anderson, Daly, and Johnson 1999) suggests that market actors are likely to play an unusually important role in inter- and intracountry diffusion patterns. Still, we believe that our study makes a valuable contribution to the literature in that it provides more-generalizable insights into the worldwide spread of new organizational practices.

[1] The growing trend toward the standardization of product and process requirements (e.g., see Sturgeon 2003), however, suggests that our findings have a wider relevance.

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Insights on the Diffusion of Organizational Innovations

A number of distinct theoretical perspectives dominate the literature on diffusion. Broadly speaking, however, they can be divided into two streams. The first, commonly referred to as the efficient-choice approach, argues that decisions to adopt innovations are based on the performance and/or profitability of innovations (Davies 1979; Rosenkopf and Abrahamson 1999). Variants of this approach assume different levels of information. Yet they all model decision makers as rational, calculative agents who select among alternatives according to their efficiency.

The second set of approaches, widely associated with the new institutionalism in economic sociology, reject the idea of profitability and/or performance as the primary motive behind the adoption of innovations. Although they accept that early decisions to adopt innovations may be influenced by efficiency considerations, they argue that later adopters are characteristically driven by a range of social pressures to adopt similar organizational practices. These pressures may have little to do with enhancing economic and/or technical performance and more to do with maintaining external legitimacy.

In a seminal piece, DiMaggio and Powell (1983) described three such social pressures—coercive, mimetic, and normative—that shape the demand for innovations and produce organizational convergence. Coercive pressures operate when firms are "compelled or mandated through regulation or exchange" (Mendel 2002, 419) to conform to specific practices. Mimetic isomorphism arises when organizations imitate the behavior of others (Haveman 1993; Rosenkopf and Abrahamson 1999), whereas normative pressures refer to the influence of professionals who define norms of rational action and prescribe "best-practice" solutions (Galaskiewicz and Wasserman 1989; Abrahamson 1996).

Institutionalist, inefficient-choice approaches have dominated the recent literature on the diffusion of organizational practices. In fact, in the only previous study to investigate the global spread of ISO 9000, Guler, Guillén, and Macpherson (2002) developed a new institutionalist framework to model cross-national transfers. Underpinning the choice of new institutionalist approaches is the observation that the economic returns from organizational innovation are often ambiguous. Hence, the emphasis on the norms, rhetoric, and ideologies of best practice, which are assumed to shape decisions to adopt innovative practices under complex and uncertain conditions (DiMaggio and Powell 1983).

We agree that institutional pressures are likely to play a leading role in the diffusion of ISO 9000. Besides, their influence has been convincingly documented in a number of recent qualitative and quantitative studies of the diffusion of organizational innovations, both within and across nation-states (Zbaracki 1998; Guler, Guillén, and Macpherson 2002; Nelson and Gopalan 2003). Yet, we argue that new institutionalist approaches are "underrationalized" (Strang and Macy 2001, 156) and that economic considerations are likely to shape the decision to adopt quality-management standards. Indeed, the findings of some studies seem to support this interpretation, suggesting that both institutional and efficiency motives may explain diffusion processes involving organizational innovations (Mansfield 1993; Hislop, Newell, Scarborough, and Swan 1997; Kogut and Parkinson 1998).

Our analytic framework, therefore, not only recognizes a central role for institutionalized norms, expectations, and rules in explaining diffusion patterns, but is open to the possibility that efficiency may influence decisions to adopt new organizational practices. Put simply, while managers can be induced, coerced, or regulated to adopt ISO 9000, the extent to which they are receptive to these pressures will partly be a function of profitability. Of course, this does not mean that managers are fully rational, always optimizing agents. They are not (Dicken and Malmberg 2001). Yet, it

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would be surprising if geographic factors that influence efficiency—or, indeed, the supply of information about profitability and/or performance—did not affect rates of adoption.

Combining these perspectives—economic and new institutionalist—the following subsections outline a series of hypotheses about the conditions that promote and/or inhibit ISO certification in which the unit of analysis is the nation-state. Our hypotheses are divided into two broad categories. The first are concerned with transnational network ties that connect geographically dispersed territories, firms, and managers and provide a conduit for the international transfer of organizational innovations. The second are concerned primarily with country-level environmental conditions that influence the receptiveness of firms to new organizational practices.

Transnational Network Ties

Networks have received growing attention from economic geographers over the past decade. Underlying this interest has been the recognition that firms are embedded in a complex set of relational networks that link customers, suppliers, and a host of governmental and nongovernmental organizations. Networks create opportunities for interaction, learning, and influence and are therefore seen as providing a central context for the production, shaping, and transfer of new ideas, knowledge, and practices (Gertler 2001; Bathelt and Glückler 2003). Much of the focus of recent work in geography, of course, has been on relational networks at the subnational level, specifically among actors within city-regions (e.g., Florida 1995; Morgan 1997; Keeble and Wilkinson 1999; Benner 2003). Yet there is growing awareness that interactions through networks at the international level also shape patterns of geocorporate behavior (Amin and Thrift 1992; Clark, Mansfield, and Tickell 2001; Coe and Yeung 2001; Dicken and Malmberg 2001; Sturgeon 2003).

One of the most important transnational networks is created by international trade. Although trade flows are primarily associated with the exchange of goods and services, there are two reasons why we may expect them to influence the cross-national transfer of organizational innovations. First, networks of trade connect customers in one country with suppliers in another and provide a channel for the transmission of coercive supply-chain pressures (Coe and Yeung 2001; Smith 2003). Porter (1990) described how sophisticated and demanding buyers in home markets, acting through value chains, can act as catalysts for improving product quality, productivity, and competitiveness of domestic firms. The exercise of coercive power by influential buyers and its influence on organizational behavior have also been observed at the cross-national level. Thus, Hughes (2000) documented how Kenyan floricultural suppliers are required to meet strict requirements regarding production processes, quality, and so forth that are set by major retail multiples in the United Kingdom. Anecdotal evidence has suggested that similar supply-chain pressures have been a significant factor in the take-up of ISO 9000. Many certified firms, especially large and/or multinational ones, routinely specify ISO 9000 as a contractual condition of supply (Casper and Hancke 1999). Hence, firms that export a large share of their output have significant incentives to adopt the standards. This situation no doubt explains the results of firm-level surveys that "market access" and "customer requirements" are lead motives for certification activity (Vloeberghs and Bellens 1996; Buttle 1997; Ebrahimpour, Withers, and Hikmet 1997; Chittenden, Poutziouris, and Mukhta 1998).

A second way in which trade may influence the cross-national pattern of organizational practice is by increasing the frequency of formal and informal interactions among actors in different countries (c.f. Granovetter 1973). These interactions provide opportunities for cross-national learning about the technical performance and/or profitability of specific organizational innovations (Gertler 2001). They also support mimetic-type behavior whereby

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organizations imitate the practices of others they perceive as especially legitimate and/or successful (DiMaggio and Powell 1983). Through trade-based interactions, firms may learn from and, moreover, emulate the practices of their high-reputation foreign counterparts (Arias and Guillén 1998).

Taken jointly, these arguments strongly suggest that countries that export a higher share of their output to markets with many ISO 9000 certificates will have more certificates. One key market in this respect is the European Union. Member states, such as Sweden, France, and Germany, were early adopters of ISO 9000 and have since diffused the standards throughout their economic structure. As a result, although it accounted for a mere 5 percent of the world's population, the EU 15[2] was host to nearly half the global number of ISO 9000 certificates in 2001. Given the popularity of ISO 9000, we expect that firms that export to the European Union will be more likely to learn about it and will be influenced to adopt ISO 9000 as a model of best practice. What is more important, perhaps, is that exporters are likely to face strong demand-side pressures to adopt ISO 9000 from EU customers. Indeed, according to several observers, the formal adoption of conformity-assessment procedures by the European Commission in 1989, which allowed European firms to refuse goods and/or services from non-ISO registered organizations, made ISO 9000 a de facto standard for firms wishing to access the European market (Tanner 1998; Withers and Ebrahimpour 2000; Mendel 2002). This interpretation is consistent with Corbett (2003), who found that supply-chain pressures by early adopters in Europe played an important role in the transfer and diffusion of ISO 9000 to later adopters in other countries and regions, which leads to Hypothesis 1:

> *Hypothesis 1.* Countries that export a larger share of their goods and services to the EU are likely to have more ISO 9000 certificates.

[2] The EU 15 prior to the accession of the 10 new member states in May 2004.

Transnational production networks, centered on and around transnational corporations (TNCs) and their subsidiaries, constitute another business network that supports the diffusion of organizational innovations at the global level. Gertler (2001, 11), for example, stated that, "foreign direct investment (FDI) constitutes arguably the most active channel available to firms to promote the circulation of new practices." Supporting such claims is a substantial body of work that has documented how TNCs have been instrumental in the transfer, adoption, and diffusion of new technologies, knowledge, and organizational practices in host economies (Florida and Kenney 1992; Li and Yeung 1999; Potter, Moore, and Spires 2002; Hayter and Edgington 2004).

This work has suggested that TNCs accelerate the cross-national transfer and within-country diffusion of new organizational innovations in two ways. First, they contribute directly to the take-up of new practices, deploying "standardized" organizational procedures, structures, and strategies throughout their regional and/or global network of operations. Clark, Mansfield, and Tickell (2001), for example, described how a growing number of German TNCs are implementing common accounting standards, in both their domestic and overseas operations. A similar process may account, in part, for the global spread of ISO 9000. Reports have indicated that many large TNCs have adopted ISO 9000. Moreover, they are adopting the standards on a corporate-wide basis, since ISO 9000 offers a flexible and widely accepted system of quality management and assurance (Yahya and Goh 2001; Mizuno 2002).

A second way in which TNCs influence the spread of new organizational practices is by acting as a catalyst for adoption by domestic firms. As influential and potentially demanding buyers of goods and services (Porter 1990; Potter, Moore, and Spires 2002; Hayter and Edgington 2004), transnationals can prompt take-up directly, compelling local suppliers to meet specific procedural standards. For example, Ivarsson and Alvstam (2004), described how, as a

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qualifying criterion, Volvo's suppliers of components are required to meet specific standards regarding, among other things, internal quality systems. Given that TNCs have been at the forefront of adopting ISO 9000, we expect that similar requirements have driven certification activity among upstream suppliers.

TNCs may also stimulate certification among domestic firms by acting as normative models of best practice. Their size, observability, and profitability mean that TNCs are more likely to be seen as legitimate and/or successful (Haveman 1993). Thus, managers of domestic firms may imitate ISO 9000 certification by TNCs to associate themselves with the strategic choices of these high-reputation counterparts (Abrahamson 1996). Similarly, interacting with local TNC affiliates and/or subsidiaries, domestic firms may learn about the existence and/or benefits of ISO 9000. Supporting this idea, Potter, Moore, and Spires (2002) found that the informal sharing of ideas, views, and information is a central mechanism through which new practices have diffused from foreign investors to domestic firms in the UK manufacturing sector.

Through these processes, therefore, the local involvement of transnationals is likely to be conducive to the diffusion of ISO 9000. Indeed, previous cross-country evidence corroborated this thesis, finding a positive statistical relationship between the certification of both ISO 9000 and ISO 14001 and inward investment by TNCs (Guler, Guillén, and Macpherson 2002; Neumayer and Perkins 2004), hence Hypothesis 2:

> *Hypothesis 2.* Countries with more inward investments by TNCs are likely to have a higher number of ISO 9000 certificates.

Of course, it is not only contemporary linkages that may influence patterns of diffusion, but also historical ones. Arias and Guillén (1998, 115) noted that historical interdependencies have largely been overlooked in the literature on cross-national diffusion. Yet, given the durable nature of economic, social, and political institutions (Gertler 1995), there are sound reasons to suppose that they will continue to influence the transfer of organizational innovations across national borders.

Particularly significant in this respect is colonialism, which was experienced by all but a handful of today's developing economies. Although the majority of colonies have since gained independence, there is plenty of evidence to suggest that they continue to enjoy close economic, political, and social ties with the former colonial powers. Neumayer (2003), for instance, demonstrated that patterns of bilateral aid remain heavily influenced by former colonial linkages. These and other ties are likely to prove important channels for organizational diffusion across national boundaries, particularly from developed to developing countries, reflecting the unequal power relations "between colonizer and colonized, dominator and dominated in the world system" (Frenkel and Shenhav 2003, 1541). Arias and Guillén (1998), for example, described how the exchange of students, managers, and professionals as part of bilateral aid schemes during the post–World War II period led to the transfer of economic practices from Europe and the United States to developing countries.

Applied in the present context, these insights suggest that we should expect ex-colonies of developed economies with a high number of ISO 9000-certified facilities to have a higher number of certificates. In practice, these countries are likely to be former colonies of EU member states, especially ones that were under colonial control for a prolonged period. As is shown in Table 1, the European region is host to over half of the world's ISO 9000 certificates and, moreover, was a pioneer in the early diffusion of the standards, which leads to Hypothesis 3:

> *Hypothesis 3.* Countries that spent a longer period under European colonial rule are likely to have a higher number of ISO 9000 certificates.

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At a more general level, we expect that the cross-national transfer and diffusion of new organizational innovations will be influenced by the extent to which social actors in one country communicate with their counterparts in others. Empirical work has shown that early adopters are characteristically more cosmopolitan than are late adopters (Rogers 1995). By interacting with a wider range of actors outside their immediate social system, cosmopolitan actors are more likely to be exposed to informational and/or social influences that promote the adoption of innovations (O'Neill, Pouder, and Buchholtz 1998). Extending these insights to cross-national diffusion processes involving organizational innovations suggests that the transfer and adoption of ISO 9000 will be shaped by the availability of cross-country communications media. Access to telephones, faxes, e-mail, and the Internet increases the likelihood of interactions between adopters and potential adopters in different nation-states and, therefore, of distanciated learning (Guillén 2001; Amin and Cohendet 2004). Indeed, given that there are no internationally recognized substitutes for ISO 9000, we expect generic communications channels to assume particular importance in the worldwide spread of the standards, as stated in Hypothesis 4:

Hypothesis 4. Countries with a greater availability of telecommunications media are likely to have a higher number of ISO 9000 certificates.

Characteristics of the National Environment

Organizational innovations diffuse not only between nation-states, but also within them (True and Mintrom 2001). In addition to transnational networks, therefore, we expect the characteristics of the national environment to influence their geographic spread. Of particular importance in this respect is the state. Despite the popular image of policies, practices, and strategies being imposed from above by global actors, there is growing recognition that the state retains considerable influence in shaping the trajectory of organizational convergence (Argent 2002; Park 2003). The state can resist homogenizing pressures by, for example, mandating compliance with national (as opposed to international) standards of organizational practice. Alternatively, it can actively support the import and diffusion of foreign practices by, for instance, providing relevant information, training, and financial support to potential adopters (Arias and Guillén 1998). The literature strongly supports the idea that the state has had a major influence in the context of ISO 9000. Driven by the belief that ISO 9000 certification can enhance industrial competitiveness, governments have encouraged the take-up of the standards. In this capacity, they have offered firms technical and/or financial assistance, primarily to lower the economic costs of implementation and registration (Mizuno 2002). They have also advanced ISO 9000 as a model of best practice using promotional materials, such as brochures and seminars, that highlight the "success stories" of efficient adoptions (Mendel 2002).

State actors have also created coercive pressures for certification. This process began in 1989 when the European Union made the pioneering decision to incorporate ISO 9000 into its "Global Approach to Testing and Certification" and subsequent "New Approach Directives." By permitting manufacturers to meet conformity requirements using ISO 9000, the European Commission provided a powerful incentive for certification among European firms, as well as their suppliers (Mallak, Bringelson, and Lyth 1997; Anderson, Daly, and Johnson 1999; McCalman, Wilkinson, and Brouthers 2000). Evidence suggests that governments in other countries have since gone on to list the standards in their conformity-assessment procedures. A growing number have also incorporated ISO 9000 into public-sector procurement guidelines (Beattie and Sohal 1999). For these reasons, we anticipate that countries whose governments are more involved in the economy in terms of

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governmental consumption, governmental production of goods and services, and governmental ownership of production facilities will have a higher certification count, which leads to Hypothesis 5:

> *Hypothesis 5.* Countries with high levels of governmental involvement in the economy are likely to have more ISO 9000 certificates.

Yet the state's influence on the diffusion of new organizational innovations is potentially ambiguous. While governments can provide positive incentives to "download" and diffuse new practices through, for example, procurement specifications, they can also indirectly deter their uptake. Thus, when governmental intervention negatively affects financial returns—for instance, because firms are subject to an elaborate, complicated, and burdensome regulatory process—organizations are unlikely to make significant long-term investments. The same is to be expected when governments increase the uncertainty of investments through the uneven application of regulations and/or corruption. Conversely, when the regulatory burden on firms is comparatively low and/or regulations are applied in a uniform way, firms are more likely to make large investments in new organizational practices, including ISO 9000, which involves a substantial up-investment and, moreover, one whose returns are likely to be realized over the longer term (Bierão and Sarsfield Cabral 2002). This point leads to Hypothesis 6:

> *Hypothesis 6.* Countries with a lower regulatory burden imposed on the private economy are likely to be hosts to a larger number of ISO 9000 certificates.

More generally, by influencing the real and/or anticipated financial returns from efficiency-enhancing organizational practices, we expect productivity levels to have an impact on certification activity. Although market requirements routinely emerge as the lead motive for ISO 9000, surveys have revealed that "productivity" and "efficiency" are significant reasons for seeking certification (Buttle 1997). Productivity motives are likely to be especially important among organizations that are characterized by low levels of productivity. Such organizations are unlikely to have exploited many low-cost, high-return investments in operational efficiency. Consequently, we predict that they will earn a higher financial return from ISO 9000, which is well suited to identifying and realizing productivity-enhancing investment opportunities, as is stated in Hypothesis 7:

> *Hypothesis 7.* Countries with lower levels of productivity are likely to have a higher number of ISO 9000 certificates.

Organizational resources are another factor that is known to influence the adoption of new practices (Florida, Atlas, and Cline 2001). Of particular significance in this regard is human capital. Firms with better-educated workforces are not only more likely to have knowledge of new organizational practices, but are likely to find it cheaper to implement them. As we noted earlier, the procedural requirements of ISO 9000 are extensive, particularly in terms of planning, monitoring, and documentation. Hence, we anticipate that the profitability of ISO 9000 will be sensitive to educational levels, with firms with poorly educated workforces finding it especially difficult and costly to achieve certification, as stated in Hypothesis 8:

> *Hypothesis 8.* Countries with higher educational levels are likely to have a higher number of ISO 9000 certificates.

The receptiveness of firms to specific organizational practices, strategies, and standards is also likely to depend on the firms' economic sector. Certain innovations will clearly be of greater value to organizations in some economic sectors than those in others. ISO 9000, for example, is likely to be of most benefit to manufacturing firms. The importance of quality to the safety and reliability of their output means that manufacturers are often subject to coercive pressures from upstream buyers.

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Markets for many manufacturing goods, especially standardized and/or internationally traded ones, are also highly price competitive. As a result, manufacturing firms face especially strong pressures to cut costs, providing an additional motive for adopting efficiency-enhancing organizational practices. This situation is likely to favor ISO 9000, which, in addition to improving the quality of products, is well suited to identifying and realizing cost savings through operational improvements (Larsen and Häversjö 2001). Together, these points suggest that ISO counts will be higher in manufacturing-based economies, a predication that has been supported by reports that certification activity has proceeded most rapidly in the industrial sector (Chittenden, Poutziouris, and Mukhta 1998; Acharya and Ray 2000; Brown 2004), which leads to Hypothesis 9:

> *Hypothesis 9.* Countries with a greater share of manufacturing in their gross domestic product (GDP) are likely to have more ISO 9000 certificates.

Research Design

Our dependent variable is the number of ISO 9000-certified facilities at the national level (ISO 2001, 2002), normalized by population size to make the counts comparable across different-sized countries (ISO9000PC). National ISO certification counts are available from 1993 onward. We lose the first year because of the inclusion of the lagged dependent variable in the regressions. Moreover, since the 1993 and 1994 data refer to the mid-year rather than the end of the year, we restrict our sample to the period 1995–2001, all of which refer to end-of-year counts.[3] Data for ISO 9000 are available for 2002, but many of our explanatory variables are not, with the result that we are forced to omit this year from the analysis.

[3] For 1995, we include the lagged value of the dependent variable from mid-1994, however, to avoid a further reduction in the sample size.

To test the influence of transnational network ties on national certification counts, we use four explanatory variables. The first is the value of exports of goods and services to the then-15 EU member states relative to the exporting country's GDP (EU15EXPGDP). For the EU countries, this variable refers to exports to the other 14 EU states. These data are taken from the Organization for Economic Cooperation and Development (2003). The second variable, the stock of FDI relative to GDP (FDISTOCKGDP) as reported by the United Nations Conference on Trade and Development (2003), is a better measure of the overall level of TNC involvement in host economies than is the potentially volatile annual FDI inflows and hence is well suited to testing our hypothesis. The third variable is the number of years a developing country has been under European colonial rule between 1900 and 1960 (COLONY), as documented by Alesina and Dollar (2000). The fourth variable is the number of main telephone lines per 100 inhabitants (TELEPHONESPC) as a proxy for the availability of telecommunications, with data taken from the International Telecommunications Union (2003).

Characteristics of the national environment are captured by a set of five variables. First, we use a subcomponent of the Heritage Foundation's (2003) Index of Economic Freedom, which ranks countries on a 1–5 scale according to the government's general involvement in the economy (GOVINVOLVEMENT). Countries are graded with respect to (1) the level of governmental consumption as a percentage of the economy, (2) the extent of governmental ownership of businesses and industries, (3) the share of governmental revenues from state-owned enterprises, (4) governmental ownership of property, and (5) the economic output produced by the government. Higher values imply greater governmental involvement. Although this variable measures general governmental involvement, another subcomponent of the Index of Economic Freedom provides a measure of the regulatory burden imposed on private

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businesses (REGBURDEN), again ranked on a 1–5 scale. A country is rated 1 if its regulations are straightforward and applied uniformly to all businesses and corruption is nearly nonexistent, whereas it is rated 5 if the government impedes the creation of new businesses, corruption is rampant, and regulations are applied randomly.

The third variable in this group is the gross secondary-school-enrollment ratio, used as a proxy for the national level of education (%SECONDEDUCATION). These data are taken from the World Bank (2003) and UNESCO (2003). Ideally, we would have liked to use a variable that measured the educational status of the workforce directly, but the only measure that fits this description has poor cross-country availability, so we resort to secondary school enrollment. The manufacturing share of GDP (%MANUFACT), the fourth variable, is taken from the World Bank (2003) and is complemented by data provided by the Central Intelligence Agency (2002). For our measure of economic productivity, we use GDP in purchasing power parity (PPP), divided by the size of the labor force (GDPPERWORKER). All data are from the World Bank (2003).

Finally, as an additional control variable, we include total GDP in PPP (GDP). In the absence of data on the number of facilities in a country, we realistically assume that the number of potential adopters is a function of total economic size. Countries with more facilities are also more likely to host innovative, early adopters who experiment with ISO 9000 and subsequently influence others to adopt the standards (Rogers 1995). Table 3 provides summary descriptive statistical information on the variables. With regard to potential multicollinearity problems, we computed variance inflation factors and did not find a reason for concern (the average factor is only 2.91).

We estimated the following model:

$$\ln y_{it} = \alpha + \beta_1 \ln y_{it-1} + \beta_2 \mathbf{x}_{it} + \gamma_t T_t + \mathbf{v}_{it} \quad (1)$$

where the subscript i represents each country in year t, y is the number of ISO 9000 certifications, and $\mathbf{x}$ is the vector of explanatory variables. The dependent variable is logged in order to reduce heteroscedasticity and to render its distribution less skewed. To do so, we were forced to add 1 to the absolute number of ISO 9000 counts, since the log of zero is undefined. For the explanatory variables, we had to take the log of the total GDP variable. Its distribution is extremely skewed, and its relation to ISO 9000 counts is log linear, suggesting that the number of certifiable firms increases

Table 3

Descriptive Statistical Information on Variables (N = 899)

Variable	Mean	Standard Deviation	Minimum	Maximum
ln ISO9000PC	–4.61	2.23	–6.91	0.32
ln ISO9000PC (lagged)	–5.04	2.41	–11.70	0.26
ln GDP	24.40	1.92	19.64	29.82
EU15EXPGDP	0.01	0.05	0.00	0.59
FDISTOCKGDP	23.99	28.97	0.04	271.57
TELEPHONESPC	19.92	21.32	0.00	78.00
COLONY	23.35	27.45	0.00	60.00
GOVINTERVENTION	2.63	0.85	1.00	5.00
REGBURDEN	3.25	0.89	1.00	5.00
%MANUFACT	17.92	8.99	3.48	60.00
%SECONDEDUCATION	66.70	34.37	5.30	152.70
GDPPERWORKER	15.69	22.98	0.23	132.58

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with total economic size, but at a decreasing rate.[4] The year-specific dummy variables T capture general developments, such as rising worldwide levels of awareness about the standards, and correct for unobserved time effects. The $\mathbf{v}_{it}$ is a stochastic error term. We estimate equation (1) with Beck and Katz's (1995) popular and commonly applied time-series cross-sectional estimator with panel-corrected standard errors. The error term is presumed to be heteroskedastic and contemporaneously correlated across countries. Beck and Katz provided Monte Carlo evidence that this estimator typically produces more conservative estimates of standard errors than does the alternative estimator, feasible generalized least squares. The time dimension is somewhat shorter than in typical applications of Beck and Katz's estimator, but using a random-effects estimator instead leads to practically identical results.[5]

The use of a lagged dependent variable has several advantages. First, and most important, it allows us to control for self-reinforcing diffusion dynamics, whereby the number of previous adoptions positively influences subsequent ones (Rosenkopf and Abrahamson 1999). Such dynamics have been well documented (Guler, Guillén, and Macpherson 2002; Neumayer and Perkins 2004; Perkins and Neumayer 2004) and are likely to have a major impact on the geographic pattern of ISO 9000 certification. Second, by using a lagged dependent variable, we are able to reduce any autocorrelation substantially. Third, the lagged dependent variable is correlated with potentially omitted variables. No econometric model is ever complete, and several potential determinants of ISO 9000 certification are difficult to capture. Inclusion of the lagged dependent variable thus tends to mitigate potential omitted variable bias (Finkel 1995). We have data available for a large panel of 130 countries. Table 4 lists the countries that were included in the sample.

Results

Table 5 presents our estimation results. As expected, the lagged dependent variable is positive and highly statistically significant, the inclusion of which also accounts for the high R-squared value. That is, our estimations suggest that the number of past ISO 9000 adoptions has a major impact on subsequent certification activity, a finding that is consistent with the idea that patterns of geocorporate change are cumulative and path dependent (Coe and Yeung 2001; Bathelt and Glückler 2003). Although our results say nothing about the underlying drivers of this relationship, it is most likely the product of bandwagon-type dynamics. Thus, a larger user base will most likely enhance the supply of information about ISO 9000, increasing the probability of nonadopters learning about the standards, whereas accumulated experience with ISO 9000 is likely to reduce the implementation costs for late adopters, raising the profitability of the standards and the economic incentive to certify. Similarly, coercive pressures to adopt ISO 9000 are likely to increase with the number of certificates as a growing population of certified firms place contractual requirements on their domestic suppliers.

Still, the estimated coefficient of the lagged dependent variable is lower than 1, suggesting that the spread of ISO 9000 is not simply driven by self-reinforcing bandwagon dynamics. Other factors are clearly important in the geographic pattern of ISO 9000 certification. One is the size of the economy. We estimate that larger economies, as measured by GDP, have more ISO 9000-certified facilities. Given that larger economies are likely to have a greater number of potential adopters of quality-management systems than are smaller ones, this result makes sense.

[4] If it was not entered in logged form, the total GDP would be negative and significant, which makes no sense.

[5] Unfortunately, we could not use a fixed-effects estimator, since there simply is not enough over-time variation in the data. The major variation is cross sectional.

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Table 4

List of Countries in the Sample

Albania	Colombia	Hungary	Mauritius	Singapore
Algeria	Congo (Rep.)	Iceland	Mexico	Slovak Republic
Argentina	Costa Rica	India	Moldova	Slovenia
Armenia	Côte d'Ivoire	Indonesia	Mongolia	South Africa
Australia	Croatia	Iran	Morocco	South Korea
Austria	Cyprus	Ireland	Mozambique	Spain
Azerbaijan	Czech Republic	Italy	Namibia	Sri Lanka
Bahrain	Denmark	Jamaica	Nepal	Swaziland
Bangladesh	Dominican Republic	Japan	Netherlands	Sweden
Barbados	Ecuador	Jordan	New Zealand	Switzerland
Belarus	Egypt	Kazakhstan	Nicaragua	Syria
Belgium	El Salvador	Kenya	Niger	Tajikistan
Belize	Estonia	Kuwait	Norway	Tanzania
Benin	Ethiopia	Kyrgyz Republic	Oman	Togo
Bolivia	Finland	Laos	Pakistan	Trinidad and Tobago
Botswana	France	Latvia	Panama	Tunisia
Brazil	Gambia	Lebanon	Papua New Guinea	Turkey
Bulgaria	Georgia	Lesotho	Paraguay	Uganda
Burkina Faso	Germany	Lithuania	Peru	United Arab Emirates
Burundi	Ghana	Luxembourg	Philippines	United Kingdom
Cambodia	Greece	Madagascar	Poland	United States
Canada	Guatemala	Malawi	Portugal	Uruguay
Cape Verde	Guinea	Malaysia	Romania	Venezuela
Chad	Guinea-Bissau	Mali	Rwanda	Vietnam
Chile	Guyana	Malta	Saudi Arabia	Zambia
China	Hong Kong (China)	Mauritania	Sierra Leone	Zimbabwe

Our econometric estimations also strongly support the idea that transnational network ties have influenced the uneven transfer and diffusion of ISO 9000 at the global level. As anticipated, exports to the EU 15 (EU15EXPGDP) and the FDI stock (FDISTOCKGDP) are positively and statistically significantly correlated with national ISO 9000 counts. Stated differently, countries that are more integrated into the global economy—through international trade and investment—are likely to have more certified facilities. These results are broadly consistent with those of Guler, Guillén, and Macpherson (2002), who similarly estimated that trade and investment patterns influence the geography of certification, but were derived from a more globally representative sample of 130 countries.

Our econometric estimations do not tell us why a European export orientation and exposure to international investment encourages firms to adopt ISO 9000. Yet, on the basis of evidence from case studies, we suspect that there are two underlying drivers. The first, and most important, is coercion. Contractual requirements that were imposed by business customers are likely to have provided a major impetus for certification. As we noted earlier, many large TNCs have adopted ISO 9000 and, moreover, are requiring their suppliers to certify to the standards. Hence, it makes sense that countries with a larger stock of FDI should have more ISO 9000 certificates. Similarly, the high number of ISO 9000-compliant firms, together with the formal incorporation of the standards into the European Union's conformity-assessment procedures, strongly suggests that exporters to member states are likely to face strong pressures to certify to ISO 9000. These market-based pressures most likely explain the higher number of certificates in countries that

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Table 5

Estimation Results

Variable	Result
ln ISO9000PC (lagged)	0.730
	(10.18)**
ln GDP	0.084
	(4.71)**
EU15EXPGDP	0.700
	(4.33)**
FDISTOCKGDP	0.001
	(2.07)*
TELEPHONESPC	0.015
	(6.77)**
COLONY	0.001
	(2.63)**
GOVINTERVENTION	–0.008
	(0.65)
REGBURDEN	–0.070
	(2.57)**
%MANUFACT	0.009
	(8.54)**
%SECONDEDUCATION	0.003
	(2.65)**
GDPPERWORKER	–0.003
	(2.80)**
Observations	899
Countries	130
Adjusted *R*-squared	0.95

Note: The dependent variable is the logged number of ISO 9000 certifications per million inhabitants. The absolute z-statistics are in parentheses. OLS estimation is with panel-corrected standard errors. Constant and year-specific time dummies are included, but coefficients are not reported.
* Significant at the .05 level.
** Significant at the .01 level.

export a higher share of their output to the European Union.

A second set of drivers are informational and ideational in nature. Interacting with ISO 9000-certified buyers in the European Union, and/or certified TNCs in host economies, managers are likely to learn about the existence, benefits, and/or profitability of the standards, which may stimulate certification activity (Gertler 2001; Guler, Guillén, and Macpherson 2002). Alternatively, domestic managers may mimic their European Union and/or multinational counterparts with whom they interact, adopting ISO 9000 in order to align themselves with externally defined norms of best practice (Abrahamson 1996). Previous case-study research suggested that these mechanisms are important vehicles for the diffusion of new ideas, knowledge, and practices (Hughes 2000; Potter, Moore, and Spires 2002), and there is little to suggest that they have not also been influential in the geographic spread of ISO 9000.

Further empirical support for the assumed importance of transnational networks in the global diffusion of new organizational practices is that telecommunications and colonial linkages influence the pattern of ISO 9000 certification. The per capita availability of telephones (TELEPHONESPC) and the length of time a country has been under European colonial rule (COLONY) are both positive correlates of certification counts. Again, our estimations do not allow us to draw definitive conclusions about underlying mechanisms, although the results are intuitively plausible. Telecommunications provide an opportunity for potential adopters to learn about organizational practices from adopters in other countries. It is hardly surprising, therefore, that countries with a higher density of telephones have more ISO 9000 certificates. The relationship between certification activity and former European colonial status is equally plausible. Europe has led in the adoption of ISO 9000, driven, in large part, by the decision by the European Union to incorporate the standards into its conformity procedures. Ongoing and often close ties between European states and their former colonies are likely to facilitate the transfer of information, norms, and the like regarding the standards, stimulating certification activity in developing countries.

Consistent with our predications, and moving beyond the determinants hypothesized by Guler, Guillén, and Macpherson (2002), we also found that characteristics of the national environment influence patterns of organizational diffusion. In particular, we found a positive and statistically significant relationship among national ISO 9000 counts, enrollment rates in

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secondary education (%SECONDEDUCATION), and share of manufacturing in GDP (%MANUFACT) and a negative significant relationship among national ISO 9000 counts, regulatory burden (REGBURDEN), and economic productivity (ln GDPPERWORKER). Drawing causal inferences from these statistical relationships is difficult. However, given that all four factors have the potential to influence the profitability of certification, we suspect that economic considerations predominate.

Thus, firms with better-educated workers are more likely to be aware of the existence of ISO 9000 through, for example, their links with professional associations. Moreover, they are likely to find implementing a documented quality management system less costly than their counterparts in countries with poorly educated workers. The negative relationship between productivity and certification is also most likely rooted in the economic returns from adoption. Quality-management systems are well suited to identifying and realizing low-cost, high-return operational improvements. However, because firms in more productive countries will have exploited many of these gains, it makes sense that the potential economic returns, and hence the willingness of firms to invest in ISO 9000, will be lower under conditions of high productivity.

The economic incentive to adopt ISO 9000 is also likely to be affected by the style of business regulation. Burdensome, erratic, and/or corrupt regulatory interventions by governments reduce the economic incentive to make costly, long-term investments. Therefore, it is hardly surprising that they should act as a deterrent to adopting ISO 9000, whose setup costs are high and whose financial returns are realized only over the longer term. Differences in the financial returns from certification may also explain why countries with a higher share of manufacturing in GDP have more ISO 9000 certificates. Manufacturing firms are more likely to benefit from cost savings by implementing quality-management systems—through, for example, the reduced use of materials—than are firms in, say, the financial sector. These offsetting benefits may be expected to increase the willingness of profit-seeking managers to absorb the costs of implementing and certifying ISO 9000. Reinforcing these incentives are supply-chain pressures which are known to be the most advanced in the manufacturing sector.

One surprising result is the statistically insignificant and negative coefficient for GOVINT. This finding contradicts our hypothesis, which suggested that countries with higher levels of governmental consumption are likely to have more ISO 9000 certificates. It is also counter to the findings of Guler, Guillén, and Macpherson (2002), who estimated a positive and statistically significant relationship between ISO 9000 counts and governmental consumption. What explains this apparent disparity? One possible answer is our larger sample of countries. Because of data limitations, Guler, Guillén, and Macpherson (2002) were forced to omit a large number of, presumably, developing countries from their sample. Although governments of low-income countries consume a substantial share of GDP, there is little evidence to suggest that they have driven ISO 9000 certification through procurement and conformity requirements. Therefore, while governments may well have driven certification in a number of developed countries, their overall influence at the global level is comparatively small.

Discussion and Conclusions

According to Bryson (2000, 157–58), "Central to the geography of economic activity should be an understanding of the transfer of management ideas and techniques into and between companies." This article has investigated the mechanisms and geographic preconditions underpinning such transfers at the global level. Using panel data for 130 countries, we applied econometric techniques to estimate the influence of several hypothesized variables on the adoption of ISO 9000, the internationally

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recognized series of quality-management standards.

A particular advantage of our quantitative approach is that it allowed us to identify generic facilitators of and/or barriers to the diffusion process. Previous geographic work has done a poor job in this respect. Drawing on case-study evidence from a small number of economies, researchers have been mainly concerned with identifying country-specific socioinstitutional characteristics that account for the acceptance or, more often, rejection of "imported" organizational innovations (e.g., Christopherson 2002; Argent 2002). We sought to move beyond this focus on national specificity by performing a much-needed systematic analysis of organizational diffusion across a large number of developed and developing countries. Of course, our large-sample, econometric approach was constrained by the availability of measurable proxies and, moreover, could not provide the kind of contextual detail afforded by previous small-sample, qualitative studies. Nevertheless, it usefully complements these approaches, although we stress that our quantitative methodology is in no way superior.

Our results advance current understanding of the mechanisms and geographic preconditions underlying the cross-national transfer and within-country diffusion of new organizational innovations in several ways. First, they confirm the role of networks, specifically, transnational networks, in the international spread of organizational practices (Hughes 2000; Dicken and Malmberg 2001; Gertler 2001; Smith 2003; Sturgeon 2003). They suggest that relational networks that link actors in different nation-states function as conduits for the transfer of information, norms, and coercive pressures and, in doing so, provide a central context for the cross-national diffusion of new organizational innovations. The importance of networks, of course, is hardly new to economic geographers. However, while the predominant focus of recent work has been on interaction, learning, and influence through social networks at the subnational level (e.g., Benner 2003), our work points to the possibility of similar processes operating through networks at the international level.

This is not to say that the domestic context is irrelevant. To the extent that the most important determinant of national certification counts is the existing number of ISO 9000 certificates, the results of our analysis suggest that domestic learning and influence are paramount. Despite the supposed primacy of global forces, patterns of geocorporate change remain cumulative, path dependent, and predominantly local (Gertler 1995; Coe and Yeung 2001; Bathelt and Glückler 2003). Still, the fact that telecommunications, export ties, and colonial ties all emerge as statistically significant determinants of national certification counts strongly indicates that distanciated learning and influence are real (Amin and Cohendet 2004).

Our findings therefore suggest that proponents of the learning-region approach (e.g., Morgan 1997) are right to highlight the central importance of geographic proximity in organizational learning. Yet, by neglecting global ties, they risk underspatializing the sources of geocorporate change. Our findings point to the need for a multiscalar perspective, one that recognizes that learning and influence operate on a variety of scales, from local to global (Coe and Yeung 2001; Sturgeon 2003).

Our findings also reinforce the importance of the spatial configuration of networks in the uneven diffusion of organizational practices. Transnational networks are not ubiquitous. Rather, as Coe and Yeung (2001, 375) reminded us, "they are highly uneven and embedded in specific places." Our econometric estimations suggest that the uneven way in which transnational networks are inserted into territories has an influence on geographic patterns of organizational practice. Thus, inward investment, telecommunications, EU export linkages, and colonial ties all emerged in our study as statistically significant determinants of national ISO 9000 certification counts. Our study thus contributes to a growing body of relational economic geography that emphasizes the

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importance of networks and, moreover, their inherent spatiality, in explaining the uneven outcomes of economic globalization (Coe and Yeung 2001; Dicken, Kelly, Olds, and Yeung 2001; Bathelt and Glückler 2003).

Our empirical analysis also indicated a major role for the domestic context in the uneven geography of organizational practice. Again, the idea that national environmental characteristics influence the diffusion of knowledge, ideas, and practices is not new. Our specific contribution, however, is to re-emphasize the importance of the economic. On the basis of the observation that our country-level environmental variables—share of manufacturing in GDP, economic productivity, regulatory burden, and human capital—all potentially influence the cost-benefit ratio of certification, we argue that the domestic context is important through its influence on the economic returns to adoption.

The apparent role of economic factors is significant for two reasons. First, it suggests that the influence of the domestic environment is not restricted to institutional variables, which have been widely implicated in previous geographic research as constraining organizational convergence (Pauly and Reich 1997; Argent 2002; Christopherson 2002; Cox 2004). Other, arguably more mundane, characteristics are also important. They include various country-level variables—the structure of the economy, the level of human capital, and so on—that collectively influence the financial costs and benefits of new organizational practices. Of course, recognizing that economy, culture, and society are coproduced, we do not suggest that institutional characteristics do not matter in the uneven global diffusion of new ideas, practices, and strategies. They clearly do (Gertler 2001). Nevertheless, our findings reinforce recent critiques of the "cultural turn," cautioning against explanations in economic geography that exclusively privilege the "socioinstitutional" over the economic (Martin and Sunley 2001).

The influence of the economic in the diffusion of ISO 9000 is also potentially significant, since it challenges existing theories of new institutionalism. These theories reject the idea of rational, profit-maximizing action and instead maintain that the take-up of new organizational practices is governed primarily by managers' quest for legitimacy (Abrahamson 1996). The findings presented here do not entirely contradict this position. Indeed, the influence of, for example, TNCs, suggests that institutionalized pressures for conformity may play an important role in the spread of new practices. Our results equally suggest, however, that efficiency considerations are also significant. That is, in addition to questions of legitimacy, calculative managers may pay attention to economic costs, benefits, and profitability in deciding whether to adopt new organizational practices.

Taken together, then, our results reinforce the findings of recent studies that have suggested that organizational convergence at the global level is both uneven and contingent (Coe and Yeung 2001; Gertler 2001; Cox 2004; Poon and Thompson 2004). No doubt, globalization—the intensification of economic, political, and social linkages at the international level—has increased the mobility of organizational innovation across national boundaries. Yet, as evidenced by significant variations in the take-up of ISO 9000 at the country level, increased mobility does not imply cross-national organizational convergence. One reason for these continuing differences, of course, is that the spatial pattern of cross-national interconnection is itself highly geographically uneven. Flows of inward investment into territories, the availability of telecommunications, and so on vary significantly across the globe. Another reason, and one that resonates with the findings of previous research, is that certain national environments are more favorable to the take-up of organizational innovation than are others. In fact, given far-reaching geographic variations in these determinants, it is perhaps unsurprising that spatial unevenness is a persistent feature of organizational transfer, diffusion, and convergence at the global level.

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