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Innovative Firms in Emerging Market Countries: An Introduction

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Abstract and Keywords

This introductory chapter begins by discussing the theoretical and empirical context for the book before moving on to a brief consideration of changes in the policy environment to which innovative firms have been subject. In terms of the latter, particular attention is paid to the roles of foreign direct investment (FDI), trade, and market liberalization. The discussion then turns to a detailed review of the process of innovative capability building, distilling the key findings of what has become a substantial literature. Next, the framework for the analysis is presented. The discussion here sets out — and contextualizes — the main questions to be addressed in subsequent chapters. Finally, the structure of the book is described.

Keywords: innovative firms, capability building, policy environment, foreign direct investment, trade and market liberalization

1.1. Introduction

This book forms part of a wider program of research on technological and economic catch-up which has been coordinated by Professor Richard Nelson at Columbia University, New York. Two volumes in this series have already emerged. One, edited by Franco Malerba and Sunil Mani, focuses on sectoral innovation systems and catch-up.¹ The other, edited by Hiro Odagiri, Akira Goto, Akira Sunami, and Richard Nelson, examines intellectual property rights and catch-up.² These volumes concern the wider industrial systems within which firms operate and the overall policy and regulatory environment for technological change in emerging market countries. In

contrast, this book is preoccupied with capability formation at the firm level. While much of the catch-up literature in the past has focused on aspects of the wider environment within which firms operate, we wish to bring firm-level capabilities to the forefront of the story. In our view, the formation of capabilities at the firm level is a critical feature of all successful technological and economic catch-up experiences, yet one which has been little studied.

We believe that the firm-level orientation of this book speaks to a wider audience interested in the role of business transformation and entrepreneurship in late industrializing countries. Numerous entrepreneurial and innovative businesses have lately been emerging and growing in late industrializing economies such as China, India, and Brazil. In tandem with this, a number of recent books have examined institutionally driven and market-driven innovation in the context of different emerging market countries. Khanna and Yishay (2007) discuss the growth of entrepreneurship in China and India in the (p.4) context of their institutional environments, while Prahalad and Lieberthal (1998) discuss how the particular characteristics of some emerging markets have given rise to many new entrepreneurial opportunities. Our volume examines another dimension of this unfolding set of processes: the building of technological capabilities in these firms in late industrializing countries. We argue that such capability building is unleashing the potential for accelerating enterprise development, so in turn giving rise to an increased role for late industrializing country firms on the global stage.

In the second half of the 20th century the global concentration of industrial innovation in the world's advanced industrial economies, having been extended to include Japan during the middle decades of the century, was further extended to encompass another generation of new entrants to the club of producers of the world's industrial technology. These newcomers consisted of a small number of economies, and among these greatest attention has been concentrated on three in East Asia (Korea, Taiwan, and Singapore), though others such as Israel were also involved. The East Asian part of this change has been extensively documented—for example by Amsden (1989, 1997), Ernst (2002), Hobday (1995, 2000), Kim (1997), Kim and Nelson (2000), Mathews (2006) Mathews and Cho (2000), Nelson and Pack (1999), Wong and Ng (2001), and many others.

This wealth of case-study material and broader synthesis tells a story of cumulative deepening of technological and related capabilities and activities at the firm level. A growing sub-set of firms across these countries had

moved from technological imitation and adaptation, through innovative reverse engineering and incremental improvement to more “fundamental” modes of technological innovation that were close to, or even pushing forward, the international technological frontier. Recognition of the importance of these processes across several industries in Korea, Taiwan, and Singapore gave rise during the 1990s to views about the emergence of a new international technological division of labor. But the significance of this was sometimes questioned by those who emphasized the limited number and size of these economies, together with the historically specific conditions under which they had made this progression from imitation to innovation.

The contours of this change in the international distribution of innovative effort have been mapped more broadly in a recent study (Athreye and Cantwell, 2007). This demonstrates that with reference to the most advanced kinds of technological innovation (as measured by patenting in the US) there was actually further consolidation, not reduction, in the degree of concentration across countries from around 1970 through to the early 1990s. However, lower-level kinds of innovation of the sort that rely on simpler and more basic capability development were already dispersing during this period, as measured by the total international licensing receipts earned by the firms of countries for their intellectual property creation, and this was partly accounted (p.5) for by new entrant countries. Then, in a transition since the early 1990s, the more sophisticated kinds of innovative effort have become more geographically dispersed across countries too—with the well-known East Asian new entrants being significant among the contributors to this shift.

But two other new entrants were also important contributors to this transition—India and China. Wider recognition of the emergence of significant innovative activity in these large economies at the dawn of the 21st century adds to a palpable scent of change in the air. Combined with the further deepening and spread of innovative activity among firms in the new entrant economies of the previous decade or two, this suggests that a redistribution of global innovative activity may be under way on an unprecedented scale. This appears to be reinforced by the deepening of firms’ innovative capabilities in industrializing economies such as Brazil, Argentina, and perhaps Malaysia—suggesting a further cohort of potential entrants to the global industrial innovators’ club. This transformation is likely to have far-reaching consequences, not only for patterns of industrialization and development in the developing world, but also, more generally, for the future global balance of economic, political, and military power.

This intriguing set of circumstances, and the critical role within it of the technological upgrading and geographical restructuring of the activities of firms, provides the background for this volume.

This emerging transition is shaped by numerous trends and forces. Three are central to the issues addressed in the book. First, it has been argued that the catch-up in basic levels of innovative capacity has been strongly encouraged especially since the early 1980s by the rapid growth of arm's length markets for intellectual property trade, which has created an opportunity for the emergence of new players (Arora et al., 2001). Second, the rapid growth of foreign direct investment (FDI) has brought with it a global redistribution of not only the direct production activities of multinational corporations (MNCs) but also of their innovative activities, as branches of MNCs have evolved from being purely competence-exploiting to becoming locally competence-creating (in the terminology of Cantwell and Mudambi, 2005). Third, the combination of outsourcing and offshoring via global production networks and value chains has further reinforced the global dispersion of innovation in two ways: technology development capabilities have been deepened by supplier firms in the globally dispersed locations of production (most strikingly in East Asia—e.g. Hobday, 1995; Ernst, 2002), and firms in the advanced countries have increasingly outsourced and offshored elements of their innovative activities themselves (Teece, 2006; Chesbrough, 2003).

Given these different routes to developing innovative capabilities, several types of firm have been at the center of the emergence of innovation activities in new global locations. Some have been indigenous firms—usually exploiting the opportunities to acquire technology in different forms through arm's (p.6) length transactions in international markets, and sometimes deepening their capabilities as suppliers within global value chains, perhaps progressing from OEM, via ODM to OBM positions within those chains (Hobday, 1995). Some have been branches of foreign-owned MNCs, whose shift toward dispersed competence-creation has increasingly been prompted by the availability of newly developed competences in host economies—particularly in Singapore, China, and India. Yet others have involved cooperative ventures between indigenous firms and multinationals.

One of the aims of the book is to get a better feel for the landscape that is emerging from the interaction between the forces fostering the dispersion of innovative competence and the types of firm that are the key actors in the new locations of innovative activity. We aim to understand better where—in what countries, and in what sectors—innovative firms of different types have

in the past, and may in the future, evolve and emerge. However, that is a challenging task because there is little consensus around most of the issues involved. In particular, the influence of the three trends noted above is far from clear.

First, although the accessibility of technology through arm's length market transactions may be increasing, many would argue that the current international intellectual property rights (IPR) regime raises, rather than reduces, the barriers faced by at least some kinds of firms in developing countries in actually accessing substantial parts of the international stock of knowledge.

Second, the capability-enhancing role of participation in global value chains has been questioned. The significance of knowledge flows from advanced country firms to support technological upgrading in developing country suppliers seems to be contingent on several issues—e.g. the governance of the value chain (Schmitz, 2004). In particular, knowledge flows to facilitate upgrading of the functions of supplier firms toward, for instance, design, marketing, and R&D functions involved in deeper innovation activities often seem limited, so contributing little to firms' progression from OEM to ODM and OBM positions in global chains (Schmitz, 2004; Giuliani et al., 2005). Indeed, rather than global value chains acting as key conduits of knowledge and capabilities for developing country firms, it may be that local investment in creating and cumulatively deepening knowledge resources provides the necessary basis for participating in such chains and networks (Ernst and Kim, 2002).

Third, the extent to which MNC subsidiaries enhance innovative capabilities in developing countries is also far from clear. They evidently do so in some circumstances—e.g. in many subsidiaries in Singapore (Amsden and Tschang, 2003) or in some firms in the automobile industry in Brazil (Quadros and Queiroz, 2001). However, three kinds of qualification arise: (i) there seems to be considerable variation between subsidiaries and circumstances—as among subsidiaries in Argentina where significant innovative activity was undertaken in only a minority of cases in quite narrowly defined local and (p.7) corporate situations (Marin, 2006), (ii) even in “favorable” circumstances there may be limits to the deepening of their innovative capabilities beyond which subsidiaries will rarely go—as suggested for Singapore by Amsden and Tschang (2003), and (iii) wider knowledge spillovers from subsidiaries to other firms have only rarely been identified (e.g. Gorg and Greenaway, 2004).

More generally, as with the relationship between knowledge accumulation and participation in global value chains, there may be an issue about sequence and causation in the case of FDI. The story of the contribution to local innovative capacity being made in some cases by MNCs has to be matched by the story of the pull on MNCs to become involved in or associated with enterprise activity in emerging market economies where innovative capabilities already exist—as shown in the study by Athreye and Cantwell (2007). This found that, on average across countries, inward FDI since 1950 had not preceded the emergence of lower levels of innovative activity in countries catching up. Indeed, the increased geographical dispersion of competence-creating innovative efforts across existing MNC subsidiaries (often located in other centers of excellence abroad) appears to have reinforced the position of the most established technology-producing countries. However, the extension of such networks to new locations that had already built up sufficient absorptive capacity in the form of basic levels of innovative capability has on average facilitated the catch-up of countries in more sophisticated kinds of innovation since the early 1990s. (Of course, these are merely the average tendencies—we know that there have been important variations in the role of FDI in technological capability development across countries, it being substantial in (say) Singapore or China, but of much less significance in (say) Korea or India (Hobday, 2000; Lall, 2001).)

Thus, the picture seems complex. Different types of firm have played different types of role (including none at all) in the emergence of progressively deeper levels of innovative activity across different situations in industrializing economies over recent decades. It may be that they have played different roles at different stages in that process, and also that the capability-building efforts of the different types of enterprise have interacted in different ways at different times. Then, cutting across that diversity, the key characteristics of some of the types of firm have changed over time—in particular the corporate strategies and structures of many MNCs at the start of the 21st century are totally different from those of the 1970s. In this volume, the central aim will be to develop a much greater depth of understanding of how and why that diversity of innovative activity in enterprises has emerged as part of the past and evolving global redistribution of innovative activity. We are also interested in advancing our understanding of the potential impact upon corporate innovative capabilities of the interactions between firms of different types. These inter-firm relationships include, although they are not limited to, those between foreign-owned MNCs and indigenous firms.

(p.8) 1.2. The Roles of Trade, Market Liberalization, and FDI

In accounting for increased geographical dispersion of innovation, the distinctive roles of falling barriers to trade and investment on the one hand, and rising FDI on the other, cannot be overlooked. Regarding the former, the past 20–30 years have seen a number of important countries across Asia and Latin America consciously pursue a strategy of opening up their economies as they sought to dismantle the policy structures laid in place by import-substitution industrialization (ISI). ISI as a policy regime first emerged in the 1930s but was rapidly expanded and formalized in the 1950s and 1960s. Its key objective was to overcome the external constraint, boost growth, and ultimately to facilitate a change in an economy's position in the international division of labor. This was to be achieved by selective protection of key sectors, notably those associated with the manufacture of consumer goods (Baer, 2008). As these new sectors expanded, so it was hoped, growth would be lent impetus while the need to import would be diminished.

As time went by, the expansion of the industrial sector under ISI led to the development of indigenous technological capabilities in some of the larger economies which adopted the strategy. As will be seen in Chapters 4, 7, and 8, these included India, Argentina, and Brazil. Successful though ISI may have been in effecting rapid structural change and a short-term increase in trend growth rates, the strategy was associated with considerable shortcomings. In particular, economies that adopted it remained heavily dependent upon key imported inputs such as fossil fuels, capital goods, and, significantly, technology (whether embedded in goods or transferred through FDI or licensing agreements). Given an export sector rendered uncompetitive by the effects of protection and exchange rate overvaluation, the ISI strategy became, by the 1970s, increasingly compromised by external disequilibrium and a consequent need to accumulate foreign debt. By the emergence of the debt adjustment crisis in the early 1980s, it had become clear that the pursuit of ISI was simply no longer viable (Cimoli et al., 2009). This was due both to the adverse external funding environment and to the strategy's distinctly patchy track record on trade performance and growth. As a consequence, for a decade from the mid-1980s onwards, ISI was progressively abandoned in a range of Asian and Latin American economies, some of which, of course, feature in this volume. In the case of China (though not by any means an economy which had implemented Indian or Latin American-style ISI), the period from the late 1970s on has, too, witnessed a marked reduction in barriers to trade and investment. Stemming from this,

China has been integrating itself into the global economy at an astonishing pace.

(p.9) The embracing of trade and market liberalization—whether in place of ISI or the pre-1978 Chinese model—represents a profound transition in *policy regime*. This, as shall be seen, has had important consequences for the emergence and behavior of innovative firms in a number of countries featuring in this book. In particular, it will be argued that the transition to greater openness in trade and investment has exercised a significant influence on firms' capability accumulation paths. This influence has been exercised as openness to trade and investment has affected the sources of technology to which firms have turned, as the role and scope of inward and outward FDI has expanded, and as firms have found themselves increasingly exposed to the forces of international competition. However, as later chapters argue, the fact that inward-orientated industrialization strategies were swept away should not imply that they had no redeeming features or favorable enduring legacies. In fact, as the cases of Argentina, Brazil, China, and India make clear, considerable technological capabilities were accumulated under the previous policy regime. These capabilities, as it turns out, were to provide a vital springboard to further capability building in the liberalization period.

Despite the change in the policy environment, the path dependency associated with capability building has meant that the specific form of implementation of liberalization has varied to reflect those inherited capabilities. One key aspect of this is that the nature and the composition of established capabilities of indigenous firms affects their interaction with foreign-owned multinational companies and this therefore sets the parameters for the impact of FDI on local firms and thus the way in which opening up to FDI has occurred across different countries. Consequently, while in every case the general theme is a greater degree of integration between domestic and foreign firms, as a condition for effective catch-up, the organizational form of this association between domestic and international business has varied dramatically between countries. Some countries, such as Korea and India (at least until recently), have adopted relatively closed approaches toward FDI and are characterized by more arm's length and contractual relationships between domestic and foreign firms.

Conversely, countries such as Singapore and in recent times China have adopted increasingly open approaches to FDI which has become the locus

of integration between domestic and foreign-owned firms. In the case of Latin America, attitudes and policy toward FDI have tended to sit between these two poles, allowing for distinctive modes of integration of multinational subsidiaries into local knowledge networks. Therefore, it is very difficult to generalize about the context for FDI in emerging market economies and the nature of its impact on capabilities building in indigenous companies. We can note a number of different industrial policy models or frameworks for FDI each of which may potentially be successful within a given setting of national institutions and industrial structures inherited from the past.

(p.10) This helps to explain why in this book we have adopted a country-based approach in which we examine some of the most interesting national cases in separate chapters. One of the purposes, therefore, of each chapter is to illustrate the relationship between indigenous firms and foreign companies in the context of the development experience of the country in question. Moreover, what we do in this book is to focus in individual country chapters on those types of enterprises that have been the most innovative in a given national setting. In some cases, such as China and Malaysia, this means that we have a great deal to say about the role of innovative foreign-owned firms in those countries. In other cases, such as Korea or Brazil, we have less to say about innovative foreign enterprises since they have played a less substantial role in firm-level capability building in those economies. There has been a debate which is often set in very general terms about the role of FDI and foreign multinationals in national economic development. While those such as Amsden have argued that domestic firm capability building has to proceed in a relatively protected environment in order to create an independent national technological base, others writing about knowledge spillovers in China have stressed how relationships with foreign multinationals may enhance independent economic development. In our book, we have aimed for a more balanced view in which we recognize first a range of interdependencies between domestic firms and foreign multinationals. Second, as just described, we wish to emphasize that the nature of this relationship between domestic and foreign business varies greatly across different countries. We will return to this issue in Chapter 9 in drawing upon the evidence in the country chapters to produce some cross-country comparisons about the role of FDI and foreign firms.

1.3. The Focus: Enterprise Learning and Innovative Capability Building

To accomplish its task the book will draw on the substantial and growing body of empirical literature which has begun to emerge concerning emerging market enterprise innovation in the new global context. Part of the motivation for the book is that much of the established literature on catch-up has focused on the roles of government policy and societal institutions (see Fagerberg and Godinho, 2005). These writings generally acknowledge the role of dynamic local firm capabilities in technological and economic catch-up, but tend to focus on the environmental context in which such capabilities are fostered, rather than on the firm itself as the locus of such development (Teece, 2000). Here instead we focus on the micro-foundations of enterprise capability (p.11) formation, and place firms at the center of our study. A critical set of issues raised by the centrality of firms to capability development is what types of firms have been most involved in catch-up processes, the conditions under which different types of firms become more innovative, and the role of the interaction in innovation (knowledge spillovers) between different types of firms. Our authors share a common starting point in recognizing the following six observations or stylized facts about the development of technological capabilities in firms (adapted from Lall, 2000).

First, firm learning is primarily a conscious, purposive, and costly process, rather than an automatic and passive one. It relies on the deliberate building of capabilities that have strong tacit elements, rather than learning by doing through the continued practice of established processes which entail little risk or directed effort. Second, learning tends to be path-dependent and cumulative, and so firms tend to move incrementally along specific or localized trajectories, and build upon their established capabilities and organizational routines (Nelson and Winter, 1982; Dosi, 1988; Bell and Pavitt, 1993). Firms usually cannot make swift transitions or optimal selections of technology, but they engage in experimental technological search processes. In the earlier stages of capability development, firms may have to learn how to learn, to establish effective search processes, and to better recognize how they may be able to build up the most relevant capabilities needed to master more advanced technologies. Third, the learning process is highly technology-specific and sector-specific, and different technologies require different learning costs, risks, and duration of effort. This is especially relevant when considering the scope for paths that upgrade technological effort, since, for example, learning garment assembly may be “easier” than

textile manufacture, which in turn is “easier” than making textile machinery, and so on (Lall, 2000).

Fourth, capability development involves efforts at all levels of the firm. In the earliest stages of the more simple or basic capability building, it relies relatively more on organizational innovation such as the introduction and improvement of technical functions like quality management and maintenance. As the technologies mastered become more complex and sophisticated, then distinct processes of search and experimentation come increasingly to the fore, and formal R&D becomes necessary, especially in larger firms.

Fifth, the progression from basic to sophisticated capabilities can also be described as a transition from the attainment of operational capabilities (know-how) to a deeper understanding of the principles of the technology used (know-why). This transition is far from automatic, and many firms do not progress beyond the achievement of efficient process engineering, quality control, and maintenance routines. Yet the emergence of know-why allows firms to develop the more autonomously driven innovative capabilities (based on knowledge interdependencies rather than pure dependencies) that are needed to move up the technology scale, to diversify their technological (p.12) base, to better deploy existing know-how, and to cope with unanticipated technological shocks or opportunities. Technological upgrading in this sense need not be about operating at some notional world frontier; even good “follower” strategies require good know-why capabilities.

Sixth, technological learning in a firm does not take place in isolation, but is rife with knowledge-centered externalities and linkages with other actors (Nelson, 1995; Stiglitz, 1996). These include linkages with other firms (locally and internationally), local universities and public research institutes, consultants, industry associations, regulatory bodies, and training institutions. Many such linkages are informal in character, and some depend upon the geographical proximity associated with the clustering of industries or certain types of activity.

1.4. The Framework for Analysis

Throughout this book, the examination of the phenomenon of innovative firms in late industrializing countries makes use of a simple conceptual framework. This has two main dimensions:

- (i) A set of “levels” of innovative activity and capability through which firms may (or may not) evolve over time—moving at