Business Innovation in Asia

Knowledge and technology networks from Japan

Dennis McNamara

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Business Innovation in Asia

Industrial competition with rising economies, new regional investment from the West, and trade pacts among competitors threaten Japan's long postwar prominence. Global market dynamics and regional competition prompted the shift from offshore factories to local networks in the last decade. Similar forces are driving the recent formation of regional Nikkei – Japan-affiliated – nodes in major industrial clusters in Asia.

The central concept of this volume, "knowledge networks," refers to interactive linkages around nodes of tacit and codified knowledge embedded in global value chains. Through survey evidence and interviews at firms and factories, this book reveals the problems facing knowledge transfer, such as persisting difficulties in communication, technology transfer, indigenous learning in regional nodes of Nikkei value chains and the persistence of earlier patterns of hierarchical coordination in information flows despite the shift towards more horizontal network organization. However, a comparison of Nikkei knowledge networks in China, South Korea, and Thailand reveals the possibilities of an interactive learning community in cross-border investment. If Japan can meet the challenge of tapping Asia's offshore resources for innovation, it will pose a formidable global challenge to Western competitors.

This book will be of interest to academics, postgraduate students and professionals working in the field of Asian business, innovation, globalization, and network theory.

Dennis McNamara is the Park Professor of Sociology and Korean Studies, and Special Assistant to the University President for China Affairs.

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Preface

Urgent issues of innovation at firms, knowledge networks in societies, and community in the region have come to the fore in East Asia. Prospects for a new knowledge nexus in East Asia have stimulated a wide range of discussions. Intriguing questions of security, national development, and global trade and investment have fueled a vigorous debate. Some look to knowledge as power and turn quickly to issues of national security. Others see opportunity for moving up the development ladder with cross-border flows of capital, expertise and knowledge workers. Many in Japan struggle with the nation's future in the region, and the new technological competition from her neighbors. Hopes for an East Asian Community have spurred still others to plans of knowledge networks binding a region beyond either markets or militaries. Similar questions have drawn me across a decade of study in bringing this research project to print.

I began at the intersection of national development and cross-border production chains to learn more of the interaction of local and global dynamics. Technology transfer in manufacturing chains was my focus. But as I witnessed the rise of the "New Asia," regionalism captured my attention. Discussion at the initial East Asian Network of academics (NEAT) under the ASEAN + 3 umbrella drew me deeper into issues of community formation. Colleagues at the annual meetings of the APEC Academic Centers looked more concretely to policy and practice in investment. A rapidly expanding set of bilateral trade pacts gave new urgency to the debates, and concrete form to cooperation and even coordination across borders.

While others lauded regional solidarity, economic development, or the growing intensity of intra-regional trade and investment, I was finding a far more interesting transition. I was looking for technology transfer but finding much more. A variety of factors such as the outsourcing of research and development by Western firms, improved communication networks, and globalization and structural reform among Japanese firms, all contributed to new knowledge flows among Japanese firms in traditional manufacturing industries. Moving among firms, industry associations, and trade organizations, I was witnessing the beginnings of a remarkable shift in Asia from simply offshore manufacturing chains to knowledge flows.

Innovation brought these disparate themes into a focus. A chronology of Nikkei networks in three industrial sectors profiles the major changes. Portraits of leading Japanese firms and their leadership give texture to the story, just as innovation

systems in the three nations of interest provide context. Issues of complementarity, cooperation and competition, and even coordination in the new preferential trade agreements, all provide markers for contrasting knowledge networks in the three nations. I look to major Asian nations hosting Japan's foreign investment to assess interactive learning for firms across borders. Home firms in electronics, autos, and textiles give texture to the picture abroad. Why do some host nations manage to anchor productive activity, and still others innovation?

A profile of process and prospect emerges for a shift from assembly abroad to knowledge exchange in Japan's offshore manufacturing networks. I open the discussion, pose the questions, and chronicle a major transition in the region. Precedent suggests prospect, and may contribute to constructive policy and practice. Will national security trump regional synergies? Will Japan carve out a new leadership role in tandem with rising powers such as China and South Korea? How would the West meet the challenge of a new knowledge nexus in East Asia?

* * *

It is difficult to single out people and organizations across a decade of study that have contributed to my work. The Fulbright-Hays Program of the US Department of Education supported research in Seoul and Tokyo. The Korea Foundation supported meetings of the Georgetown University Conference on Korean Society, a forum for drawing out many of these ideas. The East Asian Institute of Thammasat University in Bangkok brought me into the early formation of the East Asian Community, and organized seminars around the topic. The Institute of Industrial Economics at the Chinese Academy of Social Sciences in Beijing helped with research support and a group of colleagues who pressed me forward on issues of regionalism and development.

Equally significant in a project of this length and breadth are the university colleagues who help to sustain one's interest and imagination. Faculty at the Graduate School of International Studies at Sogang University in Seoul, and at Sophia and Waseda in Tokyo certainly played that role. Students and faculty alike at Renmin University and Fudan University in China, and Thammasat University in Bangkok brought still new challenges and insights to my work. And finally, a word of thanks to my colleagues at Georgetown University who joined various seminars, conferences, and other fora, to bring insight and wisdom to the project.

Abbreviations

ACFIF	Asian Chemical Fiber Industries Federation
ADB	Asian Development Bank
AFTA	ASEAN Free Trade Agreement
AICO	ASEAN Industrial Cooperation
AOTS	Association for Overseas Technical Scholarship
APEC	Asia–Pacific Economic Cooperation
Art.	Article
ASEAN	Association for Southeast Asian Nations
ASPAC-TCIF	Asia Pacific Textile and Clothing Industries Forum
ATB	Asian textile business
BOI	Board of Investment, Thailand
BOJ	Bank of Japan
BP	*Bangkok Post*, Thailand
CACFI	Conference on Asian Chemical Fiber Industries
CCPIT	China Council for Promotion of International Trade
CD	*China Daily*
EAEP	*East Asian Economic Perspective*
EEI	Thailand Electrical and Electronics Institute
EOI	export-oriented industrialization
EPA	Economic Partnership Agreement
ERIA	Economic Research Institute for ASEAN and East Asia
ESCAP	UN Economic and Social Committee for Asia and the Pacific
FDI	foreign direct investment
FKI	Federation of Korean Industries
FTA	Free Trade Agreement
FTI	Federation of Thai Industries
GERD	gross domestic expenditure on R&D
GM	General Motors
GMB	global market briefings
GTC	general trading companies
GTIS	Global Trade Information Service
GVCs	global value chains
ICT	information and communication technology

IDE	Institute of Developing Economies, Japan
IFDI	inward foreign direct investment
IMF	International Monetary Fund
IMV	international multi-purpose vehicle
INEF	Institute for Development and Peace, University of Duisburg
INT	Interview
IPR	intellectual property rights
IRI	Industrial Research Institute Company
ISI	import-substitution industrialization
ISO	International Organization for Standardization
ITGLWF	International Textile, Garment, and Leather Workers' Federation
JAMA	Japan Automobile Manufacturers' Association
JAPIT	Japan Association for Promotion of International Trade
JBIC	Japan Bank for International Cooperation
JCEA	Japan–China Economic Association
JCFA	Japan Chemical Fibers Association
JCHE	Japan Chemical and Heavy Industries News Agency
JEITA	Japan Electronics and Information Technology Industries Association
JEMA	Japan Electrical Manufacturers' Association
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JRI	Japan Research Institute
JSBRI	Japan Small Business Research Institute
JTECS	Japan–Thailand Economic Cooperation Society
JTEPA	Japan–Thailand Economic Partnership Agreement
JTEPO	Japan–Thailand Economic Partnership Agreement Office
KCFA	Korea Chemical Fibers Association
Keidanren	Japan Business Federation
KIEP	Korea Institute for International Economic Policy
KNSO	Korea National Statistics Office
KOFOTI	Korea Federation of Textile Industries
KT	*Korea Times*
LCD	liquid crystal display
LDI	LCD (liquid crystal display) Driver IC (integrated circuit)
MERI	Mitsubishi Economic Research Institute, Japan
METI	Ministry of Energy, Trade and Industry, Japan
MEW	Matsushita Electric Works
MEXT	Japan, Ministry of Education, Culture, Sports, Science and Technology
MITI	Japan's Ministry of International Trade and Industry, predecessor to METI
MKE	South Korea's Ministry of the Knowledge Economy
MNE	multinational enterprise

MOCIE	Ministry of Commerce, Industry and Energy, Korea
MOST-C	Ministry of Science and Technology, China
MOST-K	Ministry of Science and Technology, Korea
NBSC	National Bureau of Statistics China
NEAT	Network of East Asian Think-tanks
NIEs	newly industrializing economies (Taiwan, Hong Kong, Singapore, and South Korea)
NSOT	National Statistics Office, Thailand
NSTDA	National Science and Technology Development Agency, Thailand
OBM	own brand manufacture
ODA	overseas development aid
OECD	Organization for Economic Cooperation and Development, Paris
OEM	original equipment manufacture
PDP	plasma display panel
PTA	purified terephthalic acid
RCAPS	Ritsumeikan Center for Asia Pacific Studies
RIETI	Research Institute of Energy, Technology, and Industry (Japan)
SAIC	Shanghai Automotive Industry Corporation
SCB	Statistics Bureau, Japan Ministry of Internal Affairs and Communications
SFERTC	Shanghai Foreign Economic Relations and Trade Commission, China
SFIC	Shanghai Foreign Investment Commission, China
SMEA	Small and Medium Enterprise Agency, Japan
SMRJ	Organization for Small and Medium Enterprises and Regional Innovation, Japan
SWAK	Spinners and Weavers Association of Korea
TAB	tape automated bonding
TAI	Thailand Automotive Institute
TAIA	Thai Automotive Industry Association
TAPMA	Thai Autoparts Manufacturers' Association
THTI	Thailand Textile Institute
TKS	Tōyō Keizai Shimbunsha
TMC	Toyota Motor Corporation
TN	*The Nation*, Thailand
TNI	Thai-Nichi Institute of Technology
TPA	terephthalic acid
TPA	Thailand–Japan Technology Promotion Association
TRIPS	Agreement on Trade Related Aspects of Intellectual Property Rights
TSMA	Thai Synthetics Fiber Manufacturers' Association
TSST	Toshiba Samsung Storage Technology Corporation
TWARO	Textile Workers Asian Regional Organization

UMTS	Universal Mobile Telecommunications System
UNCTAD	United Nations Conference on Trade and Development
UNIDO	United Nations Industrial Development Organization
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

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1 Business, knowledge, and networks

A global competition for knowledge is driving change in Asian markets and societies. Just as finance capital once ruled in industrial society, Daniel Bell recognized the leading role of information and knowledge in the post-industrial society (1973; Kumar 1995). The forms of *knowledge* may be familiar, but the linking of knowledge in new communication channels is indeed revolutionary. So too is the global reorganization of manufacture where knowledge is controlled and shared largely within global value chains of production and marketing. Fruin wrote of a novel and very fluid type of "network society," paralleling the electronic network of multiple nodes without a permanent center and no longer bounded by geographical setting. Networks might be seen as "sets of independent actors who cooperate frequently for mutual advantage and create a community of practice (1998: 4)." Knowledge surging in global streams across national borders makes possible new types of communities of practice.

Information and communication systems now make it possible to coordinate production across multiple sites, enabling firms to reorganize into global value chains (GVCs) beyond the earlier model of vertically integrated production within national borders. Networks permit specialization but also flexibility and responsiveness to changing consumer demands. An additional dynamic of clustering into major production nodes has promoted the reorganization of now hyper-mobile international capital. Multinational enterprises will invest in production at major sites abroad with attractive infrastructure and labor costs, leading to a concentration of suppliers for some regions, and isolation for others. A new competition for knowledge resources forces difficult choices of inclusion or exclusion, cohesion or fragmentation in the globalization process. Successful strategies for inclusion among developing nations in the "New Asia" merit closer scrutiny.

Technology has played a central role in the rise of East Asia to prominence in global production chains. Effective acquisition and application of ever more sophisticated technology distinguished the postwar recovery of Japan, and subsequently the trajectory of the "Newly Industrializing Economies" (NIEs) of Taiwan, Hong Kong, Singapore, and South Korea. Access to foreign technology helped to fuel China's economic trajectory, and spur development of local institutions of innovation. Yet other regional economies such as Thailand have seen far less growth in local industry despite decades of foreign investment. On the demand

side, growth in urban consumer markets now complements export growth, and has begun to affect inward foreign direct investment (FDI) across the region. One recent change in Japanese offshore manufacturing in Asia is a shift of horizontal networks abroad, so that a full line of manufacturing is possible on site. An earlier vertical pattern of manufacturing segmented between higher value-added aspects in Japan, and lower value-added assembly abroad (METI 2005). Growing local market demand and the easing of trade restrictions help to drive the change. Market integration in a "seamless economic zone" has brought manufacturing closer to markets (METI 2007d). Liberalization and preferential trade agreements make possible close to tariff-free supply of raw materials and intermediate goods across borders within the Association for Southeast Asian Nations (ASEAN). This has intensified the sharing of production across national borders in dense networks of manufacture and distribution, a further feature of this "New Asia."

Lower labor and energy costs, extensive human resources, and relative geographical proximity of countries within the region encouraged extension abroad of manufacture, first with textiles and clothing, and then with automobiles and electronics. Major clusters of production have emerged on the outskirts of Seoul, Shanghai, and Bangkok. Growth in foreign and local demand has increased both the scale and technological levels of production, prompting deeper, more extensive flows of knowledge across the region, a final feature of the "New Asia" and the subject of this study. We find evidence of the latter not only in international comparisons of national innovation systems, but also in product development such as the jump from electrical to electronic products, fuel-efficient autos, and industrial textiles. Profile and prospect of regional knowledge networks come into view at the intersection of local systems of innovation with GVCs in electronics, autos, and fashions.

Technology

Technos or "technique" includes organizational strategies and machines. One scholar defined the transfer of technology as "a learning process where technological knowledge is continually accumulated into human resources engaged in productive activities." Shiowattana enumerated human resources such as acquisitive, operative, adaptive, and innovative capacity (1990: 112). Transfer of management and production techniques with relevance beyond the single firm or industry can benefit local society. For instance, Japanese management strategies often include job rotation rather than fixed duties and specialization. A community of multi-process or multi-function workers committed to a firm is the goal. A related feature is the principle of "floor-level" (*genba*) or "hands-on" experience which brings managers, technicians, and assembly line workers to the production line to learn of the various functions in assembly.

Certainly this can promote community among workers, marketing and engineering divisions, but it is likewise a critical channel for skill transfer in the local community. Monden wrote of just-in-time production and quality control in *Toyota Production System* (1998). The former refers to central coordination of supply and