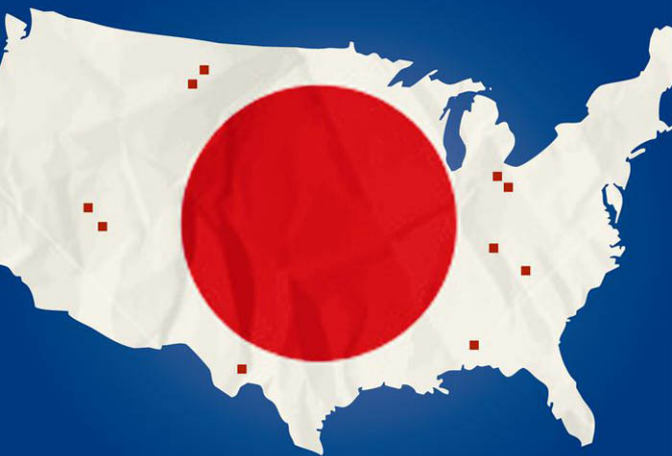


# Hybrid Factories in the United States

*The Japanese-Style Management and Production System  
under the Global Economy*



*Edited by* Tetsuji Kawamura

# The Hybrid Factory in the United States

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# The Hybrid Factory in the United States

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Production System in the Global Economy*

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EDITED BY TETSUJI KAWAMURA

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## PREFACE

This book investigates the local production operations and their management in major Japanese firms' local plants in North America—mainly in the United States—examining the reality of transferability and transfiguration of Japanese-style management and production system (JMPS) in other countries, in the context of the global economy. The main part of this study is based on our comprehensive field surveys in North America in 2000–2001 conducted by our Japanese Multinational Enterprise Study Group (JMNESG).

One of the important features of this book is its chronological comparison of the major changes that have taken place since our first round of comprehensive research in North America in 1986–1989. It also includes inter-regional comparisons that make extensive use of research conducted in major regions of the world since the late 1980s.

Since the early 1980s, Japanese firms have been globalizing their production operations on a large scale, particularly in North America, Asia, Europe, and elsewhere. They have shown superb competitive powers in export trades. JMPS has been widely recognized as a major source of the competitive edge of Japanese firms. In the era of transforming the postwar Pax Americana regime and consequent globalization, it seems to assist with the transfiguring of management and production system standards worldwide. *Becoming lean* is a common slogan worldwide. Japanese manufacturing firms themselves, however, had to overcome an increasing hardship of both export trade—caused by intensifying trade frictions with the United States and Europe—and the high appreciation of Japanese yen. They were forced to advance local production operations abroad and globalize their businesses.

Although they reluctantly started local production abroad, these full-fledged production operations inevitably lead Japanese firms to face one major challenge. They had to establish JMPS locally (we call it the application aspect), which meant realizing that in other countries conditions differed from those that had originally nurtured the system. Sometimes they adapted to local conditions and successfully assimilated to them (we call it adaptation aspect) to stabilize management.



In these cases, they had to determine how to change their systems without compromising competitiveness or jeopardizing the major source of their competitive edge. In other words, they had to find ways to balance applications and adaptations. They faced a dilemma. Their efforts to solve this dilemma resulted in a “hybridization” of their management and production systems. The development of their local management and production systems was governed by this “hybridization” dynamic. The experiences accumulated abroad dictated changes; in order to retain its basic logic and competitiveness, the essentials of JPMS needed to be redefined.

To assess the success of the “hybridization” dynamics of JMPS abroad, we developed a new “hybrid-analysis” model and methods as our major research and analytical framework. Our investigation started in the United States and North America in 1986 (a preliminary study) and, funded by a Toyota Foundation grant-in-aid, we conducted the first fully developed research in 1989. This was followed by Asian-region investigations in South Korea and Taiwan 1991; in Thailand, Malaysia, and Singapore in 1992; in the United Kingdom in 1997 and continental Europe in 1998; in South America (Brazil and Argentina) in 2000. These were followed by the second all-out research in North America in 2000–2001, another in Central Europe (Czech, Hungary, and Poland) in 2002, China in 2003, and finally, in Latin America in 2007.

We have published several books of our studies in Japanese and in English, and individual members have published many articles relating the issues. The books in English are as follows:

For North America: Tetsuo Abo et al. (March, 1990), *Local Production of Japanese Automobile and Electronics Firms in the United States*, The Institute of Social Science, University of Tokyo, Research Report No.23; Abo, Tetsuo, ed. (1994), *Hybrid Factory*, New York: Oxford University Press.

For the United Kingdom and Europe: Kumon, Hiroshi, and Tetsuo Abo, ed. (2004), *Hybrid Factory in Europe: The Japanese Management and Production System Transferred*, New York: Palgrave-Macmillan.

For Asia: Itagaki, Hiroshi, ed. (1997), *The Japanese Production System: Hybrid Factories in East Asia*, New York: Macmillan.

General study: Tetsuo Abo, ed. (2007), *Japanese Hybrid Factories: A Worldwide Comparison of Global Production Strategies*, New York: Palgrave-Macmillan.

As a matter of fact, there have been tremendous changes in the business environment surrounding JMPS. Japanese manufacturing firms have experienced severe hardships in the “lost decades” since the collapse of the “bubble” economy in the late 1980s in Japan. Many doubts to the effectiveness of JMPS were expressed because of the prolonged slump of Japanese economy after the early 1990s. Many criticisms and remarks of its limitations and problems were expressed, and unrestrained admiration toward it subsided. Many called for the renovation of “obsolete” Japanese systems, while a long boom in the U.S. economy and the very good performance of U.S. firms in 1990s lead to the reappraisal of

the American models. However, our research, as well as other investigations in Japan and abroad, has demonstrated that Japanese flexible production systems and the management methods consciously created to achieve both high efficiency and high quality at the same time still constitute the basis of a competitive edge of manufacturing in the growing uncertainty under the global mega competition. Notwithstanding the pressures of changing macro and micro business environments, JMPS should not be underestimated.

The most salient feature of recent change is the progressing globalization of business; its impacts are tremendous. The dramatic termination of the Cold War in the early 1990s brought about the global proliferation of a market economy. IT and ITC innovations have accelerated the globalization of business and finance, which has consequently intensified mega-competition in global markets. Rapid changes in technologies and product features in the automobile, electronics, and other major industrial fields have exerted mighty pressures on the R&D process as well as on production systems and work practices. Traditional work rules and labor relations need to be reoriented to cope with these technological changes and mega competition in the globalized markets. All of these factors have forced major Japanese firms to grow into a true global enterprise, instead of simple situation-followers. Global business management is needed to control global business and production networks. Chinese development as a “world factory” and the rapid development of other emerging economies have big impacts on global economy. In global business, major Japanese firms have to cope with new challenges by Korean, Taiwanese, Chinese, Indian, and other companies, to say nothing of the U.S. and European firms. They have to find more effective ways to organize and manage efficiently their production and business networks that are spreading all over the world.

The impacts of the recent “once-a-century” global financial and economic crisis might be quite significant. Steep shrinkage of the markets in automobile, electronics, and other industries affected business, and cost-cutting pressures became more severe than ever. Shortening product cycles and production lead-time place extra burdens on production operations. Stagnated economies in the advanced countries and the growth of emerging economies force firms to target the so-called volume zone markets of the middle- and lower-income segments in the emerging economies. Becoming lean is a more common target than ever. Even shifting to new green technologies, such as hybrid cars and EVs, has influenced the major reorientation of R&D system and production methods in auto industries. These are but a few examples of significant changes in the global economy.

These new conditions and changes in the economic environment add new dimensions to the problem of international transferability of JMPS. The basic logic of JMPS or “lean” principles is more essential than ever to cope with these new challenges; but many new devices and institutional settings have to be created to facilitate its assimilation to different local conditions, region by region. In this sense, the transfer of JMPS as a system is quite significant. Realization of

the “capability-building” system is essential to cope with new challenges. However, they have to achieve a balance and stabilization of their management and production systems by assimilating to conditions that are quite different region by region. There must be no single mode, because any JMPS adaptations are situated under the “hybridization” dynamics. Localization of management is a major challenge for Japanese firms; but it is more important that they establish effective “hybrid factories” with appropriate global management. This is one of the conclusions we have reached; we believe it is very important to investigate the real dimensions of the transferability and assimilation of JMPS in the United States, the major battlefield of global mega-competition.

This book elucidates the real advantages and weaknesses of JMPS, in the United States and elsewhere, under the globalized economy. Investigation of Japanese local transplants is also very important in elucidating the real dimensions of major management innovations in general that U.S. industries have experienced so far, including the restructuring and re-engineering of their corporate organization and business structure, the transformation of their production and work management on-site, and so on. Our hybrid-analysis methods of 23-items of Japanese local plants in the United States will help specify which aspects of JMPS will either inevitably transform or should be sustained according to the local conditions in North America—in very concrete ways and attentive to regional differences. It will clarify not only the prospect of the future of Japanese manufacturing firms in North America, but also will consider the future of American manufacturing industries especially after the current financial crisis. Our study of local Japanese plants in the United States will provide a “mirror” through which the real causes of current hardships of U.S. manufacturing—typified by recent General Motors and Chrysler cases in automobile industries—may be seen. It may be worth mentioning Toyota’s large-scale recall problems and their quality issues. The causes seem to be complicated, and we need another round of our own investigations to determine more accurately the causes and consequences of the problems. However, the study in this book suggests one important aspect of the problem.

In the final chapter we observe a certain insufficiency of the systematic local transfer of JMPS, especially the “capability building” system in the major assembly plants as well as in local suppliers. Based on the 23 items of our hybrid analysis, our study shows that individual elements or institutions of JMPS are realized by and large in the Japanese local plants. Notwithstanding the appearance of progress in the transfer of individual elements of JMPS and localization of the management, the systematic transfer of JMPS is insufficient, especially in terms of the “capability-building” system that promotes Kaizen and enhances the implementation of the basic logic of JMPS principles. One causal factor is a spread of “functional equivalents” brought about by the transformation of traditional work rules and labor practices, especially by the spread of nonunion type practices in the United States. These trends have made it easier to realize certain individual

elements of JMPS locally in North America. However, there is a tendency of a kind of “nominalization” of the real function of essential elements of the “capability-building” system of JMPS on shop floor, which tend to progress in terms of the basic logic of JMPS.

One of the major factors in the transfer of JMPS is the restraint from long-lasting or deep-rooted socioeconomic conditions in corporate America, including traditional work rules and labor practices. Another factor that contributed to the tendency of JMPS to be enhanced is a more recent development stemming from a rapid expansion of local production that was brought about by expanding sales in a long boom of the U.S. economy in the 1990s (and thereafter up to the recent time before the Lehman Shock). The management and production system in local Japanese plants has become prone to the traditional American-type mass production logic. The “recontextualization” has become a very important aspect, as is discussed in the final chapter.

There must be more lessons that Japanese firms should learn. For example, Japanese industry might realize the necessity of reorganization of R&D systems to cope with the changing product technologies, especially hybrid car technology and advancing computerized controls of cars. Another lesson might be seeing a need for a certain restructuring of concurrent engineering systems and local certification systems of parts and components with local suppliers. To speak more generally, our research demonstrates the necessity for Japanese firms to learn more about the social context of business practices, including the political processes related to product quality issues in the United States. We are fully aware that our international transfer model of JMPS needs to expand to cover these new aspects of production operations and management abroad by Japanese firms as a global enterprise.

Our study lasted for more than twenty years within the same research framework, though there have been some changes in membership in the research team. We fully recognize the importance of the continued study. Many joint studies are terminated because of difference of research methods and frameworks, or due to human relationships within the group. Even though, of course, it is true that our study group members have had serious internal debates for the research methods and other issues, we have managed to maintain the same basic research frameworks and methods. The second round of the comprehensive investigation in North America forced us to follow up on major changes and continuations of the management and production systems of Japanese transplants that had occurred during the intervening ten years. It enabled us to achieve “vertical” comparisons for these ten years in North America, together with “horizontal” or global inter-regional comparative studies on the same research frameworks. However, as mentioned in the concluding chapter of this book, the current methodology of our hybrid analysis has a certain limitation, especially in relation to spreading “functional equivalents” and “recontextualization.” There must be ample room to refine. It is also more necessary to specify the hybridization dynamics in relation

to the business strategies of individual firms. It may be useful to synthesize our hybrid analysis methods more with economic geography and area study methods, and so on. These are the future challenges of our study.

It is quite fortunate that our hybrid analysis methods have been recognized as one of the major research frameworks for elucidating the study of international transferability of management and production system in general. All the more reason we need to refine and improve our methods. Whether we have achieved our research targets in this book is subject to stern judgments by professional researchers and general readers. We expect unrestrained criticisms. We will appreciate them.

Tokyo  
May, 2011

Tetsuji Kawamura

## ACKNOWLEDGMENTS

As is always the case, overseas field surveys need a large amount of labor and very extensive cooperation and assistance from many companies and institutions, to say nothing of our individual research partners abroad. In our 2000–2001 survey, well over forty companies gave us their generous cooperation and assistance. We are very much aware that many staff and employees of the companies were involved and gave their precious time for the arrangements of our meetings and plant tours. We have done similar field surveys for more than twenty-five years. In aggregate, the cooperation and assistance provided by companies is tremendous. The project was sponsored by the 2000–2001FY Grant-in-aid program of Scientific Research (Basic research category A1) of the Ministry of Education and Science, Japan (Project number 12372004; Research Head: Prof. Tetsuo Abo, Teikyo University).

Our survey in North America in 2000 and 2001 on which main part of this book is based was very intensive, as is usual with our researches in other regions. In late August and early September of 2000, all fifteen project members, together with three American and two Mexican co-researchers, joined the surveys in four teams for more than one month altogether to cover the East, Middle West, South and Southwest, and West Coast of the United States, as well as Mexico and Canada. We visited and conducted interviews in forty-four local plants altogether, mainly Japanese and American-Korean companies, as well as their regional headquarters, sales, R&D centers, and other business offices. In addition, we visited fifteen automobile assemblers, thirteen automobile parts suppliers, eight electronics assemblers, four other electronics plants, one semiconductor plant, and one head office of sales of a Japanese company.

In August–September in 2001, fourteen project members in four groups again surveyed thirty-seven local plants and regional head offices of Japanese and Korean American companies mainly in the United States—eight automobile assemblers including two American plants, eleven automobile parts suppliers, eleven electronics assemblers, four other electronics plants, one semiconductor plant, and six head offices and other sites. Our aggregate car mileages by four

teams altogether well reached into tens of thousands. We also conducted parallel plant surveys in the various places in Japan for comparative purpose.

We have done similar field research for more than twenty-five years in many regions of the world. We would like to express our sincere gratitude to all of the companies who participated in these and previous surveys. To show our sincere thanks, we list below the names of the companies that we visited for this current research. Without their generous cooperation and assistance, this book would have been impossible.

In the 2001 survey, we had quite an impressive experience. We visited the Sao Paulo factory of one of the leading Japanese auto companies on September 11. One of our teams, including me, entered the United States three days after the 11th to continue scheduled research in the Midwest and South traveling via Chicago, Illinois. Our travel agent took great care to reschedule our flights. Otherwise important part of this book would be missing. The experience reaffirmed a fact that global business, and our research activities overseas, has to take geopolitical risks in a globalized world.

Also, our research abroad was sponsored by research programs that included the Toyota Foundation, the Scientific Research grant-in-aid of the Ministry of Science and Education Japan, and the Industrial Research Institute of the Ministry of Industry and Trade Japan. We are very grateful to all the programs that enabled us to conduct our research. Without such support, our study would have been more difficult.

We benefited from the many useful comments and necessary criticisms of our studies. Toshihiro Nishiguchi at the Wharton School of the University of Pennsylvania, Takahiro Fujimoto at the University of Tokyo, Richard Florida at the Carnegie Melon University, and Vladimir Pucik at Cornell University emphasized the significance of our hybrid analysis methods earlier on and strongly recommended our previous book, *Hybrid Factory*, for North American survey. Robert Boyer, at CERN in France, encouraged a more generalized hybridization framework and provided us with an important notion of “functional equivalents” to enlarge our analytical scopes. John Zysman of the University of California strongly recommended the publication of our study in the previous book to Oxford University Press and encouraged us to publish this volume. We are indebted to many other scholars whose thoughtful assistance helped improve our study. We express our heartfelt appreciation to all of them, although we cannot mention all of their names here.

Five years passed between the publication of the Japanese version and this English version. The translation took much longer than expected. We are very grateful to Takahiro Fujimoto of Tokyo University and Koji Okubayashi, professor emeritus of Kobe University, who provided excellent recommendation letters for the translators. Gary Dymski, University of California Riverside, and Silvana de Paula, Federal Rural University of Rio de Janeiro, very kindly arranged the editing and proofreading of our English translation. We express our particular thanks to

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## List of Participating Companies

Aisin Seiki, Co., Ltd.	Mazda Motor Corporation
Akebono Brake Industry Co., Ltd.	Minebea Company, Ltd
Alps Electric Company, Ltd.	Motorola, Inc.
Brother Industries, Ltd.	Mitsubishi Electric Corporation
Calsonic Kansei Corporation	Mitsubishi Motors Corporation
Daikin Industries, Ltd.	NEC Corporation
Delphi Automotive Systems Corporation	NHK Spring Company, Ltd.
Delta Kogyo Co., Ltd	Nissan Motor Company, Ltd.
Denso Corporation	Panasonic Corporation
Ford Motor Company	Samsung Electronics Company, Ltd
Fuji Heavy Industries Ltd	Sanyo Electric Company, Ltd.
Fujifilm Corporation	Sharp Corporation
Fujitsu Limited	Sony Corporation
Furukawa Electric Company, Ltd.	Suzuki Motor Corporation
General Motors Corporation	TDK Corporation
Hitachi, Ltd.	Texas Instruments Inc.
Honda Motor Co., Ltd.	Yokohama Rubber Company, Ltd.
Inoac Corporation	Toshiba Corporation
Isuzu Motors Ltd.	Toyoda Gosei Company, Ltd.
Johnson Controls Automotive Systems Corporation	Toyota Motor Corporation
Komatsu Ltd.	Toyota Motor Kyushu, Inc.
Kyocera Corporation	TS Tech Company, Ltd.
	Yazaki Corporation

Note: In this book we use alphabetical symbols to mention the targeted companies and their local plants instead of their real name, in consideration of the many unpublished data and information that they provided us. In Part I, we assign simply one alphabet letter to each company. In Part II, for the purpose of the “application-adaptation” analysis, we give a four letter alphabetical symbol to each targeted local plant, along with the classification, by region and industry, to calculate the hybrid scores. In the case studies, we use real names, with firm consent by companies.



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# The Hybrid Factory in the United States

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# Introduction

## *The Japanese-Style Management and Production System in the United States*

TETSUJI KAWAMURA

### 1.1 Japanese and U.S. Production Systems in the United States: The Significance of the Hybrid Model Analysis

#### 1.1.1 Overseas Transferability of the Japanese Model

Japanese firms' overseas production operations have steadily advanced since the 1980s. This phenomenon has highlighted issues with the overseas transferability of the Japanese-style system of management and production.<sup>1</sup> Japanese manufacturing firms have developed a flexible production and management system, typified by the Toyota Production System (TPS), which simultaneously achieves both high efficiency and high quality. The core of the system is characterized by specific principles of production process management and corresponding methods of human organization on the shop floor. A variety of institutional settings and practices support these core elements of the system. Together, all these factors constitute a characteristic ensemble that has been defined as the Japanese-style Management and Production System (JMPS). This system has provided the basis for a common model that functions across differences in time periods, industries, and firms.

The competitive edge of Major Japanese firms derives from the functioning of the JMPS; however, the JMPS strongly depends on the human elements on the shop floor. The system was developed within the Japanese sociocultural context, and Japanese firms preferred to export to other countries, rather than set up local production operations within them. However, from the late 1970s onward, major Japanese manufacturing firms faced difficulties as a result of increasing trade frictions and the appreciation of the yen. These difficulties obliged them to transfer local production operations abroad. In this process, they confronted the challenge



of implementing the JMPS on foreign soil, and some concrete problems of transferability emerged. Straightforward implementation of the Japanese-style systems and practices proved to be difficult in overseas operations because of constraints imposed by foreign managerial environments and conditions.

The Japan Multinational Enterprise Study Group (JMNESG) started researching the overseas transferability of the JMPS in the late 1980s. In our research, we surveyed more than 200 Japanese “transplants” all over the world. If the related research conducted by JMNESG members on domestic plants in Japan is included, the total number of plants surveyed amounts to more than 400. The major surveys carried on abroad started in North America (1986 and 1989), followed by the Asian Newly Industrializing Economies (NIEs) and Association of Southeast Asian Nations (ASEAN) regions (1992–1993), the United Kingdom (1997), and the European continent (1998). Later, a second round of surveys studied North America (2000–2001), South America (Brazil and Argentina, 2001), China (2002), and Central Europe (2003). Thus, the world’s major industrial areas have been covered by our investigation. On the basis of our work, we developed a theoretical framework that we call the “Hybrid Model” and an application-adaptation analysis method for use in analyzing and synthesizing our research findings.

The most salient dimension of our analytical framework focuses on the “hybridization” dynamics that take place in the transfer of the JMPS to Japanese firms’ overseas plants. When Japanese firms locate plants abroad, “hybrid” systems emerge as a result of the JMPS being implemented in the context of previously existing managerial environments and conditions. The pattern and degree of hybridization differ by country and region, depending on local conditions, industry characteristics, and corporate strategies; consequently, it will not be helpful to discuss issues of international transferability in an overly broad or general way. Every element of the JMPS must be examined, and close attention must be paid to national, regional, and firm-specific differences.

### 1.1.2 Research Outline and Overview of This Volume

This book grew out of our second period of investigating Japanese transplants in North America (2000–2001), which occurred 11 years after our research group’s previous survey (conducted mainly in 1989). We used the Hybrid Model analytical framework to conduct the 2000–2001 survey, which took place on a larger scale than our previous research. In 2000, 15 research group members and Japanese research partners, together with three American and two Mexican research partners, divided into four groups by region, to visit and survey 44 plants in the United States, Canada, and Mexico. These were mainly Japanese plants. But we also surveyed American and Korean plants. The firms surveyed consisted of 15 automobile assembly plants, 13 auto parts plants, 12 electronics plants, three

semiconductor plants, and one plant classified as “other” (none of the above categories). In 2001, 14 researchers and research partners again divided into four groups by region to visit and survey 37 plants in North America. The firms surveyed consisted of eight automobile assembly plants (including two American plants), 11 auto parts plants, 11 electric machinery plants, one semiconductor plant, and six other plants. For the purpose of comparative analysis, plants across Japan were also surveyed to shed light on management and production systems in use at domestic plants. In all, 77 plants were surveyed.

Almost half of the 33 Japanese transplants surveyed in 2000–2001 were included in the 1989 surveys. About one-third of the remaining 15 transplants had already moved to other countries or withdrawn from North America by 2000–2001, and the others could not be surveyed for various reasons. For transplants that were covered in both surveys, we were able to trace the trajectories of their local operations during the intervening time. We were also able to make comparisons with the cases we surveyed in East and Southeast Asia, the United Kingdom, and continental Europe.

During the 11-year interval between the two surveys, significant changes in the economic and managerial environment have taken place worldwide. The Japanese economy has been subject to a prolonged recession; there have been many transformations of, and innovations in, the Japanese-style management and production system; major shifts have occurred in the automobile, electronics, and semiconductor industries; the American economy underwent a long boom period during the 1990s; labor relations have changed, and managerial innovations have taken place; and information technology has advanced tremendously. All of these changes have affected North American managerial environments and conditions of production, causing changes in hybridization dynamics.

Pressures on management and production systems began to grow in the 1980s. The American-type (Ford-Taylor) mass-production system, which once was the worldwide standard for production systems, was confronted with many strong limitations as a result of the decline of America’s postwar corporate system. In contrast, the JMPS in Japanese manufacturing demonstrated an extraordinary competitive edge in the 1980s, especially in the automobile, electronics, and general machinery industries. The JMPS was acknowledged as the main engine providing the momentum that caused Japan’s production model to become the new global standard.

The opposite happened in the 1990s, when the limitations of Japanese-style management were widely acknowledged (see chapter 2 for details). The unusual hardships faced by the Japanese economy during the 1990s provided the backdrop for critics of Japanese-style management. Economically speaking, Japan experienced a lost decade during the 1990s, as the country suffered from the prolonged “Heisei recession.” In contrast, the United States enjoyed a sustained period of expansion due to the emergence of a *new economy* that was based on

information technology. The JMPS was confronted by major challenges both domestically and abroad: while major Japanese manufacturing firms were experiencing deflationary pressures and high labor costs, they faced growing competition from Korean, Taiwanese, American, and European firms in the high-tech industries of semiconductors, PCs, and LCDs, and in the middle-tech industries, such as TVs and other electronics, automobiles, steel, and machinery.

Japanese firms increased their overseas production to avoid high domestic cost structures, which led to “hollowing” problems in Japan’s domestic plants. An especially difficult problem for Japanese firms to solve was how to maintain an adequate level of domestic production, which remained the major wellspring of competitiveness. At the same time, overseas plants faced the much more difficult challenge of trying to preserve and enlarge their competitive edge while adapting to foreign managerial environments. Firms with overseas plants were obliged to expend tremendous effort to grow into truly global enterprises. They had to learn how to organize an effective management and administration system for business branches and production operations extended all over the world, including the development of logistics systems and human resources functions. These firms also had to develop an effective “select and concentrate” strategy to enhance their competitive edge.

Under these pressures, the old Japanese model was widely criticized as obsolete. Major Japanese firms tried to pursue extensive innovations in their management methods, including aspects of labor relations and human resources management, both domestically and overseas. These developments deeply affected their operational methods and management styles in their overseas transplants. In the global economy, the managerial environments and production conditions faced by Japanese transplants vary considerably from region to region. As a result, the business strategies implemented by Japanese firms, which in the past were often characterized as rigid and uniform, now represent a wide variety both domestically and overseas. If we were to look only at these differences, we might doubt whether we could even categorize them in a single “Japanese model.”

As a matter of fact, if we were to consider the significant changes in the business environment and the JMPS in the 11-year interval between our two surveys, we would have to reappraise both our model for international transfer of the Japanese system and the American model as well. However, we use the same theoretical framework and methods that we used in the previous study because we want to emphasize the compatibility of this work with our previous research in North America and other major regions. This approach allows us to test our previous model and theoretical framework by presenting and critically evaluating the research outcomes that this framework and set of methods—the international transfer model—generate for this new period of study (The International transfer model is also called the Hybrid Mode or the application-adaptation analysis). The limitations of this approach are discussed in chapter 6.

### 1. Characteristics of the Economic Environment and Local Application Conditions in North America

#### Development of Japanese firms' production operations in North America

North America is the most significant production site for Japanese manufacturing firms in the world. At the time of our 2001 survey, North America accounted for half of the Japanese Foreign Direct Investment (FDI) balance. The ASEAN countries' share of the Japanese FDI balance showed a large decrease from 1996 to 2001, but this decrease was offset by an increase of the same size in the North American share. There were only minor increases in the Japanese FDI in China and the European Union (EU). The EU share of the FDI was only half that of East Asia in 1996, but by 2001 the EU share had increased to the same level as East Asia. North America still remains the largest area for Japanese FDI, although the region has experienced successive decreases in Japanese FDI since 2001. (See figure 1-1A.)

The history of Japanese production operations in North America can be divided into three major periods: (1) from the late 1970s to the mid-1980s (up to the "Plaza Accord" in 1985); (2) from the late 1980s to the early 1990s; and (3) from the mid-1990s to the present. A number of Japanese firms did operate in North America before the first phase, mainly targeting sales in local markets. Those with large-scale operations that survived in 2001 include Hitachi Maxell (magnetic tape), Honda Canada (motorcycles), YKK Canada, Sharp, NEC (communication equipment), TDK, Tokyo Electron, NSK, and Komatsu, TAB (Toyota group).

In the late 1960s and early 1970s, the world economic order of the postwar Pax Americana broke down, resulting in major changes in the economic environment. Trade frictions with the United States and European nations emerged, and the

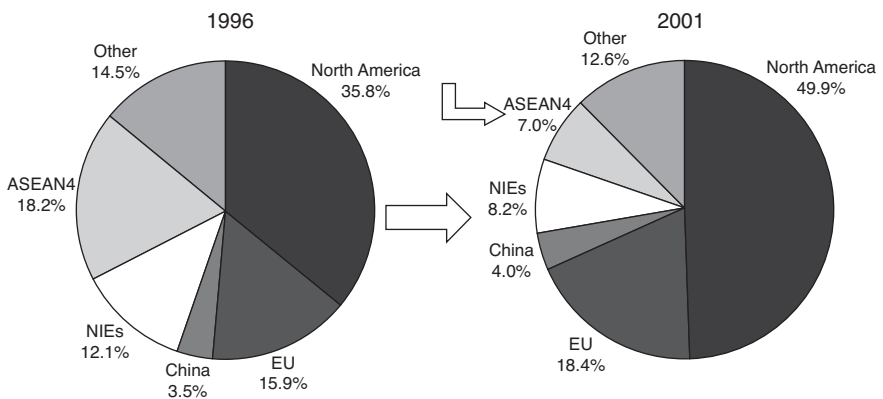


Figure 1-1A. Regional Distribution of Japanese FDI Balance, 2001 (ASEAN Four = Thailand, Malaysia, Indonesia, and the Philippines; NIEs = Newly Industrializing Economies; EU = European Union)

Source: Ministry of Economy and Industry 2003, figure 2-3-30.

yen appreciated, causing major Japanese firms to expand overseas production operations on a large scale. Firms focused their efforts on the United States, North America, in general, and East Asia.

After the recession of 1974–75, the Japanese high-growth era came to an end, and the overall world economy slowed down. In the late 1970s, major U.S. firms in key postwar industries—such as automobiles, electronics, machinery, and iron and steel—struggled with stagflation and experienced serious competitive problems. The rapidly widening trade gap between the United States and Japan, largely caused by major Japanese firms' increased exports to America, aggravated trade frictions between the two nations. The principal areas of contention were the automobile, electronics, and machinery industries, which accounted for the majority of the U.S.-Japan trade imbalance.

As the yen continued to appreciate against the U.S. dollar, Japanese exports to the United States faced significant difficulties. Consequently, two major responses emerged among Japanese manufacturing firms. One response was to start large-scale local production operations in the United States, Canada, and Mexico. This was effort to overcome export difficulties by exporting production, not just products. A second response was the Japanese expansion in the Asian region, centering on the NIEs, notably in electronics industries. This strategy represented an indirect effort to maintain exports to the United States.

The trade in color televisions, a source of trade friction with the United States in the late 1970s, was an example of the first response. After the implementation of the voluntary export restrictions and tariffs contained in the Orderly Market Agreement of 1977, a wave of major Japanese electronics firms started local production in North America. In the early 1980s, these firms established large TV-assembly transplants in the United States and bought some U.S. TV factories. They also started TV-assembly plants and component factories in the border area of Mexico to make use of an “offshore” production system under the *maquiladora* framework.

In the automobile industry, trade friction with the United States worsened in the early 1980s as a result of the increasing difficulties faced by the U.S. Big Three automakers. After the oil crisis of 1973, U.S. demand shifted to favor compact cars, vastly increasing sales of Japanese cars. The severe recession after the second oil crisis, in 1979, aggravated the situation. The Voluntary Restraints Agreement limited Japanese automobile exports to the United States first to 1.68 million units per year, and later to 2.5 million units per year. Constrained by the Agreement, Japanese automakers started to establish local transplants in the United States on a large scale (and to a lesser extent in Canada). Their Japanese suppliers of parts and components also began local North American production.

In the early 1980s, U.S. trade deficits with Japan widened as a result of the increasing “twin deficits” of the U.S.'s federal budget and current account. The U.S. government increasingly took protectionist trade measures to curb Japanese

exports to the United States, including antidumping measures and other restrictive actions. As trade frictions intensified in a variety of industries, including semiconductors, photocopiers, power tools, and other machinery, Japanese firms in those industries launched local production operations in North America.

According to the data on Japanese overseas production operations prepared by Toyo Keizai (2003), the number of Japanese transplants in the United States climbed from approximately 60 cases before 1973, to 192 cases during 1974–1986. Major Japanese electronics assemblers and suppliers that started large-scale North America production operations during this period included Hitachi (color TVs), Toshiba Display (CRT monitors), Matsushita, and Sharp (color TVs and microwave ovens). In the early and mid-1980s, the Japanese automobile “Big Three”—Toyota, Nissan, and Honda—started their U.S. car-assembly operations. Honda opened a car factory in Marysville, Ohio; Nissan launched a production facility in Smyrna, Tennessee; and Toyota started the NUMMI plant (a joint GM-Toyota venture) in Fremont, California. Many Japanese suppliers, such as Denso, also built North American transplants during this time. One-third of the Japanese transplants we surveyed in 2000 and 2001 started their U.S. production operations in this period.

The second major response to U.S. and European trade disputes by Japanese companies—particularly those in the electronics industry—was to start large-scale local production in the NIEs. Europe was important in this regard because the region was the second-largest market for these firms’ products, after the United States. Japanese firms made use of the NIEs’ export-oriented development strategies, including the establishment of free-trade zones, to maintain exports to U.S. and other markets. Consequently, a Pacific Ocean triangular-trade network emerged among Japan, Asia, and the United States. This network later provided an international framework for promoting the industrial development of the ASEAN nations and China.<sup>2</sup>

Japanese FDI reached a high point from the mid-1980s to the early 1990s. Japanese FDI remained high in part because U.S.-Japan and Europe-Japan trade frictions continued throughout these years, but other domestic factors also contributed to this situation: the high wages, and the consequent domestic labor shortage, caused by the bubble economy in Japan; the extremely high yen after the Plaza Accord in September 1985; and low capital costs in the bubble economy. (See figure 1-1B.)

In the United States, the economic expansion of the late 1980s—prompted by the merger and acquisition boom and a frenzy in the financial markets—provided a favorable context for Japanese firms relocating production to North America. According to Toyo Keizai (2003), about 370 Japanese manufacturing firms started U.S. production from 1987 to 1993, more than double the 190 firms that had initiated U.S. production in the previous 12 years (1974–1986). In the automobile industry, Toyota opened factories in Kentucky and Canada, Suzuki started a joint venture with GM in Canada, Mazda and Mitsubishi opened their own car plants,

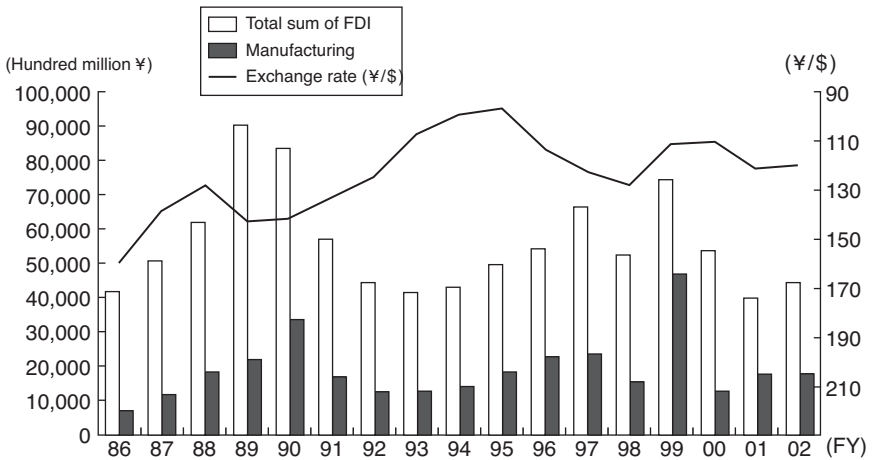


Figure 1-1B. Japanese FDI Balance with the United States, 1986–2002

Source: Prepared by Japanese Bank for International Cooperation, Ministry of Finance, cited in Saito, 2003: 5.

and Subaru and Isuzu launched joint ventures in the Midwest. All these plants were built for full-scale production operations. Nissan also started car assembly in Smyrna, Tennessee, and began producing pickup trucks. Thus, every Japanese automaker except Daihatsu launched local production operations in North America during this period. The major suppliers associated with these automakers also moved into the United States. Five of the 10 major suppliers we surveyed in 1989 started their local production operations after 1987. In the semiconductor industry, Mitsubishi Electric and Fujitsu started large-scale memory-chip and application specific integrated circuit (ASIC) chip production plants.

In Asia, Japanese production operations were further extended from the NIEs to the ASEAN regions, especially in the electronics industries. The industrial and economic success of the NIEs had intensified trade tensions with the United States and other industrialized nations. As NIEs began to democratize, their production costs began to rise due to wage hikes and labor disputes. In response to these new limitations, Japanese firms shifted their export production sites to the “ASEAN Four” (Thailand, Malaysia, Indonesia, and the Philippines). European and U.S. multinational firms, and even some firms from the NIEs—Taiwanese and Korean firms, among others—went along with them. This caused an acceleration in the economic and industrial development of the ASEAN Four, and it expanded the industrial trade networks among Asian countries, thus reinforcing the Pacific Ocean triangular-trade network. These developments provided the framework for rapid Asian industrial development as the principal driver of world economic growth. The rapid growth of electronics industries in East and Southeast Asia put competitive pressure on Japanese electronics transplants in North America.

In this period, the JMPS was widely praised as the real reason for the extraordinary competitiveness of Japanese firms, especially in processing and assembly industries, such as automobiles, electronics, and machinery. The system came to be seen as a “model” that should be implemented not only in Japanese transplants, but also in the factories of American and European firms (as well as those of Korean and Taiwanese companies). The JMPS appeared to be the global standard in management and production systems. JMNESG’s 1989 survey in North America and the subsequent surveys in East Asia (Korea and Taiwan) in 1992 and in Southeast Asia (Singapore, Thailand, and Malaysia) in 1993 were conducted in this heyday of the Japanese system.

## *2. Major Changes in the JMPS in the 1990s*

The primary focus of this book is the “third period” of Japanese production, from the early 1990s and onward, during which Japanese overseas production operations underwent major changes. These changes have, in turn, had a major influence on the business strategies of Japanese firms.

Among the circumstances that have affected Japanese companies’ business and production strategies in North America since the early 1990s, three stand out. First, Japanese competitiveness has been seriously threatened, and Japanese firms have been forced to contend with significant challenges at home and abroad. Second, the pressures of global “megacompetition” have intensified. Third, the United States underwent an economic boom that lasted for an extraordinarily long period during this time, throughout the entire decade of the 1990s.

The erosion of Japanese competitiveness stemmed primarily from deteriorating corporate performance. This was a result of the difficulties facing the Japanese economy, rather than problems in the microstructure of the JMPS. The biggest problems were the deflationary trend of the Japanese economy, which became amply evident from the early 1990s onward, and intensified competition at home and abroad. The Japanese economy fell into a deflationary spiral, because of the protracted Heisei recession that followed the collapse of the bubble economy in the early 1990s. This spiral caused the bankruptcy of large banks and securities houses. An increase in the break-even point for major manufacturers during the bubble economy also played a part in these difficulties. All these factors combined to cause high costs at home and put significant pressures on Japanese companies.

Concurrently, global megacompetition took a further toll on the Japanese economy. While competition with Western companies grew more intense, Korean, Taiwanese, and other Asian companies were rapidly catching up to Japan in a wide variety of areas, including medium-technology products such as television sets, audio equipment, and other consumer electronics; automobiles, steel, and ordinary machinery; and later, high-tech sectors including semiconductors, personal computers, and liquid crystal displays.