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EDITORIAL ANNOUNCEMENT

SEIICHI KATAYAMA (Editor-in-chief)

It is a great pleasure and honor to announce that the **REVIEW** has been selected as a journal on **ECONLIT**. On this occasion our editorial board has decided to change the editorial format. Hereafter contributors will have to follow standardized manuscript editing.

Our editorial board hopes that much stronger support will be forthcoming to ensure the continued successful publication of the **REVIEW**.

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IMPLICATIONS OF THE ASIA-EUROPE MEETING FOR THE WORLD TRADING SYSTEM: AN ISSUE-ORIENTED REVIEW

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Abstract

The first Asia-Europe Meeting (ASEM) was convened in March 1996 and received strong political support from both Asian and European sides. The creation of ASEM is important in that it attempts to build a "bridge" between Asia and Europe, at the same time that regional economic integration between other major regional "poles" is taking place. In particular, APEC has emerged as an important player in defining new boundaries for economic cooperation across the Pacific. Europe has perceived APEC as a potential threat in this regard, especially since Asia is the most dynamic region in the world and EU-Asian links remain relatively weak. Asian countries are interested in strengthening relations with the EU for economic and strategic reasons. This paper evaluates the political economy of ASEM in light of the rapidly-changing global trading system. In addition to a close examination of the economic and policy dimensions of ASEM, the paper considers the future importance of ASEM to Europe and Asia. Analysis underscores the importance of APEC in driving and, most likely, defining the ultimate structure of ASEM, and explores the pivotal link played by ASEAN in both regional organizations.

JEL classification: F13; F15; O52; O53
Keywords: ASEM; ASEAN; Economic integration; APEC; EU-Asian economic relations

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Not only the EAEC but also APEC are simply political shows. At the first APEC meeting, they announced the willingness to complete a FTA by the year 2020. I wonder if anyone believes that this promise will be kept. It is just 20 years from now! Many representatives voted yes, and they might be persuaded by the year 2020. They witnessed the creation of the EU and NAFTA and other economic integration areas and they felt they should do something about it. (Lester Thurow)[1]

As the 19th century belonged to Europe, the present belongs to North America, and the next will belong to East Asia···. We would fool ourselves if we did not recognize that important parts of East Asia may soon reach and surpass us in terms of prosperity···. If we miss the train, I have no doubt that Asia 'will go it alone'. (Harlem Brundtland)[2]

1. Introduction

The above two quotes contrast starkly regarding their views of the future of the Asia-Pacific in the world trading system. Thurow dismisses APEC as a show, with more flash than substance; one can read from this (aided by a copy of his controversial book, *Head to Head*) that regional integration is not much of an issue and efforts in this direction are empty reactions to trade bloc formation elsewhere. Hence, the promise of free trade in APEC by the year 2020 need not be taken seriously. On the other hand, Brundtland emphasizes the importance of Asia in the future of the world economy, even going so far as to predict (as have many before her) the advent of the Pacific Century. Her plea, in contrast to what Thurow might perscribe, is for a strong push toward establishing closer economic cooperation with Asia. Europe will neglect this region at its own peril.

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1 This quote was translated from the Japanese, as found in *The Yomiuri*, "APEC is Just a Political Show," September 1996. As the original quote was no doubt in English, there are likely to be some discrepancies in the quotation from its original format.

2 *Asahi Evening News*, "Europe Revises Its Sense of Asia's Importance," November 6, 1995.

These two views probably underscore many of the attitudes that Europeans had toward the first Asia-Europe Meeting (ASEM) in March 1996. Asia has clearly not received high priority on the security or economic fronts since the end of the colonial area. At the regional level, European economic integration has kept policymakers preoccupied, and European economic interests are concentrated within the region or across the Atlantic, not eastwards to Asia. Pressing security interests go as far as Russia, down to the Middle East, and into Africa; Asian matters have been left to others. For these reasons, as well as the absence of any specific policy goal in mind, the ASEM agenda was kept open and consistent with Asia's own version of NATO ("No Action, Talk Only").

Nevertheless, it is difficult for Europe to continue to ignore Asia, particularly when it is forging closer links with its most important (external) economic partner, the United States, through APEC. The wide-scale participation of European and Asian countries in ASEM is indicative of this fact.[3] Even if APEC were merely a "show," there would be strong reasons for the EU to be concerned with possible developments regarding regional cooperation on the other side of the world. For example, while the Asia-only EAEC has really not amounted to much in terms of concrete initiatives, the fact that it exists in spirit and principle has been enough to merit close monitoring by the United States, perhaps even in an overly-ambitious manner.[4]

Since the late 1980s when the "trade-bloc trend" became an increasingly vital part of the world trading system, interesting regional configurations have been developing, especially in the formation of ancillary relationships between major blocs, which we might call "poles." The European pole is led by the EU; North America is being led by the United States; and the Asia-Pacific is now being led by

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3 ASEAN proposed the ASEM forum, and it ended up being composed of the 15 countries of the EU, the 7 ASEAN countries, Japan, China, and South Korea. Japan proposed the participation of Australia and New Zealand but failed.

4 The United States reacted quite harshly to the first proposed "East Asian Economic Grouping" (EAEG), which was tabled by Prime Minister Mahathir of Malaysia as an Asian-only trade bloc in December 1990. The Bush Administration--led by Secretary of State Baker--complained that it would impede the APEC process and was exclusionary. These exchanges led to a deterioration in Malaysian-U.S. relations, even as ASEAN has downgraded the EAEG to a more innocuous "East Asian Economic Caucus" (EAEC). Relations have improved between the Clinton Administration and Mahathir since, but suspicions continue to be present.

APEC. Additional intra-pole and inter-pole relationships have been developing that could be extremely important in forging the nature of the emerging world trading system. With respect to intra-pole developments, the EU has negotiated association agreements with Central and Eastern European countries and has sought out additional means of solidifying economic cooperation with Africa and Russia. At the initiative of the United States, NAFTA is now considering the Chilean application of accession (which will probably happen in the near term, now that the 1996 election year is over) and a "Free Trade Area of the Americas" (FTAA) is beginning to emerge, in which North, Central, and South America will increasingly form closer cooperative links, leading to the eventual creation of a free-trade area even as early as 2006. Within the Asia-Pacific region, the ASEAN Free-Trade Area (AFTA) and the Closer Economic Relations between Australia and New Zealand (CER) already exist; ASEAN has recently enlarged to include Vietnam, with Laos most likely joining in 1997 (to be followed by Cambodia and Myanmar), implying expanded subregional integration at the heart of APEC; special regional cooperation initiatives have been developing, such as "growth triangles" and the Mekong River initiatives; and, of course, the East Asian Economic Caucus (EAEC) continues to exist.

Inter-pole arrangements have been proceeding more tentatively, but the trend seems to be clear. The EU and the United States have been discussing the possibility of forming a "transatlantic free-trade area," but these negotiations have been set aside for the moment.[5] Still, a basis for dialogue exists. The missing link, then, would be the bridge between Europe and Asia. ASEM is designed to fill this gap.

From the EU perspective, ASEM not only makes sense but may be necessary. The EU's primary economic competitors are the United States and Japan. The United States is a (leading) member of NAFTA, APEC and the FTAA, i.e., the major non-European poles. In particular, the United States and Japan are connected within the APEC framework

5 In fact, it is not clear what such a free-trade area would look like. The EU and the United States will have close to free-trade in most manufactured goods traded bilaterally by the end of the Uruguay Round cuts. This would leave agriculture to free up, which is a non-starter (most of the EU-U.S. disputes are directly related to this sector, and fights regarding the liberalization of agriculture in the GATT/WTO are legendary, even leading to two (premature) deaths of Uruguay Round negotiations in December 1990 and December 1992.)

and through which each nation implicitly is assured of a strong say in the other's special groupings, i.e., NAFTA/FTAA and the EAEC, respectively. Should, for example, the FTAA take a turn for the worst (i.e., through discriminatory arrangements aimed at Northeast Asia), Japan could exert pressure on the United States against this through APEC, thereby containing the United States if it is not to compromise its goals in APEC. The same would be true should Japan promote such an arrangement under EAEC (though that is clearly less plausible). But where will the EU stand in all this? There will be times when the WTO will not suffice, particularly in the new international economic environment in which non-traditional trade issues have become increasingly paramount.

It is the working hypothesis of this paper that the future of the world trading system will be built around how these poles develop internally and between each other. In particular, it focuses on the "missing" ASEM link. As ASEAN has been a key catalyst in the APEC pole and instrumental in establishing the Euro-Asian bridge, a considerable weight will be placed on the role of ASEAN in this tri-polar world. The paper begins with a review of the political backdrop from which ASEM emerged (Section 2), followed by a review of European-Asian economic linkages and motivations for establishing more extensive links between Europe and Asia in Section 3. Section 4 discusses the first ASEM meeting itself and its implicit and explicit results. In the final section, the paper considers ASEM and APEC in light of a changing global economic environment in which all parties appear to be trying to gain open markets, or at least prevent their potential exclusion from a major economic "pole".

2. Background to ASEM

According to World Bank projections, East Asian countries will grow at 8 percent or more over the next 10 years, which is consistent with many other forecasts. This means that Asia will continue to be the most dynamic region in the world. Moreover, this growth rate is expanding an economic base that has been growing at a similar pace for a few decades, implying that the addition to world output (and the share of Asia in world production and consumption) will continue to be impressive. For example, in 1979 and 1993, Chinese GDP at market

prices came to $202 billion and $426 billion, respectively.[6] Ten percent growth using the 1979 base leads to a net addition in world output of $20.2 billion, whereas for 1993, it comes to $42.6 billion. To put this in perspective, this net addition to output is almost half that of Germany in 1993 (which comes to $96 billion), if the growth rate for 1992-1993 is averaged (using the 1993 growth rate would be deceiving, as the German economy contracted by 1.2 percent!). With the growing internationalization of the world economy, no private sector firm with multinational operations will be able to ignore Asia in the near future without deleterious ramifications.

President Clinton initiated the first heads-of-state APEC Summit (on Blake Island, Washington State) in November 1993, which has now become an annual event. In convening this meeting, which set in motion discussions regarding an APEC free-trade area, the United States clearly had in mind pushing regional liberalization under APEC, rather than leaving it to, say, an EAEC from which it would be excluded. In this sense (and in others), it was used as a political vehicle, but one with substance in mind (rather than "fluff," as Thurow maintains). At this point, the EU began to take APEC a bit more seriously. And for domestic political reasons, Clinton did not show up at the Osaka Summit in 1995--at which the blueprint for economic integration within APEC was supposed to be created.[7] Because of this absence, ASEAN was able to play a stronger role at the Summit; in fact, ASEAN has always been considered central to APEC, as is evidenced by the agreement to hold APEC summits in ASEAN every other year.[8] Also,

6 These figures were taken from World Tables (1995), using its suggested conversion rate of Chinese Yuan into U.S. dollars. It should be noted that this type of tabulation is trickly (see, for example, Lardy 1994), but we are only using these figures for heuristic purposes.

7 The reason for this was not an indication of lack of commitment on the part of Clinton toward APEC--which, in fact, would have been hurting his own intiative--or a protest to the Japanese, but rather pertained to a highly-politicized fight between the Executive and Administrative branches over balancing the national budget, including much talk about "U.S. government default." In fact, the government was closed down for days during this period. Leaving the United States at that point would have left him open to considerable political criticism, and just as the 1996 election year was beginning.

8 ASEAN has been sceptical in the past regarding an overly ambitious APEC agenda, a fact that manifested itself in the Kuching Consensus. Nevertheless, the Kuching Consensus has been surpassed by events, and ASEAN is seeking to play an active part in molding APEC in a way that is advantageous to its own interests, rather than playing the role of "spoiler". In fact, the agreement to create a region of "open trade and investment" came at the Bogor Summit in Indonesia.

economic integration through AFTA has given a boost to ASEAN's influence, not only because of its reinforcement of overall liberalization among the member states (thereby giving it more "prestige") but also because ASEAN now can (at least potentially) work together more efficiently. The expansion of ASEAN to include additional members will also likely strengthen its role.[9] Moreover, there are negative constraints on other countries and regions; Japan has always had difficulty assuming the role of leader in Asia, and China is somewhat limited in that it is not a member of the WTO and is marred by the "Taiwan" problem, which it calls an internal issue (i.e., not subject to APEC concerns) but the rest of the organization understands to be of vital importance. Hence, ASEAN in a literal and figurative sense, is at the core of APEC and essential to its future.

The EU's dramatic push to create a unified Single Market commenced in 1986 and was all but completed by the mid-1990s, at which time the EU began to focus more intensively on monetary union. While the Single Market program was designed to lift Europe out of a slow-growth phase (which it did for a few short years), it is, perhaps, ironic that the region is currently trying to emerge from a long, painful recession since the Single Market was virtually completed in 1993. Clearly, Europe needs more than mere vertical economic integration as a remedy for success; more important perscriptions relate to domestic policies and, arguably, constructing closer links with dynamic, new markets. This means Asia.

Almost all Asian members of APEC and ASEM have at one time been a colony of a European power.[10] Each of these countries gained independence in the post-war era; by the late 1970s, all were free in the Pacific except the very small states of Brunei, Hong Kong, Macao, and some small South Pacific Islands. European security and, to some degree, economic interests in Asia largely disappeared with their empires, a trend that was exacerbated by regional developments

9 While Vietnam joined ASEAN in 1995, it is not yet a member of APEC, which has had a moritorium on new members for the past 3 years. However, when the moritorium is lifted, it will be a prime candidate for accession. Laos will likely follow, and, possibly, Cambodia. Myanmar is probably a candidate only in the medium- to long-term.

10 Southeast Asian countries receiving independence from colonial powers include: Myanmar (U.K., 1948); Laos (France, 1954); Vietnam (France, 1954); Cambodia (France, 1954); Malaysia (U.K., 1963); Singapore (U.K., 1965); Philippines (Spain, 1898; U.S., 1946); Brunei Darussalam (U.K., 1984); Indonesia (Netherlands, 1945).

elsewhere (e.g., the UK's joining the EU in 1973). For example, direct foreign investment of the EU in East Asia (excluding Japan) was less than 5 percent of total outward position in all major EU countries in 1994, e.g., 1.8 percent for France, 2.4 percent for Germany, 4.9 percent for Holland, and 0.8 percent for Italy.[11] In part because of the European withdrawal and in part because of structural change in its home market, Japan became an increasingly important player in Asia at this time.

As a means to address new issues in the post-cold-war era, the EU published in July 1994 a political statement called, "Toward a New Asian strategy."[12] In this document, the EU complains about various economic intrusions and challenges of the United States, but also underlines the regional security responsibilities of Japan and its strategies for building well-defined distribution systems--not unlike its domestic counterparts--in Asian markets, which prevented other foreign countries from entering the region. The document also considers more fully the reasons behind the slow outflow of EU investment to Asia, but, perhaps more importantly from an ASEM viewpoint, it stresses that the Asian development model must embrace democracy and liberty based essentially on the same philosophy on which EU integration has been built. This was considered the ideal. In addition, they include discussion of many of the specific issues that Asian countries tend to find the most counter-productive in bilateral dialogue (particularly with respect to economics): political reform, human rights, respect for the environment, and the like.[13] But human rights was singled out as the key issue, and perhaps the most difficult. As the United States has learned from many bilateral and regional meetings, pushing human rights comes up against very strong resistance, with Asian countries noting that: (1) human rights are internal matters and cannot be effectively discussed in regional fora; and (2) the West continually fails to understand Asian development in general and "Asian values" in particular.

Still, EU countries are working to create the infrastructure necessary to expand economic interaction, with support coming from

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11 OECD (1996).

12 *Asahi Shinbun*, "Europe Revives Its Sense of Asia's Importance," November 6, 1995.

13 *Far Eastern Economic Review*, February 29, 1996.

the highest levels. The Vice President of the EU commission visited Vietnam in September 1995 and opened a representative office of the EU commission in Hanoi. The EU's Joint Committee on Human Resources Development (HRD) and cooperation unveiled a plan to set up in Europe a seminar on investment in Vietnam. In addition, the EU has opened a business information center, which collects extensive data on the actions of European firms in Thailand and Indonesia. The UK Chamber of Commerce in Thailand brought together support of more than 100 firms to open a series of study sessions devoted to benefiting from Japanese Official Development Assistance (ODA) in the region, and sought funds to undertake various research projects on how to tap Japanese money in Asia (about 70 percent of Japanese ODA flows to Asia[14]). Germany's industrial trade center opened in 1995 in Singapore and, since then, has registered more than 100 firms.[15]

At the Osaka APEC Summit in November 1995, the EU collected a great deal of information, particularly because of the "action-agenda" orientation of the meeting. Much of the information presented, such as that related to the rapid (unilateral) trade and investment liberalization in Asia, brought to the fore the riddle as to why the EU had not done better in the region. They also discovered that the answer certainly didn't have to do with the exclusion of the EU from economic integration programs; not only are existing preferential trading arrangements outward looking, only AFTA gives any degree of discrimination. APEC itself is based on "open regionalism," with very explicit directions to avoid discrimination against outsiders and remain faithful to the letter and spirit of the WTO. Hence, while APEC did not achieve a great deal in concrete terms at Osaka and certainly did not intend to go as far as the EU, its developments have thus far been very positive from the EU point of view, for discriminatory "bad habits" characteristic of the EU in its early years were not present. Moreover, if the reason for the poor performance in the past had to do with the small nature of the Asian market, the data exchanged at the meeting clearly showed that this was not the case. As Prime Minister Brundtland notes, Asia has become a powerhouse and will likely soon be the largest powerhouse on the planet; Europe must be careful not to enter the "game" too late. The trade and investment programs of

14 Plummer and Abe (1996).
15 *Asahi Shinbun*, October 23, 1995, p.4.

Asian countries by themselves and through regional cooperation initiatives such as APEC and AFTA should reinforce the motivation for a closer look on the part of the EU.

3. European and Asian Economic Links: A Closer Look

The extent of change in economic interaction between Europe and Asia might be proxied by changes in trade shares in each other's markets. While an imperfect measure, it is, perhaps, better than most. Another option might be detailed bilateral direct foreign investment data, but these tend to be riddled with definitional discrepancies (e.g., actual versus approval data), missing information, and less up-to-date information than trade flows. Besides, it has been shown that trade and investment are closely related, and, hence, analysis of trade flows should be sufficient.[16]

Tables 1 and 2 show aggregate bilateral trade flows between ASEM members states, as well as other selected countries and country aggregates, for 1994 and 1986, respectively. The basic conclusion that one gets from these trade matrices is that the EU essentially trades with itself. Intra-regional exports as a percentage of total exports came to over 60 percent in 1994, whereas the share of ASEM countries came to only 7 percent. EU exports to and imports from ASEAN as a share of its total have increased somewhat from 1986-1994, but by 0.01 percent. Trade with Japan has also stagnated. Hence, one finds from the tables that trade shares between regions have stabilized but at a very low level.

Nevertheless, the overall picture is, perhaps, clouded by the extreme regionalization of the EU. As the EU is essentially a Single Market and does not yet focus exclusively on extra-regional trade flows in its statistical outputs, other trade shares--particularly for developing countries--will inevitably be small. After all, the EU is by far the largest trading "country" in the world; total EU exports in 1994 came to over $1.6 trillion, better than 3.4 times that of the United States (the largest single-country exporter). Therefore, it's important to look a bit closer at recent changes in the absolute magnitudes of relevant

16 For a theoretical and quantitative treatment of trade-investment links, see Petri and Plummer (1996).

Table 1a.
Direction of Asian-EU Exports, 1994

		Total Exports (US$ BN)	DESTINATION																	
			US	JPN	HK	SK	TW	Sing.	Indo.	Mal.	Phil.	Thai.	CHN	FRN	Ger.	Neth.	Italy	UK	Den.	Swit	ASEAN(4)
	US	476.00	0.00	0.11	0.02	0.04	0.03	0.02	0.01	0.01	0.01	0.01	0.02	0.03	0.04	0.03	0.01	0.05	0.00	0.01	0.06
	JPN	395.00	0.30	0.00	0.06	0.06	0.06	0.05	0.02	0.03	0.01	0.04	0.05	0.01	0.05	0.02	0.01	0.03	0.00	0.01	0.15
	HK	28.74	0.28	0.05	0.00	0.01	0.03	0.06	0.01	0.01	0.01	0.01	0.27	0.01	0.06	0.02	0.01	0.05	0.00	0.01	0.10
	SK	95.44	0.22	0.14	0.08	0.00	0.03	0.04	0.03	0.02	0.01	0.02	0.06	0.01	0.05	0.01	0.01	0.02	0.00	0.00	0.13
	Sing.	96.59	0.19	0.07	0.09	0.03	0.04	0.00	0.00	0.20	0.02	0.06	0.02	0.01	0.04	0.03	0.01	0.03	0.00	0.01	0.28
E	Indo.(1)	39.91	0.15	0.27	0.03	0.06	0.04	0.10	0.00	0.02	0.01	0.01	0.03	0.01	0.03	0.03	0.02	0.03	0.00	0.00	0.14
X	Mal.	58.73	0.21	0.12	0.05	0.03	0.03	0.21	0.01	0.00	0.01	0.04	0.03	0.01	0.03	0.02	0.01	0.04	0.00	0.00	0.27
P	Phil.	13.09	0.40	0.15	0.05	0.02	0.03	0.05	0.01	0.02	0.00	0.03	0.01	0.01	0.05	0.04	0.01	0.04	0.00	0.00	0.10
O	Thai.(2)	37.08	0.22	0.17	0.05	0.01	0.02	0.12	0.01	0.03	0.01	0.00	0.01	0.02	0.04	0.03	0.01	0.03	0.00	0.01	0.16
R	CHN	121.00	0.18	0.18	0.27	0.04	0.02	0.02	0.01	0.01	0.00	0.01	0.00	0.01	0.04	0.02	0.01	0.02	0.00	0.00	0.06
T	FRN	233.00	0.07	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.17	0.05	0.09	0.10	0.01	0.04	0.02
E	Ger.	423.00	0.08	0.03	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.12	0.00	0.07	0.08	0.08	0.02	0.05	0.03
R	BeLux	137.00	0.05	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.19	0.21	0.13	0.05	0.08	0.01	0.02	0.01
	Neth.	146.00	0.04	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.26	0.00	0.05	0.09	0.01	0.02	0.01
	Italy	190.00	0.08	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.13	0.19	0.03	0.00	0.06	0.01	0.04	0.02
	UK	200.00	0.13	0.02	0.02	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.01	0.10	0.13	0.07	0.05	0.00	0.01	0.02	0.03
	Den.	39.83	0.05	0.04	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.21	0.04	0.04	0.08	0.00	0.02	0.01
	Ire.	29.90	0.08	0.03	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.09	0.14	0.06	0.04	0.27	0.01	0.02	0.01
	SPN	72.87	0.05	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.20	0.14	0.04	0.09	0.08	0.01	0.01	0.01
	GCE(2)	8.78	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.06	0.24	0.02	0.13	0.06	0.01	0.01	0.01
	Port.(2)	15.42	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.20	0.05	0.03	0.11	0.02	0.02	0.00
	SWD	61.24	0.08	0.03	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.02	0.05	0.13	0.05	0.04	0.10	0.07	0.02	0.03
	FND	29.79	0.07	0.02	0.01	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.01	0.05	0.13	0.05	0.03	0.10	0.03	0.01	0.03
	AUS(2)	40.14	0.03	0.02	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.04	0.39	0.03	0.08	0.03	0.01	0.06	0.02
	Addendum:																				
	APEC(3)	1651.16	0.25	0.09	0.06	0.04	0.03	0.04	0.01	0.03	0.01	0.02	0.03	0.02	0.04	0.02	0.01	0.03	0.00	0.01	0.11
	EC15	1626.97	0.07	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.10	0.14	0.06	0.06	0.08	0.01	0.03	0.02

Notes:
(1) *data for East Timor was added to Indonesia*
(2) 1993 data used for Thailand, Greece, Portugal, and Austria
(3) APEC: missing Papua New Guinea, Brunei, and Taiwan
(4) ASEAN includes Indonesia, Malaysia, Singapore, Thailand, Philippines, and Vietnam

Source: United Nations, Commodity Trade Statistics, Various Years

Table 1b.
Direction of Asian-EU Imports, 1994

		Total Imports (US$ BN)	SOURCE																	
			US	JPN	HK	SK	TW	Sing.	Indo.	Mal.	Phil.	Thai.	CHN	FRN	Ger.	Neth.	Italy	UK	Den.	Swit	ASEAN(4)
	US	687.00	0.00	0.18	0.01	0.03	0.04	0.02	0.01	0.02	0.01	0.02	0.06	0.03	0.05	0.01	0.02	0.04	0.00	0.01	0.08
	JPN	272.00	0.23	0.00	0.01	0.05	0.04	0.02	0.05	0.03	0.01	0.03	0.10	0.02	0.04	0.01	0.02	0.02	0.01	0.01	0.14
	HK	162.00	0.07	0.16	0.00	0.05	0.09	0.05	0.01	0.02	0.00	0.01	0.38	0.01	0.02	0.01	0.02	0.02	0.00	0.01	0.09
	SK	102.00	0.21	0.25	0.01	0.00	0.02	0.02	0.03	0.02	0.00	0.01	0.05	0.02	0.05	0.01	0.02	0.02	0.00	0.01	0.07
	Sing.	102.00	0.15	0.22	0.03	0.04	0.04	0.00	0.00	0.16	0.01	0.05	0.03	0.02	0.03	0.01	0.01	0.03	0.00	0.01	0.22
I	Indo.(1)	31.98	0.11	0.24	0.01	0.07	0.05	0.06	0.00	0.02	0.00	0.01	0.04	0.02	0.08	0.02	0.02	0.02	0.00	0.01	0.09
M	Mal.	58.08	0.17	0.27	0.02	0.03	0.05	0.14	0.02	0.00	0.01	0.03	0.02	0.03	0.04	0.01	0.01	0.03	0.00	0.01	0.19
P	Phil.	22.74	0.18	0.24	0.05	0.05	0.06	0.07	0.02	0.02	0.00	0.01	0.01	0.01	0.04	0.01	0.01	0.02	0.00	0.01	0.11
O	Thai.(2)	45.95	0.12	0.30	0.01	0.04	0.05	0.06	0.01	0.04	0.00	0.00	0.02	0.02	0.05	0.01	0.02	0.02	0.01	0.01	0.12
R	CHN	118.00	0.12	0.23	0.08	0.06	0.12	0.02	0.01	0.01	0.00	0.01	0.00	0.02	0.06	0.01	0.03	0.02	0.00	0.01	0.06
T	FRN	228.00	0.08	0.04	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.02	0.00	0.18	0.05	0.10	0.08	0.01	0.03	0.02
E	Ger.	377.00	0.07	0.06	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.03	0.11	0.00	0.08	0.08	0.06	0.02	0.04	0.03
R	BeLux	126.00	0.05	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.16	0.20	0.18	0.04	0.09	0.01	0.01
	Neth.	130.00	0.08	0.04	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.07	0.22	0.00	0.04	0.09	0.01	0.01	0.03
	Italy	164.00	0.05	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.14	0.20	0.06	0.00	0.06	0.01	0.04	0.02
	UK	222.00	0.12	0.06	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.10	0.15	0.07	0.05	0.00	0.01	0.03	0.03
	Den.	33.92	0.05	0.03	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.05	0.21	0.07	0.04	0.06	0.00	0.02	0.02
	Ire.	25.30	0.18	0.05	0.01	0.00	0.01	0.02	0.00	0.01	0.00	0.00	0.01	0.04	0.07	0.03	0.02	0.36	0.01	0.01	0.04
	SPN	91.84	0.07	0.04	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.02	0.17	0.15	0.04	0.09	0.08	0.01	0.01	0.02
	GCE(2)	22.76	0.04	0.07	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.08	0.17	0.07	0.14	0.06	0.01	0.02	0.01
	Port.(2)	24.12	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.13	0.15	0.05	0.09	0.07	0.01	0.02	0.01
	SWD	51.76	0.09	0.05	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.18	0.04	0.04	0.10	0.07	0.02	0.01
	FND	23.27	0.08	0.07	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.02	0.04	0.15	0.03	0.04	0.08	0.03	0.02	0.02
	AUS(2)	48.53	0.04	0.04	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.41	0.03	0.09	0.03	0.01	0.04	0.01
	Addendum:																				
	APEC(3)	1901.33	0.17	0.15	0.02	0.03	0.05	0.03	0.02	0.03	0.01	0.02	0.08	0.02	0.04	0.01	0.02	0.03	0.00	0.01	0.09
	EC15	1568.50	0.08	0.04	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.02	0.09	0.14	0.07	0.06	0.07	0.01	0.03	0.02

Notes:
(1) data for East Timor was added to Indonesia
(2) 1993 data used for Thailand, Greece, Portugal, and Austria.
(3) APEC: missing Papua New Guinea, Brunei, and Taiwan.
(4) ASEAN includes Indonesia, Malaysia, Singapore, Thailand, Philippines, and Vietnam

Source: United Nations, Commodity Trade Statistics, Various Years

Table 2a.
Direction of Asian-EU Exports, 1986

		Total Exports (US$ BN)	DESTINATION																	
			US	JPN	HK	SK	TW	Sing.	Indo.	Mal.	Phil.	Thai.	CHN	FRN	Ger.	Neth.	Italy	UK	Den.	Swit.	ASEAN(4)
	US	205.00	0.00	0.11	0.01	0.03	0.02	0.02	0.00	0.01	0.01	0.00	0.02	0.03	0.05	0.04	0.02	0.05	0.00	0.01	0.04
	JPN	209.00	0.39	0.00	0.03	0.05	0.04	0.02	0.01	0.01	0.01	0.01	0.05	0.02	0.05	0.02	0.01	0.03	0.00	0.01	0.06
	HK	19.73	0.42	0.04	0.00	0.00	0.01	0.02	0.00	0.01	0.01	0.00	0.12	0.02	0.07	0.02	0.01	0.06	0.00	0.01	0.04
	SK	34.70	0.40	0.16	0.05	0.00	0.01	0.02	0.01	0.01	0.01	0.01	0.00	0.02	0.04	0.01	0.01	0.03	0.00	0.00	0.04
	Sing.	22.43	0.23	0.09	0.07	0.01	0.02	0.00	0.00	0.15	0.01	0.04	0.03	0.01	0.03	0.02	0.01	0.03	0.00	0.00	0.19
	Indo.(1)	14.79	0.20	0.45	0.02	0.02	0.02	0.08	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.01	0.01	0.00	0.00	0.10
E	Mal.	13.83	0.17	0.23	0.02	0.05	0.02	0.17	0.00	0.00	0.02	0.03	0.01	0.01	0.04	0.03	0.01	0.03	0.00	0.00	0.22
X	Phil.	4.73	0.36	0.18	0.05	0.02	0.03	0.03	0.01	0.02	0.00	0.01	0.02	0.02	0.05	0.05	0.00	0.05	0.00	0.00	0.07
P	Thai.	8.79	0.18	0.14	0.04	0.03	0.02	0.09	0.01	0.04	0.00	0.00	0.03	0.02	0.05	0.07	0.02	0.03	0.01	0.01	0.14
O	CHN(2)	39.44	0.08	0.16	0.35	0.00	0.00	0.03	0.00	0.01	0.01	0.01	0.00	0.01	0.04	0.02	0.01	0.01	0.00	0.00	0.06
R	FRN	119.00	0.07	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.16	0.05	0.12	0.09	0.01	0.05	0.01
T	Ger.	261.86	0.10	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.11	0.00	0.08	0.08	0.08	0.02	0.06	0.01
E	BeLux	68.65	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.20	0.20	0.15	0.06	0.09	0.01	0.02	0.01
R	Neth.	80.55	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.29	0.00	0.06	0.10	0.02	0.02	0.01
	Italy	97.82	0.11	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.16	0.18	0.03	0.00	0.07	0.01	0.05	0.01
	UK	107.00	0.14	0.02	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.09	0.12	0.07	0.05	0.00	0.02	0.02	0.02
	Den.	20.56	0.08	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.16	0.03	0.04	0.11	0.00	0.02	0.01
	Ire.	12.60	0.09	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.11	0.06	0.04	0.34	0.01	0.02	0.00
	SPN	27.25	0.09	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.18	0.12	0.06	0.08	0.09	0.01	0.02	0.00
	GRE	5.66	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.09	0.24	0.05	0.13	0.07	0.01	0.01	0.00
	Port.	7.16	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.07	0.04	0.14	0.02	0.03	0.00
	SWD	37.12	0.11	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.12	0.05	0.03	0.10	0.08	0.02	0.01
	FND	16.33	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.10	0.03	0.02	0.10	0.04	0.02	0.01
	AUS	22.52	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.34	0.03	0.09	0.04	0.01	0.08	0.01
	Addendum:																				
	APEC(3)	706.59	0.29	0.09	0.04	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.03	0.02	0.04	0.02	0.01	0.04	0.00	0.01	0.05
	EU15	884.07	0.09	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.10	0.13	0.06	0.06	0.08	0.02	0.04	0.01

Notes:
(1) data for East Timor was added to Indonesia
(2) China 1987 data used
(3) APEC: missing Papua New Guinea, Brunei, and Taiwan
(4) ASEAN includes Indonesia, Malaysia, Singapore, Thailand, Philippines, and Vietnam

Source: United Nations, Commodity Trade Statistics, Various Years

Table 2b.
Direction of Asian-EU Imports, 1986

		Total Imports (US$ BN)	SOURCE																	
			US	JPN	HK	SK	TW	Sing.	Indo.	Mal.	Phil.	Thai.	CHN	FRN	Ger.	Neth.	Italy	UK	Den.	Swit.	ASEAN(4)
	US	381.00	0.00	0.22	0.02	0.04	0.06	0.01	0.01	0.01	0.01	0.00	0.01	0.03	0.07	0.01	0.03	0.04	0.00	0.01	0.04
	JPN	119.00	0.22	0.00	0.01	0.04	0.04	0.01	0.06	0.03	0.01	0.01	0.05	0.02	0.04	0.00	0.01	0.02	0.01	0.01	0.13
	HK	35.37	0.08	0.20	0.00	0.04	0.09	0.04	0.01	0.01	0.01	0.01	0.30	0.01	0.03	0.01	0.02	0.03	0.00	0.02	0.07
	SK	31.52	0.21	0.34	0.01	0.00	0.01	0.01	0.01	0.03	0.00	0.01	0.00	0.02	0.04	0.01	0.01	0.01	0.00	0.01	0.06
	Sing.	25.46	0.15	0.20	0.02	0.02	0.04	0.00	0.00	0.13	0.01	0.03	0.06	0.02	0.03	0.01	0.01	0.03	0.00	0.01	0.17
	Indo.(1)	10.72	0.14	0.29	0.01	0.01	0.04	0.09	0.00	0.00	0.00	0.01	0.03	0.03	0.07	0.02	0.01	0.03	0.00	0.01	0.11
I	Mal.	10.73	0.19	0.21	0.02	0.02	0.03	0.15	0.01	0.00	0.01	0.04	0.03	0.02	0.05	0.01	0.01	0.04	0.00	0.01	0.22
M	Phil.	5.39	0.25	0.17	0.05	0.03	0.05	0.02	0.03	0.04	0.00	0.01	0.02	0.02	0.04	0.01	0.00	0.02	0.00	0.01	0.10
P	Thai.	9.12	0.14	0.26	0.02	0.02	0.04	0.07	0.01	0.04	0.01	0.00	0.03	0.02	0.06	0.01	0.01	0.03	0.01	0.02	0.12
O	CHN(2)	43.22	0.11	0.23	0.19	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.02	0.08	0.01	0.03	0.02	0.00	0.01	0.05
R	FRN	128.00	0.07	0.04	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.20	0.06	0.12	0.07	0.01	0.02	0.01
T	Ger.	209.66	0.06	0.05	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.11	0.00	0.11	0.09	0.07	0.02	0.04	0.01
E	BeLux	68.02	0.05	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.24	0.18	0.04	0.08	0.01	0.02	0.01
R	Neth.	75.58	0.08	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.27	0.00	0.04	0.08	0.01	0.01	0.02
	Italy	99.77	0.06	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.15	0.21	0.06	0.00	0.05	0.01	0.03	0.01
	UK	126.00	0.10	0.06	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.17	0.08	0.05	0.00	0.02	0.03	0.01
	Den.	22.73	0.05	0.06	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.24	0.05	0.04	0.07	0.00	0.02	0.01
	Ire.	11.56	0.16	0.04	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.09	0.04	0.03	0.42	0.01	0.01	0.01
	SPN	35.41	0.10	0.05	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.12	0.15	0.03	0.07	0.08	0.01	0.02	0.01
	GRE	11.24	0.03	0.06	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.08	0.22	0.07	0.12	0.04	0.01	0.02	0.01
	Port.	9.39	0.07	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.10	0.14	0.04	0.08	0.08	0.01	0.03	0.01
	SWD	32.49	0.08	0.05	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.21	0.04	0.04	0.10	0.07	0.02	0.01
	FND	15.32	0.05	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.17	0.03	0.04	0.06	0.03	0.02	0.00
	AUS	26.79	0.03	0.04	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.45	0.03	0.09	0.02	0.01	0.05	0.01
	Addendum:																				
	APEC(3)	799.29	0.15	0.18	0.03	0.03	0.04	0.02	0.02	0.02	0.01	0.01	0.03	0.02	0.06	0.01	0.02	0.03	0.00	0.01	0.06
	EC15	871.98	0.07	0.04	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.09	0.16	0.07	0.06	0.06	0.01	0.03	0.01

Notes:
(1) data for East Timor was added to Indonesia
(2) China 1987 data used
(3) APEC: missing Papua New Guinea, Brunei, and Taiwan
(4) ASEAN includes Indonesia, Malaysia, Singapore, Thailand, Philippines, and Vietnam

Source: United Nations, Commodity Trade Statistics, Various Years

variables, in which case the picture looks a bit different. Statistics compiled by JETRO show that EU direct foreign investment flows to Asia have doubled from 1990-1994, from $4.4 billion to $8.8 billion, actually surpassing EU investment in Japan in 1994 ($8.3 billion). The EU imported $125 billion (excluding Japan) worth of goods from Asia in 1994, and exported $81 billion (Table 1). This compares to about $150 billion and $81 billion in exports to and imports from Japan, respectively, in 1994, making Japan's trade with Asia only about 12 percent larger than that of the EU ($231 billion compared to $206 billion). Of course, geography plays a major hand in determining Euro-Asian interaction at both economic and political levels, a fact that is becoming increasingly appreciated in the international economic literature.[17]

After the breath-taking political revolutions of 1989 in Central and Eastern Europe and the end of the cold war, economic imperatives rose to prominence on international diplomatic fronts, and Asia was hurled into the spotlight. In 1993, the World Bank published an influential book, *East Asian Miracle,* which highlighted the successes of the "High-Performing Asian Economies" (HPAEs) and factors leading to their explosive growth. In particular, stable macroeconomic policies (including sagacious exchange-rate management), high rates of savings and investment, reliance on export promotion, a focus on infrastructural development (especially human capital), market-friendly microeconomic policies, and strong economic bureaucracies were cited as the most important determinants.

The World Bank (1993) study was so successful in drawing attention to the HPAEs effective developments strategies that it inevitably produced detractors. The most influential has been, perhaps, Krugman (1994), entitled, "The Myth of the Miracle." Krugman summarizes a number of recent studies found in the endogenous-growth literature suggesting that, like flash-in-the-pan growth in the Soviet Union of the 1950s, the lion's share of the growth in some of the HPAEs tended to be due to increased inputs of labor and capital, rather than productivity increases. As factor inputs will be accumulated at an inevitably slower rate in the future, this would suggest that the skyrocketing Asian economies will soon be brought back down to

17 See, for example, Krugman (1993) and related literature.

earth. But while Krugman (1994) has received a good deal of attention in the literature, it has been criticized from a number of perspectives, not the least being its focus on sources devoted to the experiences of Singapore and Hong Kong (two small city-states), whereas booming large countries such as those in ASEAN and China are excluded, as are other HPAEs.[18] In any event, medium- and long-run forecasts continue to show Asian countries growing in the 7-8 percent range, at which rate their economies will (approximately) double every decade. On balance, academe and the private sector have more faith in the World Bank (1993) perspective than that of Krugman (1994). The fact that ASEM has been created suggests that the Europeans are of the same mind-set.

So far, we have focused on an EU-centric approach to ASEM. What will Asia get out of it? First, the EU is the world's largest market, even though it has met with a fairly prolonged recession. Second, it is a major supplier of global direct foreign investment, which Asia needs in order to bring in additional non-debt creating capital flows, provide ready-made external markets, stimulate trade, and, most importantly, provide new technologies. Third, Asia has always been nervous about the potential fortress nature of the economic "deepening" of the EU, and ASEM could provide a direct forum for Asia to protect itself, without the over-bearing interaction of other large countries such as the United States. Fourth, Asia (especially the ASEAN countries) would like to continually keep a balance of economic power in the region, i.e., it would not like to become too dependent on Japan. While the United States continues to have a large presence in the region, Asia is concerned that it could in the future be too preoccupied with NAFTA "plus" accords and the FTAA, as well as possible movements in the direction of a transatlantic free-trade area.

4. The ASEM Meeting: Origin and Results

In sum, a strong dialogue is in the interest of both sides, a necessary condition for any voluntary organization like ASEM (or APEC for that matter). Two years before, Singapore Prime Minister Goh Chok Tong approached France, the chair of the EU at the time,

18 For a survey of the critiques of Krugman (1994), see Abe and Plummer (1996).

and suggested that there be a bridge between Europe and Asia in the same way that APEC has created a firm bridge between Asia and North America.[19] Thailand was chosen as the cite for the first ASEM meeting, i.e., an ASEAN country and geographically closest to Europe. Only Asian countries were included out of respect for Prime Minister Mahathir's wishes according to the EAEC.

What was accomplished at the March 1996 meetings? It should be noted from the start that an important emphasis was placed on "equal partnership" in these discussions, i.e., negotiation and cooperation on equal footing. The main objective was to construct a partnership between Europe and Asia with a face toward the future, and a focus on mutually-beneficial trade and investment. The first group of topics discussed was consistent with direct needs of the ASEAN countries in their respective economic development drives, e.g., technology transfer, environmental issues (such as transfers of "clean" technologies), and human resource development. Also, technical issues such as customs clearance simplification measures were discussed. Asian participants stressed open trade and investment and open regionalism issues, whereas from the more non-economic perspective, Prime Minister Banharn (obviously after consultation with his ASEAN colleagues) emphasized the following in his opening speech: (1) the goal of ASEM is no less than to create a new dynamic partnership between Asia and Europe; (2) we should cooperate in non-economic areas such as nuclear and biochemical weapons; (3) it is hoped that Europe will endorse the initiatives keeping Southeast Asia a nuclear-free zone; (4) we should work together in reforming the United Nations; and (5) we should support human rights and cooperate together in opposing global terrorism. He also stressed the importance of creating closer government-private sector links, including a ASEM business forum, developing the Mekong Region (with Japanese and European involvement), and in deciding what should be done with Myanmar.[20] Europeans focused on the importance of rules-based concerns, e.g., global investment rules and intellectual property protection.

Without doubt, there was disagreement regarding a number of issues, both with respect to approach and suitability for ASEM. For

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19 *Asahi Evening News,* "Asia-Europe Summit to Push Free Trade," February 29, 1996, p.8.

20 *Asahi Shinbun,* March 2, 1996, p.8.

example, the Europeans emphasized the need to abolish child labor, whereas the Asians noted that this is really a domestic issue. On the environment, there was the standard North-South devide, with the Malaysians leading the criticisms of the European position. Moreover, the more rules-based approach of the Europeans contrasted with the famous ASEAN-style of consensus and flexibility, a question of approach that also comes up in APEC with great frequency.

The meeting was well attended, showing how important it was deemed to be even for the smaller countries in Europe and Asia. Out of the 25 countries invited, 21 sent their heads-of-state and high-level representatives; only the smaller countries of Spain, Denmark, Sweden, and Greece did not participate. In 1998, the ASEM will take place in the United Kingdom, making the possibility that New Zealand and Australia will be invited that much higher. With respect to results from the first ASEM, 19 points were raised, including a strong priority attached to strengthening opportunities for political dialogue on "equal footing." Interestingly, trade and investment concerns were placed 10th on the list, with a special mention of Mekong River development and establishing the Euro-Asian business forum.[21] Clearly, ASEM leaders are keeping controversial issues off the agenda and, instead, intend to highlight common (non-controversial) goals before proceeding to more sensitive issues.

As the EU has had an important influence on regional cooperation within ASEAN,[22] ASEM clearly takes on a special importance for ASEAN. Without doubt, regional economic integration within the EU has been highly progressive (at least over the past 10 years), and it is unwise to try to compare it to ASEAN economic integration. After all, ASEAN is a group of developing countries which are far more heterogeneous than EU countries, in terms of economic structure, political orientation, culture, etc. Still, ASEAN has begun to pick up on a number of the "deep" integration issues that have been at the core of the Single Market process, such as some harmonization issues,

21 *Asahi Shinbun*, March 3, 1996, p.6.

22 It is important to stress that by "influence" we do not mean that ASEAN strove to emulate the EU, but rather that ASEAN was able to monitor EU activities and adopt to its own purposes--or completely reject--certain approaches. The success of the Single Market program, for example, certainly left a large impression in the minds of ASEAN leaders as they began to explore more extensive regional cooperation.

intellectual property protection, dispute settlement, and customs harmonization. Hence, an important externality for ASEAN might be closer dialogue with the EU in areas currently driving ASEAN deep integration. Moreover, the EU has a great deal of experience in developing the "infrastructure of integration," e.g., railway networks, roads, and telecommunication networks. For example, as is evident from the above discussion, a theme receiving a great deal of interest is the Mekong River Initiative, which directly touches 6 countries and focuses on infrastructure, as well as the plan to develop a railway between Bangkok and China's Yunnan province.

To conclude, it would appear that strengthening European-Asian dialogue is in the interest of all parties, not only due to economic but also political opportunities. But how does the Asian commitment to ASEM compare with its obligations and stakes in APEC?

5. ASEM and APEC: East Meeting West and West Meeting East

The WTO superseded the GATT shortly after the end of the Cold War, ushering in a new era of economic cooperation along with a completely new political environment. Existing regional organizations (such as the EU and ASEAN) were breaking down internal barriers with new vigor, just as new organizations (such as NAFTA and MERCOSUR) were seeking the same goal. The simultaneous emergence of large (and small) regional blocs at the same time that the new global system was being built was cause for both optimism and concern on the part of economists and policymakers, with some believing that the trend was, on the whole, positive for multinational liberalization and free-markets (and, hence, complementary to the GATT), while others that they were in competition by definition.

Asian countries tended to view this trend with concern. Economic integration in the EU--as well as political developments in its backyard--seemed to be pushing the region to become more inward-looking or at least self-absorbed. Even if the EU did not become a "fortress," this trend ostensibly detracted from its commitments under the GATT/WTO. Evidence of this could be derived from the failure to reach a successful conclusion to the Uruguay Round in December 1990 and December 1992, in which the blame was largely placed on the EU (especially its failure to liberalize agriculture). On the other hand, the

United States, by far the most important export market for Asian manufactures--key to their respective economic development strategies--for the first time began to embrace regionalism as a commercial policy strategy, beginning with its free-trade area in manufactures with Israel in 1982, followed by the U.S.-Canada Free-Trade Area (1989) and NAFTA (1994). The inclusion of Mexico in a U.S. regional cooperative arrangement was thought to be particularly problematic from the Asian perspective, as it was the first time that one of its major trading partners would give preferential treatment to a large developing country.[23]

The successful conclusion to the Uruguay Round did much to relieve fears that the multilateral trading system was crumbling under the weight of regional trading agreements. Still, Asian countries considered new alliances among themselves and with major trading partners, both as a means of future defence as well as with a view to gaining potential economic benefits associated with regional integration. It is in this context that APEC was created--in part as a means to push through the Uruguay Round--and subsequently expanded to go beyond a discussion forum to become a vehicle to open regional markets, e.g., through its commitment to "open trade and investment in the region" by the year 2010 (for developed countries) and 2020 (for developing countries). Hence, while ASEM and APEC are very different organizations in many ways (discussed below), they have the common feature of exhibiting the Asian desire to liberalize international markets and gain security from possible "fortresses," and from the European and U.S. perspectives, the goal of attaching themselves to the fastest growing region in the world.

Also, APEC and ASEM, rather than being thought of as "trade blocs" in any real sense, might be included under a "systemization" of an international-conferences framework, i.e., designed to improve bilateral understanding. Hence, they are out-growths of the regionalism trend without necessarily being part of it, if regionalism is defined more traditionally to include discrimination in trade agreements.

APEC was conceived as a forum for discussion in 1989; the first goals were extremely modest, and the more ambitious of the participants hoped that it would eventually turn into a type of "Asia-

23 For a review of the economic effects of NAFTA on ASEAN countries, see Kreinin and Plummer (1992).

Pacific OECD." The first meetings were only attended by ministers--not heads-of-state--and an enormous amount of effort went into just settling the membership issue. In fact, this is a major success of APEC; it has been able to include the "Three China's" under the umbrella of one organization, though this arrangement continues to have many difficulties. As noted above, cooperation within APEC gained considerable momentum at Blake Island, culminating in the Bogor Declaration to create free trade and investment in the region.

Since then, as APEC countries have tried to put this agenda into practice, the momentum toward this grandiose vision has, perhaps, subsided, as the extreme diversity of the Asia-Pacific region makes realization of the APEC Vision difficult. In fact, pushing too hard would be counter-productive. It is in this sense that ASEAN has played a key role in helping to set the APEC agenda. As a voluntary organization committed to "open regionalism," all trade and investment liberalization is voluntary, consistent with the concept of "concerted unilateralism," in which peer pressure to liberalize trade and investment would play an important role. This has required the offering of a "down payment" of liberalization at the Osaka meeting (mostly just speeding up of WTO commitments or reaffirming liberalization and deregulation already promised), and will require a progressive list of liberalization if the Vision is to be achieved on time. But the important point is that ASEAN wants to ensure that APEC will follow an approach that is consistent with its own philosophy of embracing openness (rather than discrimination) and not forcing any country to move more quickly than it wishes. In the meantime, the Manila Summit in November 1996 is moving away from the preoccupation with trade and investment liberalization and instead is focusing on the "third pillar of cooperation": development cooperation, again reflecting the core influence that ASEAN enjoys in hosting the meeting every other year.

ASEM, on the other hand, is born in a completely different environment than APEC, which was, after all, the very first new international institution of the post Cold War era. The different goals of Europeans and Asians in developing ASEM would naturally imply that its character would differ from APEC. Moreover, the large influence of the United States in Asia-Pacific economics and security implies that much of the discussion will be determined with respect to

this country, whereas in Europe, power is far more diffuse and Asia does not count on Europe for its security.

It is difficult to extrapolate as to where ASEM will go in the future--and to what degree it will progress relative to the APEC experience--but a few salient observations give strong hints. First, ASEM started off immediately as a heads-of-state meeting, implying the highest level of commitment from the start. Second, while a few larger economic projects were discussed, politically-oriented issues played a prominent role in ASEM, more so than they ever did in APEC (perhaps a reflection of the limited participation of European countries in the ASEAN Regional Forum, in which only the EU formally participates rather than member states). Third, major stumbling-bloc issues that APEC dealt with from the start--as they were important to U.S. and arguably Asian strategic interests--were ignored, such as the "Three Chinas," making political discussion less polemical at the margin.

These strategies and characteristics of ASEM, along with the open agenda, political commitment, and informal dialogue, no doubt contributed significantly to its success. Many Asia-Pacific countries would like to join ASEM, in addition to Australia and New Zealand. For example, Prime Minister Bhutto of Pakistan--who has since been forced to resign--visited Indonesia in March 1996 in order to drum up support from President Suharto for Pakistan's desire to participate in the next ASEAN Regional Forum and ASEM meetings. Hong Kong wanted to join, but as it reverts to China in 1997, this is probably no longer an important question. The issue of Taiwan, however, still is; although Taiwan would like to join ASEM, it has little chance of doing so with China's strong opposition (and Taiwan has less incentive to join ASEM than it did in joining APEC).

Moreover, Central and Eastern European countries have been visiting the region with the goal of strengthening economic ties and soliciting support to join ASEM. For example, in 1996, high-level diplomatic missions from Russia, Croatia, Hungary, the Czech Republic, and others were sent to ASEAN countries with this goal in mind. Interestingly, Russia also asked Thai officials to support its accession to APEC.

If we tally up all the existing and willing future ASEM members, we count at least 40. It will be difficult to see how concrete cooperation

could be accomplished within such a large and diverse group of countries. At that level, only dialogue would be possible, and, perhaps, this would not be an ineffective format at this point in time. However, if closer economic integration issues are to be handled, there will have to be greater restrictions on membership--as APEC did with its first 3-year moritorium in 1993. How the membership issue is settled in ASEM, therefore, will give a strong indication of the envisioned future directions of the organization.

The EU was created with the Treaty of Rome in 1957, in the incarnation of the European Economic Community. Since then, it has more than doubled in size, progressed beyond a "customs union plus" format to create a common market coming within a breath of monetary union, and has endeavored to forge ever-increasing political cooperation. It has extensive ties through association agreements, the Lome accords, and other means of formal cooperation with developing countries. In sum, it has far more experience than any other grouping with respect to regional economic cooperation, including the sensitivities of developing (and developed) countries, multi-faceted cooperative arrangements, political diversity, and, of course, bilateral friction. Hence, it has greater experience than, say, the United States, Japan, or Australia, in how to avoid potential pitfalls and achieve meaningful cooperation within a framework--explicit or implicit--defined by all parties. The agenda of ASEM discussed above was a reflection of this experience; it is no accident that it was successful, when, in fact, the format could have made it a disaster, particularly given the fact that, relatively speaking, EU and Asian links are less crutial to their respective economic development and diplomatic goals. The Philippines, for example, could walk away from ASEM; it cannot walk away from APEC.

While the agenda of ASEM has not been well-defined yet--as in the case of APEC--its meetings will only be every other year at this point. This gives it plenty of time to discuss formally and informally where it would like to go in the future, and, in particular, what the likely membership composition should be. ASEAN will play a pivotal role in defining the ASEM agenda, perhaps even more than it is defining the APEC agenda. Clearly, ASEAN has in mind using competition between the EU and the United States in its respective organizations to further ASEAN goals. In particular, ASEAN will work to ensure open

international markets and will use economic and political links established in both ASEM and APEC toward this goal. On the other hand, ASEAN is finding that the costs of neglecting closer cooperation in defining joint positions in these organizations are higher; there is strong incentive for the leadership of ASEAN to define a clear strategy in these organizations, as part of its global international commercial strategies. This sort of bargaining and agenda-setting has long been recognized as an essential "positive externality" of regional economic integration. A *quid pro quo* to accomplish this is a unified regional market; it will be difficult for ASEAN to negotiate as a region if it is not yet a cohesive regional economic grouping. Having recognized this, ASEAN has moved swiftly to build on AFTA, not only in expanding the free-trade area itself (and speeding up implementation) but also in establishing a framework of cooperation on services, intellectual property rights, a dispute settlement mechanism, and "advanced" forms of investment cooperation. By the 1998 ASEM meeting, ASEAN will be in much better shape in this regard.

Japan plays an important role in this sense. It is the only developed country that is a member of both groupings. It is the most important economic partner of the Asian countries and a key trading partner of the Europeans and the Americans. As is the case for ASEAN, Japan's goal is to maintain an open and non-discriminatory international trading system; in particular, preventing extra-WTO "sanctions" against Japan by the United States and the EU are paramount economic goals. By playing a leadership role in both organizations--which it has done increasingly in APEC--Japan will be best placed to promote these objectives and, if need be, use competition between APEC and ASEM towards this goal. If Japan--and ASEAN-can ensure that discussions and agreements under ASEM and APEC will lead to non-discrimination, support of the WTO system, and freer trade and investment, it will not only achieve its own objectives but that of the entire global community.

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RECONSIDERATION OF AVERCH-JOHNSON ARGUMENT*

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Abstract

The purpose of this paper is to reconsider the essence of Averch-Johnson (A-J) argument. We show that the critical points in the argument are firstly how to choose variable adjusting to the regulatory constraint, and how the level of regulation is assigned. If the so-called A-J effect of overcapitalization is an essence of the regulatory constraint argument, a simple one factor model is enough to show it in a static model. However in a simple dynamic model, overcapitalization is not necessarily true with some form of adjustment method.
JEL classification: D42; L51
Keywords: Rate of return regulation; Averch-Johnson effect; Overcapitalization

1. Introduction

In general, the imposition of an artificial constraint on an economic decision process will result in no improvement in outcome and sometimes will induce worse situation. In this respect, Averch and Johnson (A-J) seminal work (1962) explored this issue. A regulatory constraint on the rate of return for profit maximizing monopolist may be expected to lead inefficient allocation.

Following the original A-J model, a number of literature explore the behavior of the firm under the fair rate of return constraint and examine the results. Among a number of propositions, the main result is that the profit maximizing firm under the rate of return regulation will tend to use a capital-labor ratio greater than which minimizes cost

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for its output level.[1] Specifically if the fair rate of return is greater than the cost of capital, a firm will have an incentive to invest as much as it can be consistent with its production possibilities. Hence if the essence of A-J argument is understood that an artificial constraint may reduce efficiency in production, we need not argue a capital-labor ratio, and simply be sufficient to show that the firm will find it profitable to employ more capital and invest as much as it can be consistent with its production possibilities. Therefore, a simple one factor capital model is enough to it. This is the first purpose of this paper.

As far as we stick to one factor model to argue the essence of A-J argument, entirely different issue will arise when we turn to the dynamic case. In a static model, factor choice subject to the regulatory constraint seems to be made at one stage because the long-run equilibrium is under consideration. And hereafter, there is no further adjustment. On the other hand, the regulatory constraint has to be satisfied at every instant of time in the dynamic adjustment process. As we have already shown (Katayama and Abe 1989, 1992), the choice variables for the firm to satisfy the regulatory constraint become one crucial point. In the dynamic setting, the strategic variable is not the amount of capital but the amount of investment to satisfy the rate of return to capital constraint even in a single factor model. Therefore, we need some way of adjustment for choice variables to follow the regulatory constraint, especially when it is binding. Even in a simple form of one factor model, other variable than capital must be chosen as an instrument. This point is entirely different aspect in a dynamic model. And even if the adjustment variable is properly chosen, overcapitalization is not necessarily true in a dynamic model as stated in El-Hodiri and Takayama(1981). We show that the level of the fair rate of return is a significant parameter for the existence of overcapitalization.

In section 2, A-J argument of the regulatory process in a static model is explored. Section 3 is devoted to the dynamic model. The analysis is made in Section 4. The final remarks are in Section 5.

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1 See Baumol and Klevorick (1970). They examine carefully other propositions.

2. Simple static Model

Suppose there exists a single product, single factor which is assumed capital, and profit maximizing monopolist subject to the rate of return regulation. The firm's revenue function $R(K)$ is strictly concave and $R(0)=0$. The fair rate of return s is taken to be as great as the cost of capital r (s>r). Then the profit maximizing firm subject to the constraint become the following.

$$\underset{K}{Maximize}\ [R(K) - rK] \tag{1}$$

subject to

$$sK - R(K) \geqq 0. \tag{2}$$

From the necessary condition we get

$$R'(K) = \frac{dR}{dK} = r - \frac{\lambda}{1-\lambda}(s-r) \tag{3}$$

with the effectivenness of the constraint (2) and the concavity of the revenue function, we get $0<\lambda<1$. Consequently $R'(K)<r$. The marginal revenue product of capital becomes smaller than the cost of capital. This shows that the firm uses more capital than the level of efficient production.

3. A Dynamic Model

The optimal investment model with adjustment costs is formulated as follows:[2]

$$\underset{Q(t),I(t)}{Maximize} \int_0^{\infty} \{R[Q(t)] - C[(t)]\}e^{-rt}dt \tag{4}$$

subject to

$$R[Q(t)] = P[Q(t)]Q(t), \tag{5}$$
$$\dot{K}(t) = I(t) - \delta K(t), \quad K(0) = K_0\ (>0), \tag{6}$$
$$Q(t) \leqq F[K(t)], \tag{7}$$

2 For more general model, see El-Hodiri and Takayama (1981) and Katayama and Abe (1989).

$$sK(t) - R[Q(t)] \geqq 0. \tag{8}$$

Here a single input capital $K(t) \geqq 0$ is assumed and $F(K)$ is the production function where it is assumed that $F'(K) > 0$ and $F''(K) < 0$. Q denotes the amount of output which is a control variable and $P(Q)$ is the inverse demand function which is assumed $P'(Q) < 0$. I is the level of gross investment. $C(I)$ denotes the total cost of investment including adjustment costs. It is assumed that $C'(I) \geqq 0$, $C''(I) > 0$ and $C(0) = 0$. δ is the rate of depreciation and is assumed positive. Further we simply assume that the revenue function $R[F(K)]$ is strictly concave with respect to K when the constraint (7) is binding.[3]

As we stated at the introduction, we have to notice the regulatory constraint (8). In the formalized model, control variables are the amount of output and investment. At the time of decision, K is given and so $F(K)$ is technically feasible. However to satisfy the regulatory constraint (8), the output level Q is the choice variable. This amount Q should be understood as amount of sales. Therefore to control variables so as to satisfy the constraint when binding, the sales amount of output level is only feasible choice variable for adjustment to the constraint. Thus in this specification, we allow for inefficient production which is formalized in (7).

Another point to be noticed is the definition of the Averch-Johnson effect in dynamic model. Following Peterson and vander Weide (1976) and El-Hodiri and Takayama (1981), among others, the A-J effect is defined to be the larger optimal capital stock for a regulated firm than an unregulated one. This definition is the direct extension of that in the static setting. There is no literature which discusses the A-J effect in terms of capital-labor ratio in the dynamic setting.

Next we turn to the analysis of the dynamic model.

4. The Analysis of the Dynamic Model

If there exists an optimal solution in the problem, the necessary conditions for optimality are derived as follows.[4] The Lagrangian W is

3 Nonconcave revenue function caused by the increasing returns to scale production is assumed and analyzed in Katayama and Abe (1992).

4 It is obvious, for example, by applying Lemma (iv) in Takayama (1985, p.648) that the constraint qualification in this model is satisfied if $R'(Q) \neq 0$ when the constraint (8) is binding.

defined as

$$W=R(Q)-C(I)+q(I-\delta K)+\theta[F(K)-Q]+\mu[sK-R(Q)]. \qquad (9)$$

Assuming an interior solution, there exist functions $q(t)$, $\theta(t)$ and $\mu(t)$ which satisfy

$$\dot{K}(t)=I(t)-\delta K(t), \quad K(0)=K_0 \ (>0), \qquad (6)$$
$$\dot{q}(t)=(r+\delta)q(t)-\mu(t)s-\theta F'(K), \qquad (10)$$
$$(1-\mu)R'(Q)-\theta=0, \qquad (11)$$
$$q=C'(I), \qquad (12)$$
$$\theta(t)\geqq 0, \quad \theta(t)[F(K)-Q]=0, \quad F(K)\geqq Q, \qquad (13)$$
$$\mu(t)\geqq 0, \quad \mu(t)[sK-R(Q)]=0, \quad sK-R(Q)\geqq 0. \qquad (14)$$

The following transversality condition is assumed:

$$\lim_{t\to\infty} e^{-rt}q(t)\geq 0, \quad \lim_{t\to\infty} e^{-rt}q(t)K(t)=0. \qquad (T)$$

In the above $q(t)$ is a costate variable, and $\theta(t)$ and $\mu(t)$ are the multipliers associated with the inequality constraints (7) and (8) respectively.

The constraints (7) and (8) do not contain a control variable $I(t)$ in the model. In such case we have to take account of the possibility that the costate variable $q(t)$ jumps at the junction points between unregulated and regulated intervals. However we assume away the possibility for simplicity.[5]

Then, from (11), (13) and (14), there are three possible cases with respect to the signs of θ and μ:

(a) $\theta=R'(Q)>0$ *and* $\mu=0$,
(b) $\theta>0$ *and* $0<\mu<1$,
(c) $\theta=0$ *and* $\mu=1$.

It is obvious that one of the above three cases is observed at each point of time along an optimal path. Let us examine each case in turn.

Case (a). $\theta>0$ *and* $\mu=0$.

5 See for detail Katayama and Abe (1989,1992).

In this case the regulatory constraint (8) is not binding and the output constraint (7) is effective. Therefore the optimal path must satisfy the following equations:[6]

$$\dot{K}^0(t)=I^0(t)-\delta K^0(t), \quad K^0(0)=K^0(>0), \tag{15}$$
$$\dot{q}^0(t)=(r+\delta)q^0(t)-R'(Q^0)F'(K^0), \tag{16}$$
$$q^0=C'(I^0), \tag{17}$$
$$Q^0=F(K^0). \tag{18}$$

This case is the usual monopoly with no regulation.

Fig.1 depicts the phase diagram in the (K-q) plane. It is well known that the long-run equilibrium E^0 is a saddle point and the optimal unregulated path is shown as two stable branches converging to E^0 in this infinite horizon case. This will be compared with the optimal regulated path.

Case (b). $\theta>0$ and $0<\mu<1$.

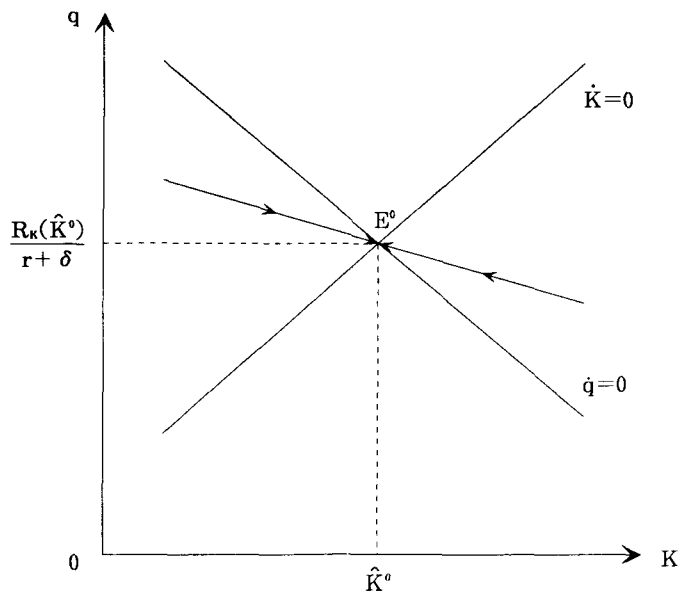

Fig. 1 Optimal unregulated path

6 The superscript $^*(^0)$ on variables and functions denote paths where the regulatory constraint is binding (not binding).

Two constraints, (7) and (8), are effective in this case. Therefore, it holds that

$$Q=F(K) \text{ and } sK-R(Q)=0. \tag{19}$$

See Fig.2 where average rate of return is depicted. In Fig.2, $\bar{K}$ corresponds to the situation satisfying these two equations simultaneously for the given level of s. For the given level of s, we can define the set of points:

$$V=\{(K;s): Q=F(K), \quad sK-R(Q)=0\}. \tag{20}$$

Thus it holds that

$$\frac{s}{r+\delta} = \frac{R(K)}{(r+\delta)K}. \tag{21}$$

The left hand side of (21) indicates a horizontal line at $q=s/(r+\delta)$ and the right hand side is obtained by multiplying the average rate of returns on capital by $1/(r+\delta)$. Here we obtain the switching curve $q=R(K)/(r+\delta)K$. Notice that the switching curve locates above the $\dot{q}=0$ locus, *i.e.*, $q=R'(Q)F'(K)/(r+\delta)$, because of the strict concavity of the revenue function.[7] (See Fig.3). The range of capital stock, $[0, \bar{K}]$, is called the regulated region of the capital stock.

Case (c). $\theta=0$ *and* $\mu=1$.

This is the case where the capital stock is in the regulated region $[0, \bar{K}]$. The optimal level of output is not determined by $Q=F(K)$ but $sK-R(Q)=0$. Hence the optimal path is described by the following equations:

$$\dot{K}^*(t)=I^*(t)-\delta K^*(t), \tag{22}$$
$$\dot{q}^*(t)=(r+\delta)q^*(t)-s, \tag{23}$$
$$q^*(t)=C'(I^*), \tag{24}$$
$$sK^*-R(Q^*)=0. \tag{25}$$

7 For more detailed explanation, see Katayama and Abe (1989,1992).

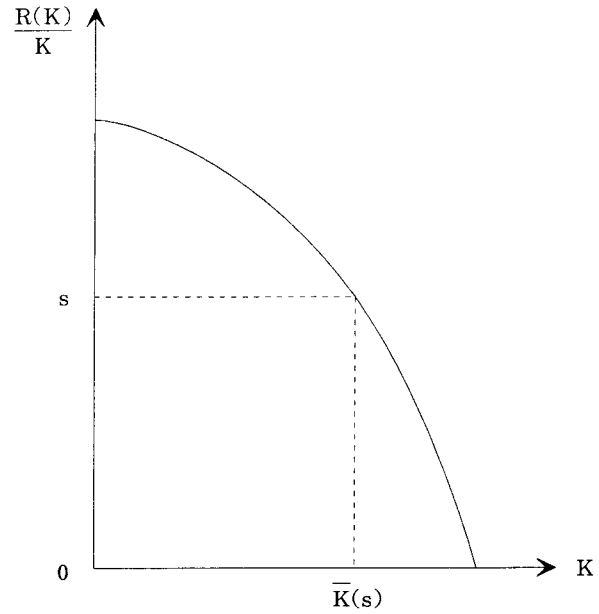

Fig. 2 Average rate of return

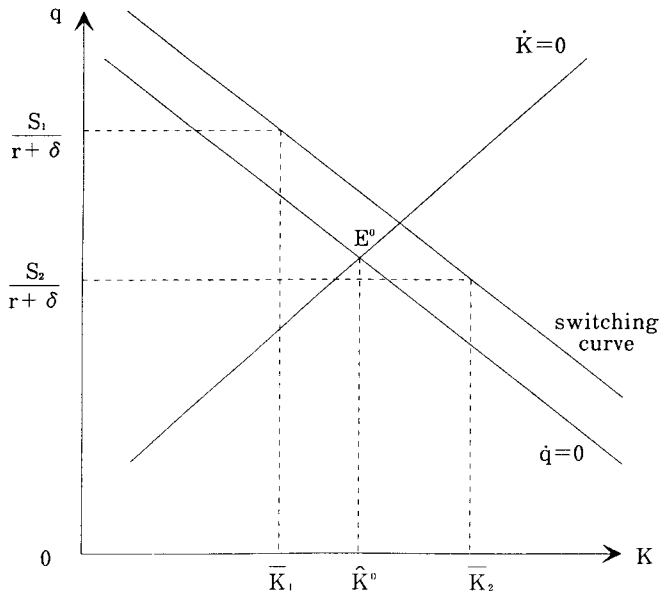

Fig. 3 Switching curve

This system has a unique steady state of capital $\hat{K}^*$ which is a saddle point. Then if this case occurs throughout the whole planning period or for the final period, the optimal path goes along the horizontal line $q=s/(r+\delta)$, since only such paths can satisfy the transversality condition (T). Furthermore it should be noted that the steady state of capital $\hat{K}^*$ decreases as the regulated rate of return s decreases, in other words, regulatory policy turns to stricter. As will be stated below, this is an important point when considering the possibility of the A-J effect of overcapitalization.

Next we turn to the analysis of the possible patterns of the optimal path. We have to notice that there are the following four ranges of s, which enable to clarify the relationship among $\hat{K}^0$, $\hat{K}^*$ and $\overline{K}$:

$$S_1 = \{s:\hat{K}^* \leqq \hat{K}^0 < \overline{K}\} ,$$
$$S_2 = \{s:\hat{K}^0 < \hat{K}^* \leqq \overline{K}\} ,$$
$$S_3 = \{s:\hat{K}^0 < \overline{K} < \hat{K}^*\} ,$$
$$S_4 = \{s:\overline{K} \leqq \hat{K}^0 < \hat{K}^*\} .$$

As shown below, the relationship among $\hat{K}^0$, $\hat{K}^*$ and $\overline{K}$ is crucial to determine the possible patterns of the optimal path and so the A-J argument. $S_i'(i=1,\cdots,4)$ is illustrated on q-axis in Fig.4, where $S_i'=\{s/(r+\delta):s \in S_i\}(i=1,\cdots,4)$. It is noticed that for $s\in S_1$, $s\leqq R_K(\hat{K}^0)$, i.e., the value of s is not larger than the marginal revenue product of capital evaluated at the unregulated long-run equilibrium point E^0. For $s\in S_i$ $(i=2,3,4)$, $s\geqq R_K(\hat{K}^0)$.

Case 1. $s\in S_1$ $(\hat{K}^* \leqq \hat{K}^0 < \overline{K})$

See Fig.5. In this case, the $\dot{q}=0$ locus is shown as follows.

$$q = \frac{s}{r+\delta} \qquad \text{for } K<\overline{K}$$

$$q = \frac{1}{r+\delta}\,[\mu s+(1-\mu)R'(Q)F'(K)] \quad 0<\mu<1 \qquad \text{for } K=\overline{K}$$

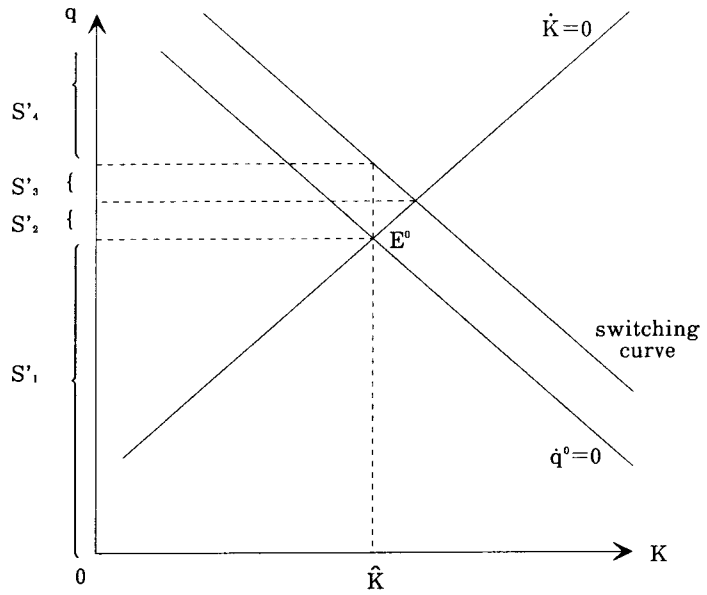

Fig. 4 Sets for different rate levels

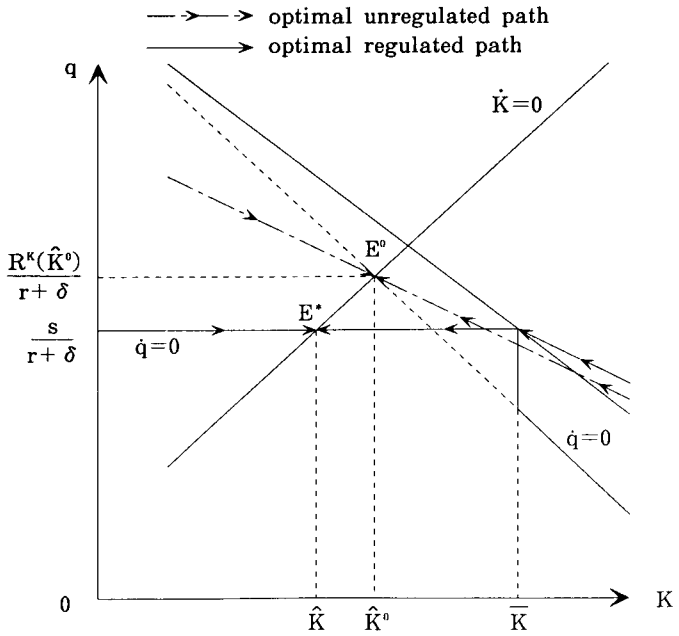

Fig. 5 $s \in S_1 \quad (\hat{K}^* \leqq \hat{K}^0 < \bar{K})$

$$q = \frac{R'(Q)F'(K)}{r+\delta} \qquad \text{for } \bar{K}<K.$$

Thus the long-run equilibrium is E^* in Fig.5 which is a saddle point. We now investigate how the optimal path is determined according to the various levels of the initial stock of capital K_0. *If* $K_0 \leqq \bar{K}$, the optimal path goes along the horizontal line $q=s/(r+\delta)$ throughout the whole planning horizon and converges to E^*. On the other hand, if $\bar{K}<K_0$, the optimal path goes along one of paths satisfying (15)-(18) until it arrives at $\bar{K}$ and hereafter goes along the horizontalline $q=s/(r+\delta)$ and converges to E^*. In this case, because $\hat{K}^* \leqq \hat{K}^0$, it holds that $K^*(\infty) < K^0(\infty)$. Therefore, overcapitalization in the dynamic sense does not hold and under capitalization is realized.

Case 2. $s \in S_2$ $(\hat{K}^0 < \hat{K}^* \leqq \bar{K})$

In this case, the long-run equilibrium is E^* where it holds that $\hat{K}^0 < \hat{K}^*$. If $K_0 \leqq \bar{K}$, the optimal path goes along the horizontal line $q=s/(r+\delta)$ throughout the whole planning horizon and converges to E^*. On the other hand, if $\bar{K}<K_0$, the optimal path goes along one of paths satisfying (15)-(18) until it arrives at and hereafter goes along the line $q=s/(r+\delta)$ and converges to E^*. As can be seen in Fig.6, this is the only case that overcapitalization, i.e., $K^0(\infty)<K^*(\infty)$, is realized because $\hat{K}^0<\hat{K}^*$.

Case 3. $s \in S_3$ $(\hat{K}^0 < \bar{K} < \hat{K}^*)$

In this case, the $\dot{K}=0$ locus intersects the $\dot{q}=0$ locus on the vertical part of it at $K=\bar{K}$. Therefore the equilibrium point is E^* in Fig.7, that is , the steady state of capital is $\bar{K}$. The two optimal paths converging to E^* are depicted in Fig.7. Then we have $\hat{K}^0<\bar{K}$. Thus overcapitalization occurs in this case.

Case 4. $s \in S_4$ $(\bar{K} \leqq \hat{K}^0 < \hat{K}^*)$

See Fig.8. The steady state of capital is $\hat{K}^0$ in this case. If $K_0 \leqq \bar{K}$, the optimal path goes along one of paths satisfying (22)-(25) until it arrives at $\bar{K}$, and hereafter goes along the optimal unregulated path and converges to E^0. On the other hand, if $\bar{K} < K_0$, the optimal path goes along the optimal unregulated path during the whole planning period and converges to E_0. In this case the regulation works neutrally

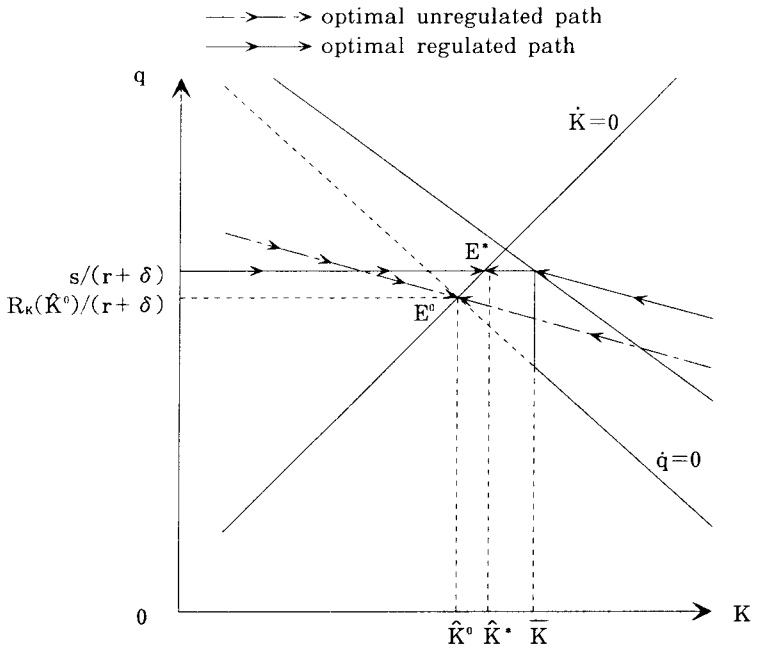

Fig. 6 $s \in S_2$ $(\hat{K}^0 < \hat{K}^* \leqq \bar{K})$

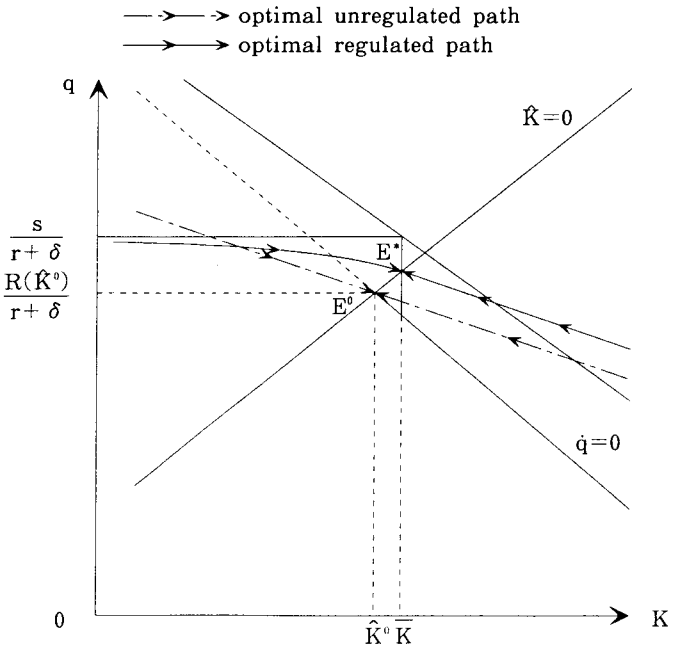

Fig. 7 $s \in S_3$ $(\hat{K}^0 < \bar{K} < \hat{K}^*)$

to the final capital stock.

Looking over the four cases, the overcapitalization case is limited to the case 2 and 3. This shows that the regulated rate plays a crucial role to the overcapitalization argument.

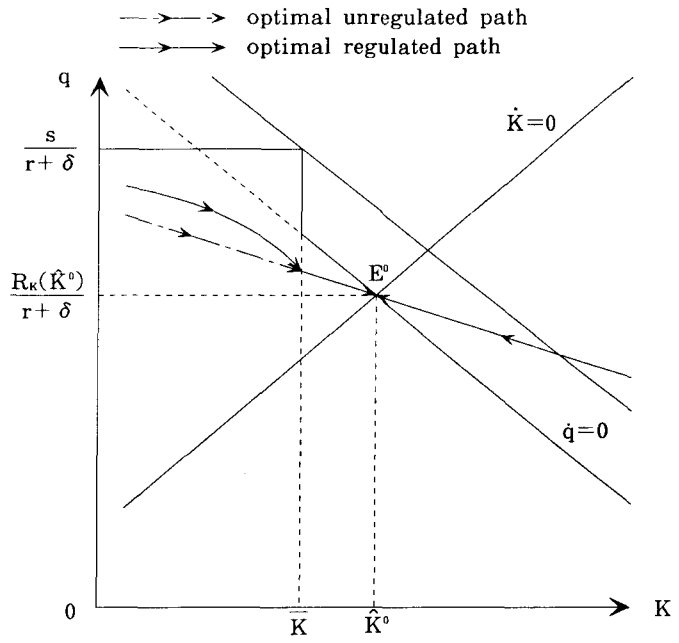

Fig. 8 $s \in S_4$ $(\bar{K} \leqq \hat{K}^0 < \hat{K}^*)$

5. Remarks

As a final remarks, we state a few points on this simple model and the results.

R-1. We can see that if the A-J effect is simply understood as unintended policy consequence in the form of overcapitalization, one factor model is enough to show it. However, in the dynamic analysis, the regulatory constraint and the choice variables to satisfy the constraint, when binding, become important. And in the dynamic model with adjustment costs attributable to time, the A-J result holds under special conditions.

R-2. In the static model, it is proved that the closer the "fair rate of return" is to the true cost of capital, the greater the quantity of

capital the firm will want to use. However, this statement need not hold in the dynamic case. We will explain about this in the following. If we could interpret the marginal revenue product of capital evaluated at unregulated stationary point $R_K(\hat{K}^0)$ to be a suitable capital cost in the infinite horizon model, we have to compare it with the level of regulated rate. *If* $s \leqq R_K(\hat{K}^0)$, shadow price of capital $q(t)$ become smaller, and as the result the terminal capital stock becomes less than the unregulated case. The result is undercapitalization seen in Case 1. Even in such case as 2 with overcapitalization, when the regulated rate s is set closer to $R_K(\hat{K}^0)$, the terminal quantity of capital stock decreases. This is the opposite to the static case. This will happen as the result that the regulatory level reduces the implicit price of capital.

R-3. As can be seen in the above analysis, we could avert from the complicated indeterminacy in employment problem in this one factor model.[8]

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8 For more detailed discussion, see Katayama and Abe (1989).

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SUPPLIER RELATIONS IN JAPAN: AN INTERNATIONAL PERSPECTIVE

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Abstract

This paper describes major characteristics of Japanese supplier relations in an international perspective. The supplier relations in Japan, particularly automobile industry, is examined in comparison with those in the United States. The primary purpose of the study is to identify significant features of Japanese supplier relations and to provide economic rationale for those relationships. In addition, comparing suppliers relations in Japan and the U.S., convergence in the nature of those are discussed. Significant features of Japanese supplier relations are identified: long-term relationships and commitments with effective communication; forced competition among few suppliers; willingness to make transaction-specific investments in plant, equipment, and human capital as well as to share technical information; significant involvement of suppliers in product development with sharing of information. Suppliers relations in the U.S. are changing and moving close to the Japanese counterpart. There has been a limited, yet noticeable, convergence in the nature of the U.S. and Japanese supplier relations.

JEL classification: L14; L62

Keywords: Long-term relationships; Procurement; Supplier relationships; Transaction relationships; Transaction-specific investments

1. Introduction

Supplier relations are important areas for any firm that subcontracts portions of components design and production because

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this creates the dependence on the technology and operations of suppliers. There are significant differences in supplier relations between Japan and the United States. According to the literature, U.S. automakers are more vertically integrated than their Japanese counterparts. Even though U.S. automakers are more vertically integrated, they contract directly with more than one thousand suppliers for the parts they do not make. The Japanese automakers, by contrast, work with approximately one-tenth that number, buying more entire subsystems from each supplier. Product development process is heavily influenced by the traditional system in which suppliers produce parts under short-term, arm's-length contracts and have little role in design and engineering. In supplier relations in Japan, in contrast, suppliers are an integral part of the product development and manufacturing processes: they are heavily involved, assume significant responsibility, and communicate extensively and directly with product and process engineers. Japanese suppliers frequently play a significant role in development. [1]

By vertically integrating, companies get all of the benefits of fewer direct suppliers and customized investments. But vertical integration removes the supplier from the discipline of the market and essentially eliminates competition because the supplier has a captive customer base. The autonomy and incentives that keep the company efficient and focused on continuous improvement are weak. One needs to employ mechanisms so that suppliers continue to be efficient and innovative. Supplier relations in Japan can be identified that both buyers and suppliers have recognized the need to be interdependent and have responded by developing bonding mechanisms that build trust and goal congruence between them. The Japanese do not rely on legal contracts to protect their interests in exchange relationships. The important issue is understanding why Japanese companies can use such a flexible arrangement.

Supplier relations in Japan can be identified to have distinctive characteristics in several aspects compared with the U.S. counterpart. It is important to understand how efficiently Japanese supplier relations work, and whether the Japanese practice is unique to the peculiar circumstances of the Japanese social and cultural system or

1 Cusumano and Takeishi (1995) review the literature in empirical studies on supplier relations in Japan and the U.S.

whether it can be applied in other countries. Furthermore, it is also important to understand the economic rationale of supplier relations in Japan. Yet many aspects are still left unknown about the process that unfolds between buyers and suppliers in Japan or the U.S. How prevalent is the Japanese practice of subcontracting across the supply base in Japan and the U.S.?

This paper describes major characteristics of Japanese supplier relations in an international perspective. The supplier relations in Japan, particularly automobile industry, is examined in comparison with those in the U.S. The primary purpose of the study is to identify significant features of Japanese supplier relations and to provide economic rationale for those relationships. In addition, comparing suppliers relations in Japan and the U.S., convergence in the nature of those are discussed.

In this paper, significant features of Japanese supplier relations are identified as follows: long-term relationships and commitments with frequent planned communication, which reduced transaction costs and eliminated inefficiencies between buyers and suppliers; trust-building practices like owning stock, transferring employees, having guest engineers, and using flexible legal contracts that create a high degree of goal congruence and mutual trust; forced competition among few suppliers focusing on costs, quality, and technological development; willingness to make significant transaction-specific investments in plant, equipment, and human capital as well as to share valuable technical information; significant involvement of suppliers in product development with intensive and regular sharing of technical and cost information to improve performance and set prices.

Suppliers relations in the U.S. are changing rapidly and are moving close to the those in Japan. There has been a limited, yet noticeable, convergence in the nature of U.S. and Japanese supplier relations. In the U.S., suppliers are significantly more likely than they were in 1980s to provide detailed information to their customers, have long-term contracts, believe that their customers are serious about product quality, and have defect-prevention systems in place. This results indicate progress toward collaborative relationships, in which suppliers play an important role in solving problems and developing ideas about products and processes.

This paper is organized as follows. Major characteristics of

Japanese suppliers relations are discussed in order. The next section presents transaction relationships with few direct suppliers. Section 3 discusses forced competition among limited suppliers. Section 4 describes transaction-specific investments. Section 5 discusses supplier involvement in product development. Section 6 discusses the convergence in the nature of supplier relations in Japan and the U.S. Finally, concluding remarks are presented.

2. Fewer Direct Suppliers

2.1 Long-term Commitments

U.S. automakers are more vertically integrated than their Japanese counterparts. Even though U.S. automakers are more vertically integrated, they contract directly with 1,500 to 3,000 parts suppliers for the parts they do not make. Toyota, by contrast, works with approximately one-tenth that number, buying more entire subsystems from each supplier. Reducing the total number of direct suppliers can lower costs while increasing quality. Using fewer suppliers can create value by providing economies of scale and benefits of experience curve that lower either transaction costs or production costs. Transaction costs, as defined here, are all the costs associated with effecting an exchange, that is, information gathering and analysis, negotiation, contacting, physical distribution costs, and so on.

Within most industries, as cumulative production experience in producing a product or service increases, quality is improved and costs are reduced. Japanese automakers have consolidated their business with a few highly efficient suppliers and created conditions that permit the suppliers to make the investments necessary to accelerate down the experience curve and to share the full advantage of this volume with the automakers. When a Japanese supplier wins a contract with Toyota or Nissan, it is essentially guaranteed four years of business or the life of the model. Moreover, if the supplier performs up to expectations, it can usually renew the business for the next model as well. Naturally, these practices encourage long-term plans and investments. Supplier invest in developing ideas and plans for the next model well in advance. Engineers from the limited suppliers have long-term experience working together, making it easier to rapidly develop designs for the next model. When the model change occurs, suppliers continue to move down

the experience curve (Dyer and Ouchi, 1993).

In contrast, U.S. automobile manufacturers have attempted to keep input prices low by maintaining size and bargaining power over suppliers. By splitting their business among many suppliers and rotating them frequently, U.S. manufactures have repeatedly destroyed the experience curves of suppliers by ensuring that no one supplier could accelerate down the experience curve to accumulate decisive cost advantage. Thus, the U.S. suppliers typically do not develop long-term relationships and experiences with automakers. Moreover, they are unable to effectively plan long-term production and investments, which is reflected in lower average plant capacity utilization. Without long-term commitments, U.S. suppliers can not have incentives enough to make long-term investments in capital equipment, Moreover, without the ability to make long-term forecasts, it is very difficult to make maximum use of capacity and capital equipment. For example, manufacturers may involve suppliers to a greater degree in the product design process to utilize fully the value of present tools and equipment. In this way, the risk of tool obsolescence due to unilateral design changes is lowered. Naturally, the longer the parties work together under these circumstances the more likely it is for mutual trust to be developed. Trust in this case comes from reliability demonstrated over repeated interactions, as well as the shared knowledge that the parties need one another.

2.2 Building Trust

The Japanese companies have recognized the need to be interdependent and have responded by developing bonding mechanisms that build trust and goal congruence between them. The Japanese do not rely on legal contracts to protect their interests in exchange relationships. The key issue is understanding why Japanese companies can use such a flexible agreement.

The practice of long-term employment within one firm is important in developing trust among individuals both within the firm as well as across firms. There is real personal contract between the purchasing managers of manufactures and the managers or owner of a subcontracting firm. Because people can develop long-term relationships with their counterparts at the supplier or buyer, it is not surprising that the Japanese have developed significantly greater trust

across firms.

The way that Japanese firms build trust is by requiring career paths in which employees transfer from firm to firm. Employee transfers, both temporary and permanent, are common among business partners, particularly between large manufacturers and their subcontractors. In addition to permanent and temporary employee exchanges, suppliers often send guest engineers to work at their customer technical centers on an ongoing basis. Supplier and automaker engineers work jointly designing the components for a new car model. Not only do these career-path help build trust between firms, but also transferred and guest employees are better able to understand how to enhance the efficiency of the development and production processes because they know both buyer and supplier operations. Direct contact is much more important than other forms of contact in developing ways for employees to know and trust each other. Both of automakers and suppliers encourage a considerable amount of face-to-face contact between supplier salespeople and engineers and between automaker purchasing agents and supplier engineers.

Companies need credible commitments if they are going to be willing to make customized investments. Stock ownership in Japanese trading relationships represents commitments that firms have made to each other, and in many ways, it is an arrangement that is akin to an exchange of hostages. Nissan owns significant portions of shares of its major suppliers. This ownership stake build trust and goal congruence between Nissan and its suppliers. Interlocking stock ownership represents a commitment to the supplier that needs an incentive to make the customized investment Nissan requires.

2.3 Supplier-assistance Management

Toyota and Nissan have large supplier-assistance management consulting groups with specialized expertise that work full time with suppliers to help them improve their production techniques and achieve total quality, cost, and delivery. Providing assistance to suppliers is a highly effective method for both helping and forcing suppliers to continuously innovate and improve to stay ahead of the competition.

Suppliers often feel indebted or obligated to the parent company, but they also have mixed feelings about the system. On the one hand,

they sometimes feel that sharing the business with another supplier is inappropriate when they are clearly ahead in both cost and quality. Moreover, they have to share not only the business but also information or technology in order to help their competitor improve. On the other hand, since they realize that someday they may need such assistance, they view the system as insurance. Toyota suppliers rarely go bankrupt because they receive helps from Toyota if they are in financial distress. Only suppliers that are unwilling or unable to improve continuously are cut off completely, and suppliers will do almost anything to avoid such damage to their reputations.

2.4 Suppliers' Mutual Learning

Sako (1995) shows evidence that the suppliers' association continue to exist in Japan not merely out of inertia but because it is serving a useful function in delivering benefits to both the automaker and member supplier. Contrary to the bilateral contracting view, suppliers value mutual learning from other suppliers just as much as learning from their buyers, and that the majority of first-tier suppliers do not consider suppliers' associations to be of less use now that in the past. There is a considerable variation from association to association with respect to the size of membership, the proportion of members in the total supplier base, and turnover of members over time. However, as a common characteristic, association membership is much broader than the boundary of keiretsu groupings, particularly in recent decades when independent suppliers which stand outside the keiretsu have been taking up membership in multiple associations.

Tokai Kyohokai has three sectors grouped according to the type of parts that members produce. Each group meets once a month, typically to visit a member supplier's factory, and to learn from the member's presentation about problems and achievements at his company in the following month. The automakers except Honda which have an association continue to retain much control over the activities of the association. Although less common today, many of the associations required the automaker's recommendation as well as the approval of the association's administrative board to become members.

Whether leading or advisory, providing support for the suppliers' association is expensive in managerial time, judging from the frequency of meetings. Weighed against this cost are the frequently cited benefits

of being able to communicate about production plans, and of soliciting good suggestions for common problems, such as parts standardization and pollution control. The most popular benefits of belonging to an association is better informational access to the buyer. Next, learning from other members through exchange of technical information is considered the second most important benefit, and more important than the receipt of technical assistance from the buyer. Many members apparently regard fellow member suppliers as a more important source of technical know-how than their buyer. The type of buyer information which is valued by members appears to be about design and development for the next model, rather than, for instance, about the certainty of production scheduling.[2]

3. Forced Competition

3.1 Multiple Sourcing

Supplier relations require investments in transaction-specific assets. Even if these investments are entirely contractible, it may be difficult to specify ex ante precisely how the assets will be employed in production. One transaction-specific assets are in place, the characteristics of the transaction and the gain from trade will be determined by ex post bargaining between the buyer and the supplier. A safeguard for the buyer is contract with more than one potential supplier to invest in the transaction-specific assets required for production. Then, after production requirements become clear, the buyer can arrange a competition between these suppliers for the right to produce.

The buyer chooses between sole and second sourcing. Under second sourcing, the buyer contracts for fully redundant capacity, awarding a contract for full production requirements to the more efficient firm. The choice between sole and second sourcing depends on information rents, which reflect the costs of inducting supplier's private information to the buyer under the situation where the supplier has private information on production. Procurement cost of buyer consists of three components of cost: cost of physical production; the cost of efforts in improving efficiency; and cost of inducing supplier's private information on production. The benefit of the second sourcing is that

2 These evidences can be supported by the survey conducted by Fair Trade Commission in Japan (1993).

procurement cost are lower when that source is more efficient in production. The cost of inducing supplier's private information is less under second sourcing, showing a benefit of competition among the two. Under asymmetric information, saving in production cost from an additional supplier is greater than benefit of the economy of scale in production of a single supplier, This is because the buyer can harness greater competition to reduce the information rents paid to suppliers (Riordan, 1996).

Cusmano and Takeishi (1991) survey purchasing agents and product planners of the largest Japanese automakers, US automakers, and the U.S. operations of Japanese automakers. They find sole sourcing is not uncommon among the U.S. companies, nor is multiple sourcing uncommon among Japanese companies, though on average the Japanese use fewer suppliers per part. They also find that suppliers to U.S. firms play a large role from an apparently early stage in development, though Japanese suppliers still play a greater role in design.

Japanese firms usually employ a multiple sourcing policy to force suppliers into intense competition, even though they forgo economies of scale. Japanese automakers are less likely to rely on one supplier than U.S. automakers are. They maintain competition so that one supplier's ability to generate cost or quality improvements provides an incentive for the other supplier to keep up. The intense competition often begins at the design stage when the automaker invites guest engineers from the two suppliers to work at the automaker's technical center as part of the design team. The competitor engineers work in the same room during the initial design development. The automaker meets with each separately to review proprietary ideas and designs and eventually decides which supplier has a superior product design and cost, thus becoming the major supplier for the model. The losing supplier may become a secondary supplier for that model or may simply have an opportunity to develop a design for a different model.

There is competitive bidding to select the supplier, though it is usually limited to a few qualified suppliers in the existing group of suppliers. Prices are negotiated prior to production and there is considerable rigidity in adjusting for subsequent supplier cost increases. This commitment to the price also serves to reward the supplier for investments and innovations that result in cost reduction.

3.2 Two Basic Types of Suppliers

A supplier typically has contracts with an automaker both for a variety of components in a single model and for similar components in different models. There are usually several companies within the automaker's supplier group qualified to manufacture a component. The other qualified suppliers may be currently producing similar components for other models. Within an assembler's hierarchical structure of suppliers, there are two basic types - design approved (DA) and design supplied (DS). DA suppliers provide both design and production services to the automaker's specifications while DS suppliers produce a component from drawings provided by the automaker. The DA suppliers are usually those with the close and long-term relationships with the automaker. First-tier and the DA suppliers have a greater number and more profitable contracts with the automaker. The automaker usually has less detailed knowledge of the DA supplier's production costs which give the supplier an advantage in price negotiation. There are many thousands of suppliers in the automaker's supplier hierarchy and only a few hundred at the first-tier.

The typical production cycle for a car model begins with a lengthy design and development stage followed by a 4-year production stage. The automaker usually invites several qualified firms in the supplier group to compete for a contract to design and produce a component for a new model cycle. A DA supplier will undertake the design and development as well as tooling for production with no guarantee of reimbursement by the automaker. For DS supplier, the automaker will guarantee reimbursement for specific investments such as tolling. Whether DA or DS, the automaker makes a firm commitment to use the supplier for the 4-years production life of the model.

3.3 Supplier Competition for Design and Manufacturing

Recent evidence suggests that although the Japanese companies encourage their suppliers to make customized investments, they use forced competition with one or two competitors to make sure that their suppliers are disciplined by the ever-present threat of competition. This competition often begins at the design stage when the automaker invites guest engineers from two suppliers to work at the automaker's technical center as part of the design team. As the design work proceeds, the automaker meets with each supplier separately to review

proprietary ideas and eventually decides which supplier has superior product design. Liker, *et al.* (1996) shows that Japanese suppliers face less competition in the design and manufacturing stage than U.S. suppliers, though Japanese suppliers do face considerable competition - about two competitors for a given design and manufacturing contract on average.[3]

The buyer can strengthen the incentives for cost or quality improvements by making the price paid to each supplier dependent on relative performance. The second-place supplier loses out on additional business and the bonus for good performance. However, the buyer does not abandon a weak supplier, but works with it to help it compete with the strong suppliers. The forced competition among the limited suppliers can be explained with the theory of principal-agent. The theory focuses on how a principal may compensate an agent for works delegated. The theory deals with the design of optimal compensation scheme in order to motivate an agent to work efficiently under the situation where an agent's action is not observed perfectly. According to the literature in the use of contests to compensate multiple agents, contests among the suppliers can work as a mean for providing incentive to suppliers.[4] The contest serves to make the supplier's reward dependent on his rivals' efforts as well as his own, while the reward are actually independent of the supplier's cost. It can be shown that contests outperform individual-agent-incentive schemes in solving the problem in unobservable efforts when suppliers face some degree of common production uncertainty in addition to their own uncertainty. Thus, the buyer as a principal, can increase incentive of supplier, as an agent for enhancing efficiency of production through multiple suppliers.

4. Transaction-specific Investments

4.1 Dedicated and Asset-specific Investments

Buyer-supplier relationships in Japan are characterized long-term

3 Liker, *et al* (1996) examines supplier involvement in design based on a 1993 survey of approximately 143 Japanese and 189 U.S. automobile components suppliers. The survey was based on mailed, self-administered questionnaires. Respondents were asked to identify their largest dollar-volume automobile component or component group. The questions were also to be answered with their largest automobile customer.

4 The use of contests to compensate multiple agents has been examined by Green and Stokey (1983); Lazear and Rosen (1981); Nalebuff and Stiglitz (1983).

and highly committed, whereas they are more likely to be governed by short-term, arm's-length relationship in the U.S. One of the major benefits of the Japanese supplier involvement in design is access to highly customized design with unique features for a particular buyers' needs.

Japanese automobile suppliers develop more unique parts for their customers and make greater investments in specialized assets than do U.S. suppliers. A first-tier suppliers does not usually receive a separate payment for the investment in tools, dies, molds, and jigs that are highly customized and would need to be scrapped if the automaker cut off orders to the supplier. The suppliers' specialized capital investments make them highly dependent on the automakers, with the real possibility of hold-up problem. However, automakers are also significantly dependent on the suppliers. Most DA suppliers' parts are "black box," meaning that the automaker provides only very general specifications while the supplier does all of the detailed functional specifications and blueprints. Consequently, suppliers have significantly more knowledge about the design and manufacture of the part than does the automaker. Because black-box parts are customized to a specific model, the automaker is highly dependent on the supplier. If the supplier did not perform as desired, the automaker would have difficulty simply shifting business to another supplier, given the product's customized nature. Some DA suppliers claim that they do not provide the automakers with all of the specific functional details when they submit their design drawings for approval, but intentionally leave out certain important details such as tolerances. Because the automaker does not know the part's exact design specifications, it is difficult to change suppliers, resulting in the automaker's dependence on the supplier.[5]

Under these conditions, each party makes commitment with substantial transaction-specificinvestments, which creates quasi rents only if the both parties continue working together. If the relationship is terminated, each party loses some portion of the rent. Thus these specialized investments create interdependence, which in turn creates incentives to cooperate. According to transaction cost economics, highly transaction-specific investment should be avoided by buying

5 Most automakers in Japan restrict suppliers to sale design specification to other companies (Fair Trade Commission in Japan, 1993).

commodities in the market and making customized products in-house where the hierarchy can be used to reduce transaction costs. By contrast, Japanese automakers increasingly pushed responsibility for design and manufacture of more complex subsystems to a close-tied group of suppliers who are willing to make significant transaction-specific investments in developing customized parts for the buyers. Moreover, Japanese automakers seem willing to allow suppliers to development capabilities to receive the long-term advantages of cooperation. In fact, relationship-specific investment increase mutual dependence if they are made equally by both parties. Since these relationship-specific investments increase the exit costs for a party and reduce the potential for opportunistic behavior, parties are likely to be comforted and thus may increase their commitment to each other. This in turn creates incentives to cooperate, and the reduction in cost and improvements in quality that are gained through the cooperation outweigh the risks of opportunistic behavior from the parties involved.

Liker *et al.* (1996) shows that suppliers have a close and long-term relationship with their largest customer both in Japan and U.S. automobile industry. They also suggests closer, more long-term relationships in Japan, though these differences are not as large as expected. It is observed that Japanese automakers have the most dedicated relationships with subsystem suppliers and the least dedicated with lower-tier suppliers. Japanese suppliers are considerably more dependent on their largest customer. Equity ownership is more prevalent in Japan. This results suggest U.S. automobile companies are as likely as Japanese companies to out-source design, given suppliers early information about product development, and allow them to develop unique design capabilities the automobile company cannot replicate.

4.2 Investments in Customized Assets

Japanese suppliers dedicated some of capita investments to their primary customer that these customized physical assets that could not be re-deployed if the customer terminate to purchase from them. Clark and Fujimoto (1991) suggested that dedicated physical assets play an important role in the improvement of product integrity and thus in overall product quality. It generally requires various type of investments in customized assets by one or both firms in order to make

the production and physical distribution more efficient. Dyer and Ouchi (1993) identify three types of customized investments employed in supplier relationship: site-specific investment; physical investments; human capital investments.[6]

Site-specific investments: Site specificity refers to the situation whereby successive production stages that are immobile in nature are located in close proximity to one another to improve coordination and economize on inventory and transportation costs. Plants are located so that they are dedicated largely to a particular customer in order to improve coordination and economize on inventory and transportation costs. Supplier relations in Japan involves building a supplier plant within fifteen miles of the customer plant to reduce transportation costs, improve delivery, and generally improve coordination. It allow supplier engineers to work daily at customer technical centers with customer engineers in designing new products.

Physical investments: Manufacturing equipment such as tools, dies, molds, jigs, machinery, information system and so on is customized. Physical specificity refers to transaction-specific capital investments. Physical asset specialization allows for developing unique feature of product and may improve quality by increasing product integrity.

Human capital investments: Dedicated design to manufacturing requires engineers to develop significant customer-specific knowledge. Human capital specificity refers to transaction-specific know-how accumulated by trade partners through long-term trading relationship.

Mutual human capital increases as trade partners develop experiences working together and accumulate specialized information, language, and know-how that allows them to communicate efficiently and effectively. It involves transferring the buyer's executives or employees to the supplier to work on a temporary or permanent basis, and sending consultants to work with the supplier to improve production methods, implement just-in-time delivery systems, or assist in solving other problems. For example, Toyota and Nissan have large supplier-assistance management consulting groups with specialized expertise that work full time with suppliers to help them improve their production techniques and solve the problems on quality, cost, and delivery. Providing assistance to suppliers is a highly effective method

6 Asanuma (1989) identified that transaction-specific investments are prevalent in supplier relations in Japan, and developed the notion of "relation-specific skill."

for both helping and forcing suppliers to continuously innovate and improve to stay ahead of the competition. Each type of transaction-specific investment is likely to have differential effects on performance. For example, site-specific investments economize on inventory and transportation costs but may have little direct effects on quality. On the other hand, investments in human capital are not likely to economize on inventory or transportation costs, but could have a substantial impact on increasing quality and reducing new model cycle time. If transaction-specific investments can increase quality, reduce new model cycle times, and minimize inventory costs, then these benefits should translate into higher efficiency.

4.3 Relationship between Transaction-specific Investments and Performance

Dyer (1996) examines the relationship between inter-firm asset specificity and performance in the automobile industry. The survey consists of two Japanese automakers and all three U.S. automakers and a sample of their suppliers. The unit of analysis is the supplier-automaker relationship. Toyota and Nissan's supplier indicated that approximately 21 percent of their capital equipment investments were not re-deployable, compared with 20 percent for Ford suppliers, 14 percent for GM suppliers. On virtually every assets specificity measure, Japanese automakers and their suppliers were more specialized than their U.S. counterparts. Moreover, with regard to site and human asset specificity, Toyota's supplier group was more specialized than Nissan's supplier group. More specifically, it examines the extent to which differences in supplier-automaker asset specialization may explain performance differences between Japanese automaker and the U.S. The findings indicate a positive relationship between supplier-automaker specialization and performance. In particular, the data suggest a positive relationship between inter-firm human capital specificity and both quality and new model cycle time. Moreover, site specialization is found to be positively associated with lower inventory costs. The findings suggest that in the automobile industry a tightly integrated production network characterized by proximity and a high level of mutual human capital specificity will outperform a loosely integrated production network characterized by low level of inter-firm specificity.

A firm may choose to seek efficiency advantages by creating assets

which are specialized in conjunction with the assets of a trading partner. These relationship-specific assets as the vehicle through which trading partners are able to generate relational quasi rents. Although investments in specific assets boost productivity, the incentive to make transaction-specific investments is tempered by the fact that the more specialized a resource becomes, the lower its value in alternative uses. The contingent value of a specific resource exposed its owner to a greater risk of opportunism than the owner of a generalized resources. According to the transaction cost economics perspective, if trade partners make transaction-specific investments, then they must safeguard against the hazards of opportunism. Source of advantage is contingent on the costs associated with safeguarding those investments. Transaction-specific investments are more likely to result in high performance when trade partners have developed safeguards which can control opportunism at relatively low cost and task activities are characterized by a highly degree of interdependence.

It would be misleading to suggest that asset specificity is the only, or even the primary, factor that contributes to performance differences among automakers. Undoubtedly numerous other factors not captured in the model contribute to performance differences. The optimal level of inter-firm asset specificity will depend on the costs of safeguarding specific investments. If the safeguard costs are particularly high then the gains from specialization may be outweighed by the costs. The fact that *kankei gaisha* (affiliated suppliers) exhibit greater asset specificity than U.S. in-house division is intriguing. Trust may be a highly effective and low-cost means for safeguarding transaction-specific investments. One can argue that constraints on opportunism within the Japanese institutional environment allow Japanese firms to generate relational quasi rents more effectively (Dyer, 1996).

The efficient level of specificity between trade partners is likely to be contingent on the task activities and degree of interdependence. Generally speaking, the greater the interdependence, the more both parties will benefit from investments in specialized assets. The findings suggest that when working activities are highly interdependent as they are in the automobile industry, the Japanese automakers are more efficient than the U.S. These transaction-specific investments create substantial buyer and supplier switching costs and, once sunk, make the two parties highly interdependence. This interdependent relationship

can create potential contracting problems if the parties do not completely trust each other. Toyota's just-in-time (JIT) system are a good example of how customized investments can create value. Just-in-time system was designed to reduce complexity and costs by eliminating inventories and work in process and to ensure that there were no redundant buffer stocks, distribution facilities, or quality inspections. However, to implement JIT efficiently, Toyota and its suppliers had to make customized investments in information systems, plants, and flexible manufacturing systems that created mutual dependency.[7]

5. Supplier Involvement in Product Development

5.1 Supplier-management in Product Development

One of the key features of Japanese supplier management is the substantial involvement of suppliers in product development. Kamath

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7 When both parties make transaction-specific investments, the cost to switching partners depends on the amount of investment. In this case, MacLead and Malcomson (1993) show that efficiency can be achieved by a contract conditioned on sufficient external variables to ensure that re-negotiation never occur. It need not be conditioned on the amount of investment, nor does it require breach penalties.

Transaction-specific investments create gains from the parties continuing to trade with each other rather than trading elsewhere. Once they have been incurred, any bargaining or contract re-negotiation affect the division of these gains. If as a result one party captures some of the returns on the other's investment, the amount of investment undertaken will be under efficient level. To generate efficient investments, a contract must ensure that the investors receives the full marginal return on investment when account is taken of any subsequent renegotiation. Renegotiation can be represented by a bargaining with four possible outcomes for the parties: trade with each other under the terms of the existing contract; no trade at all; commitment to trade with outside parties; or renegotiate of the contract to trade with each other on different terms.

Specific investment are valuable for trade only with the chosen partner, nor for trade with third parties. Thus the return on specific investments is not reflected in the value of outside options. As a result, an investor fails to receive the marginal return on investment not only when renegotiation results surplus sharing, but also when it results in the investor's outside-option constraint binding. Whenever renegotiation occurs, whether because under the existing contracts one party would prefer not to trade at all or because one party would prefer to trade with a third party. An investor will not receive the full marginal return on investment. Thus when both parties make specific investments, efficient investment requires a contract conditioned on sufficient external variables to ensure that renegotiation never occurs, The contract does not, however, need to be conditioned on the level of investment themselves, nor does it require breach penalty. The escalator clauses typically work well to condition price on outside variables in such a way that neither party would do better from an outside option.

and Liker (1994) studied supplier-management used in product development practiced by major Japanese automobile manufactures. They observed closely coordinated buyer-supplier relationships in product development. It is widely believed that Japanese manufactures treat virtually all their primary suppliers who deal directly with the automobile assembler as close partners. In fact, they typically regard only a handful as partners and assign more limited roles to the rest. Nor do buyers and suppliers work together in free-flowing teams to develop new products. Rather, Japanese automakers structure their development programs tightly and use targets and prototypes to keep suppliers in line. Managed correctly, suppliers can help their buyers reduced lead times and manufacturing costs, and can aid the design process as Toyota's and Nissan's suppliers do.

Japanese automakers assign suppliers different roles and give even first-tier suppliers varying levels of responsibility for the product development. The Japanese hierarchical structure simplifies communication between buyers and suppliers: first-tier suppliers coordinate the activities of the second tier and so on down the hierarchy, allowing customers to focus scarce communication resources on the top tier. Still, with 100 to 200 first-tier suppliers, an automaker cannot easily work with all of them as partners in product development. Successful partnerships depend on the right balance among supplier's technological capabilities, a automaker's willingness to share information, and both companies' requirements. There is a range of postures that buyers and suppliers can adopt within a long-term cooperative relationship. Suppliers may play different roles for different buyers. Each posture carries fundamentally different responsibilities during product development, and the buyer-supplier relationships vary considerably in closeness and intensity.

Partner-suppliers top the hierarchy. These selected first-tier suppliers can also be thought of as full-service providers. Partner-suppliers are responsible for entire subsystems such as heating, ventilating and air conditioning. They often participate in planning a new model even before the concept stage. Their understanding of their products and processes are superior to those of their buyers, and they suggest solutions to meet their buyers' price and performance objectives. They do their own testing and may even be responsible for testing other suppliers' parts. One of the major partners is

Nippondenso, which has grown to become an independent suppliers of a broad range of components approaching to Toyota in size.

The distinction between the mature-suppliers and the partner is subtle. Like partners, suppliers in the mature role referred to as full-system suppliers designing and manufacturing complex assemblies. Because they lack the technological capabilities of partners, they have less influence on design. The automaker gives mature-suppliers critical specifications for performance, interface requirements and space constraints. These suppliers then develop the systems on their own. Moreover, mature-suppliers take on major testing responsibilities: a buyer might not even verify the test data a mature supplier submits along with its prototype.

Suppliers in the child role have even less influence on design specifications. They may participate as consultants in meetings with the automaker during the concept stage, but the buyer determines in explicit detail the specifications for the part. The responsibilities of suppliers in this role include working out the detailed of the design and building and testing prototypes. But the buyer often conducts critical tests internally to assess the performance of the supplier's parts. Communications are not very intensive in the concept stage but intensify during prototyping, though not to the same degree as with partners or mature suppliers.

Suppliers in the contractual role simply manufacture parts designed by the automaker, usually standard parts or commodities. This role is appropriate when a customer chooses to supplement its own internal ability to design those parts with a contractual supplier's manufacturing capacity. Contractual-suppliers and their buyers may communicate frequently during the late-prototype and production-preparation stages, though communication is less intensive than it is in the other roles. These suppliers may have long-term relationships with their customers if the suppliers' unique manufacturing capabilities make them necessary or if the automakers' just-in-time manufacturing schedules are so tight that they require them. Suppliers and their customers become increasingly interdependent as they work together and their trading relationship grows. The buyer depends on the supplier's know-how and relies on the supplier to deliver on time and on target. Committed ever more heavily to the customer, the supplier depends on it for its future business.

Japanese automakers manage product development tightly. They set clear, understandable goals and communicate them consistently to suppliers, and they use targets and prototypes to enforce those goals. It is a simple, rigid process, much like an assembly line. Suppliers must keep the line moving as a highly regimental role. With a highly structured and routinized product-development process, Japanese suppliers know exactly where they fit in and when, and this arrangement allows them to be innovative within clearly determined boundaries. Japanese automakers give marching orders to suppliers through carefully considered targets for price, delivery date, performance, and space constraints. Then the suppliers go off and design to those targets. There is usually little room for missing them because a deviation by one supplier will have implications for designers of mating components systems. Suppliers are expected to work hard to meet targets on time. Although buyers are generally understanding if supplier cannot meet a targets, they are unsympathetic if the supplier shows signs that it has not worked very hard. The customer is responsible for avoiding arbitrary and capricious changes in targets, because they would reverberate throughout the system and could disrupt other suppliers' design work.

5.2 Supplier Responsibility for Product Development

The typical description of Japanese supplier management argues that suppliers are partners in product development for the early concept stages of design. By contrast, those of the typical U.S. automotive makers have been often suggested that most high value-added component development and production is done by automakers in-house using large in-house supply capability. Outside suppliers are used predominately as low-cost manufacturing platforms that are handed blue-prints and build to prints.

A number of generalizations in the literature on supplier involvement in design in Japan. Japanese suppliers take on more responsibilities for designing, prototyping, and testing complex parts and subsystems than U.S. suppliers. Suppliers in Japan are thought to be given great autonomy in designing, prototyping, and testing their components or subsystems, with little interference on monitoring by the buyer. The Japanese supplier network is organized into clearly defined, hierarchical tiers with relatively large first-tier suppliers at the top

taking most of the responsibility for design of subsystems and delegating responsibilities for simple parts to second and lower-tier suppliers that generally build parts according to blueprints provided to them.

Liker, *et al.* (1996) find little support for the expected differences in supplier involvement in the design process. There is a high level of supplier involvement in product development in both countries for the early stages of design, particularly among suppliers of major subsystems. U.S. companies show levels of supplier involvement in product development rivaling Japanese companies. The U.S. automakers seem to be giving suppliers the responsibility and opportunities to exploit advantages of asset specificity and customer dependence on the supplier, without the same level of control as we see in Japan. They do not hold equity in the supplier, they do not represent as large a volume of the supplier's sales, they have less internal capability to design the parts themselves, and they are not repeating supplier's tests as frequently. There is no evidence in these data that Japanese suppliers are given greater responsibility for prototyping in Japan than in the U.S. Nor is there evidence that Japanese companies expect more complete prototypes and trust their suppliers enough not to replicate their components test. In fact, there is a significantly greater likelihood in Japan that supplier prototype tests are replicated. Japanese automakers are closely monitoring their suppliers' designs.

5.3 Early Communication in Product Development Stage

The Japanese supplier management suggests suppliers are trusted enough to be given model information relatively early in the design process - often at the concept or pre-concept stage - and suppliers are expected to participate in the development, beginning at the concept stage. In the process, Japanese suppliers wield significant influence over the process of defining customers' requirements so that the product designs exploit the suppliers' unique manufacturing capabilities. Liker *et al.* (1996) indicate that almost all of the subsytem supplier in Japan receive early vehicle concept information from their customers although they do not necessarily have a great deal of influences over the setting of specifications for their subsystems. Contrary to the current literature that suggests Japanese companies provide broader specifications that allow the supplier greater freedom

to innovate, there were no Japanese-U.S. differences in the degree of specificity of the customer requirements. Japanese customers were as likely as their U.S. counterparts to include actual dimensions in the requirements.

Japanese automakers provide early new model information to first-tier suppliers as the product concept is forming and issue only the minimum critical product requirements. U.S. companies are thought to provide much more detailed specifications to their suppliers, allowing suppliers little latitude on specifying the design. Japanese suppliers management involve intense and frequent communication during the product development cycle, particularly in the early stages when the product is being defined. This includes the intense and regular sharing of technical information to improve performance and reduce cost. Because these are long-term buyer-supplier relationships, the quality and efficiency of information exchange is significantly higher than it would be in new relationships. Thus mutual human capital investment enhances information sharing and communication between buyer and supplier.

There was considerably more frequent exchange of design information reported in the U.S. compared to Japan at all tier levels and all stages of the development process. The frequency of communication does not necessarily reflect the quality of communication. Japanese have a long and continuous history of working together with their suppliers on design that they can communicate quickly and easily between them. Direct communication and relationships developed over a long period of time made detailed and explicit written communications largely unnecessary. The result of this emphasis on communication is greater efficiency, faster product-development cycles. The greater frequency of information exchange about product development between buyers and suppliers in the U.S. may reflect less effective communication and decision making. Japanese suppliers are given specifications formally, asking to go off and do the design and return with a prototype on time. Communication has been streamlined so it is less frequent than in the U.S. The Japanese supplier relation can be thought to involve intense and frequent communication during the product development cycle, particularly in the early stages when the product is being defined. This includes the intense and regular sharing of technical information to improve performance and reduce

cost. When a supplier gets a notice that the concept session for a specific vehicle model is being scheduled, there is no ambiguity about what the supplier must bring to the session; approximately when the first, second, and third prototypes will be due; and what the buyer's expectations at each of those milestone events will be. One can find clear and consistent communication between suppliers and buyers in the Japanese relationships

5.4 Cost-reducing Efforts

When the Japanese automaker hands design specifications to its suppliers, these specifications include a target price, whereas U.S. automobile companies tend to rely more on direct market forces to control costs. Aggressive target prices are a major factor in driving supplier to use value engineering and reduce cost so they can make a profit at the price dictated by the customer. In fact, Japanese companies also know the cost structure of their suppliers and generally set the target price very aggressively under the assumption that suppliers will continually reduce costs over experiences of the previous model. Supplier which are dependent on a principal customers have no choice but to reduce cost aggressively or risk losing the affiliation with that customer which could mean going out of business. For example, Toyota gives them targets shortly after the 36-month presentation. Usually, maximum/minimum targets are generally expressed in terms of improvements over an existing product or the prototype in the presentation: Toyota is likely to want about 4 percent reduction in cost, or about 5 percent improvement in power output. During the months that follow, the suppliers diligently strive to meet the targets through design improvements. If the targets are met or exceeded, this eventually becomes the specification; if not, in negotiations, the supplier demonstrates with test data that the target is impossible, and the both parties compromise on a target. Toyota's engineers typically set targets on each components higher than really necessary by as much as 20 percent. They realize that, with production variations, this ensures a comfort zone so parts out of tolerance will actually be quality parts. They also want the suppliers to stretch; if the targets is too easy, the supplier will relax and not try to continuously push possible boundaries. If the supplier cannot achieve the very challenging goal, there is still room for negotiation (Ward, *et al.*, 1995).

Liker, *et al.* (1996) shows the date to support the more widespread use of target pricing in Japan and the greater prevalence of competitive bidding in the U.S. However, there is also considerable evidence that U.S. companies are using this practice. More than half of both the U.S. and Japanese suppliers said the use of competitive bids was a major way to set prices. Value engineering has become an institutionalized practice in these companies. The term used for identifying ways to reduce cost in the product / process development stage is value engineering. In fact each buyer has a formula for splitting the cost saving suppliers have achieved through value engineering between the customer and suppliers.

6. Convergence

Supplier relations in the U.S. are changing rapidly and are moving close to the those in Japan. Cusumano and Takeishi (1991) present the results of a questionnaire survey to a sample of automobile manufactures in the U.S. and Japan during the spring of 1990. The survey provides evidence that U.S. automakers and suppliers have adopted at least some practices traditionally associated with the Japanese, thus indicating a possible convergence toward a Japanese model of supplier relations. The evidence shows that U.S. automakers appeared to move close to the Japanese model during the 1980s in several areas. For example, U.S. companies had long, stable histories of relations with their suppliers; the average contract lengths they gave out for components after market introduction were dropping while quality was improving; past relations an financial affiliation, such as use of internal part divisions, were becoming less important as factors in choosing suppliers, while pricing accuracy and quality seemed to be gaining importance.

Where once contracts were short-term, arm's-length relationships, now contracts have increasingly become long-term. Helper and Sako (1995) shows that U.S. suppliers must provide buyers with detailed information about their processes, and buyers talk of partnerships with their suppliers. 87 percent of Japanese suppliers, compared with 68 percent of U.S. firms, thought that their customer's commitment would last more than four years, the typical duration of a model cycle. The actual record of trading with the same customer was significantly

longer in Japan than in the United States.

In the U.S., between 1984 and 1993, more suppliers provided their customers with a detailed breakdown of the steps in their production process, an increase that is compatible with a trend toward collaborative relationships.[8] More and more U.S. suppliers have given their customers a detailed breakdown of process steps, so that the gap between U.S. and Japanese companies was eliminated by 1993 in this respect. At the same time, buyer commitment, measured by either past record or suppliers' future projections, remains higher in Japan than in the U.S. In joint problem solving, suppliers' expectations of cooperation have increased in the U.S. but declined in Japan. Thus there has been a limited, yet noticeable, convergence in the nature of U.S. and Japanese supplier relations. In the U.S., suppliers are significantly more likely than they were five years ago to provide detailed information to their customers, have long-term contracts, believe that their customers are serious about product quality, and have defect-prevention systems in place. This results indicate progress toward cooperative relationships, in which suppliers play an important role in solving problems and developing fresh ideas about products and processes.

Sako and Helper (1995) also show that there has been a considerable convergence in the methods of supplier relations towards those consistent with closer and longer-term relationships in Europe, the U.S. and Japan. An increasing proportion of European and U.S. suppliers have provided their customer with a detailed breakdown of process steps, so that the gap between European and the U.S. on the one hand and Japan on the other in this respect is eliminated by 1994.[9]

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8 Frey and Schlosser (1993) present a case of the Ford-ABB Oakville paint-finishing project that shows how cooperative and innovative buyer-supplier relationships can be achieved in the U.S. automobile industry.

9 In the U.K. automobile industry the traditional buyer-supplier relationship was promised on stable, high volume, low variety production; relationship was one of close competition, with any new business secured by one supplier being won at bidding; price was the primary criterion on which contracts were awarded. Today, one can notice that several automakers are trying to shift toward reducing costs, and resolving scheduling problems, technical difficulties and the like through a process of cooperation rather than competition. The new relationship was characterized by far greater dependency as it involved suppliers in design, research and development work, and quality control, and this in turn facilitated more commitment from suppliers by allowing them to engage in more forward planning. Reducing the supplier base is one feature of the current transformation, long-term collaborative contracts awarded to a limited number of suppliers, and

7. Conclusion

Supplier relations are important areas for any firm that subcontracts portions of components design and production because this creates the dependence on the technology and operations of suppliers. There are significant differences in supplier relations between Japan and the U.S. Supplier relations in Japan can be identified to have distinctive characteristics in several aspects compared with the U.S. counterpart. It is important to understand how efficiently Japanese supplier relations work, and whether the Japanese practice is unique to the peculiar circumstances of the Japanese social and cultural system or whether it can be applied in other countries. Furthermore, it is also important to understand the economic rationale of supplier relations in Japan.

In this paper, major characteristics of Japanese supplier relations are described in comparison with the U.S. Economic rationale for those relationships are provided. Furthermore, comparing suppliers relations in Japan and the U.S., convergence in the nature of those are discussed. Significant features of Japanese supplier relations are identified as follows: long-term relationships and commitments with frequent planned communication, which reduced transaction costs and eliminated inefficiencies between buyers and suppliers; trust-building practices like owning stock, transferring employees, having guest engineers, and using flexible legal contracts that create a high degree of goal congruence and mutual trust; forced competition among few suppliers focusing on costs, quality, and technological development; willingness to make significant transaction-specific investments in plant, equipment, and human capital as well as to share valuable technical information; significant involvement of suppliers in product development with intensive and regular sharing of technical and cost information to improve performance and set prices.

Supplier relations in the U.S. are changing rapidly and are moving close to the those in Japan. There has been a limited, yet noticeable,

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buying more assembled component systems rather than individual components. However, the structure of the U.K. vehicle industry presents severe technology transfer and to the close collaboration between buyers and suppliers. There is a largely independent and common first-tier of suppliers, as well as a common sec ondary / tertiary tier, which are shared by a number of vehicle assemblers (Turnbull, *et al.*, 1992).

convergence in the nature of U.S. and Japanese supplier relations. In the U.S., suppliers are becoming significantly more likely to provide detailed information to their customers, have long-term contracts, believe that their customers are serious about product quality. This results indicate progress toward collaborative relationships, in which suppliers play an important role in solving problems and developing ideas about products and processes technology.

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ALTERNATIVE COMPONENT SOURCING STRATEGIES WITHIN THE MANUFACTURER-SUPPLIER NETWORK: BENEFITS OF QUASI-MARKET STRATEGY IN THE JAPANESE AUTOMOBILE INDUSTRY

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Abstract

This study examines the component sourcing strategy of six Japanese automobile manufacturers. One of the major findings is that firms with a low sourcing concentration and a high supplier sharing, which are the characteristics of quasi-market strategy, tend to perform better than the other firms. The Japanese cooperative inter-firm relationship has been considered to be beneficial to both suppliers and assemblers. It is commonly considered that a relatively exclusive "keiretsu" system facilitates these close inter-firm ties. However, the results in this study have implied that a few leading Japanese automobile manufacturers may have management capabilities in benefiting from both a relatively broad supplier base and cooperative relationship with individual suppliers.

JEL classification: L14; L62

Keywords: Supplier relationship; Supplier network; Japanese automobile firms; Quasi-market strategy

1. Introduction

In many industries, the management of component suppliers is an important issue. This study analyzes component sourcing strategies of Japanese automobile manufacturers. Existing literature has mostly discussed advantages of Japanese keiretsu partnerships, comparing them with the arms-length relationships in the Western industry. Most

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studies have focused on the cooperative nature of dyadic inter-firm relationships between manufacturers and suppliers in Japan. However, few studies have explored the differences among Japanese firms in sourcing strategies in the context of the entire manufacturer-supplier industry network.

As Takeishi and Cusumano (1995) have pointed out, the emphasis on cooperative supplier relationships and the notion of the keiretsu group sometimes leads to a misunderstanding, in which some may think that there are exclusive one-to-one relationships between manufacturers and suppliers in Japan. In reality, however, many suppliers sell a certain type of components to multiple competing automobile manufacturers, while auto manufacturers buy most components from multiple suppliers. Therefore, there is a complicated network consisting of multiple automobile competitors and component suppliers with respect to transactions even on a single type of component.

This study focuses on the sourcing strategies of Japanese auto manufacturers, which relate to the manufacturer's positioning in the entire buyer-supplier network. More specifically, there are two interrelated purposes of this study. First, it develops a framework that lays out different types of sourcing strategies for individual firms, considering the entire network of automobile manufacturers and component suppliers, rather than a dyadic inter-firm relationship. This framework features concepts of the "quasi-market" and the "quasi-hierarchy" strategies. This study then argues potential relationships between the sourcing strategy types and automobile manufacturer's performance. Second, in analyzing the strategy-performance relationship, it also illustrates differences in the sourcing strategy each Japanese automobile manufacturer follows, which contrasts with many existing studies that have emphasized a single "Japanese" supplier relationship model.

There have been two important areas of study that have explored sourcing strategy and supplier management. First, the fundamental issue for manufacturers is related to the make-or-buy decision. Many studies have provided evidences regarding potential factors that affect this type of decision making (Monteverde and Teece, 1982; Walker and Weber, 1984; Hart, 1989). In the literature, selecting a "buy" decision usually means that a manufacturer and a supplier maintain an arms-

length relationship in the market.

On the other hand, the second body of literature has argued that the effective management of the supplier relationship leads to a new mode of inter-organizational relationships, which may necessitate reconsideration regarding a simple distinction between make or buy. The emerging mode of supplier management is characterized by a cooperative long-term relationship with an extensive inter-firm communication. In particular, many studies have compared supplier management practices between the U.S. and Japanese automobile industries, emphasizing the advantages of the Japanese style of management (Abernathy, Clark and Kantrow, 1983; Cole and Yakushiji, 1984; Cusumano, 1985; Asanuma, 1989; McMillan, 1990; Nishiguchi, 1994; Helper and Sako, 1995). The literature has explained that, in the Japanese automobile industry, a manufacturer and a supplier coordinate to perform interdependent tasks effectively by sharing more information, investing in relation-specific assets, and relying on trust to manage the relationship. These studies and others have also implied that this type of supplier relationship is supported by the Japanese keiretsu system (Lincoln, et. al., 1992; Dyer and Ouchi, 1993).

Even though there has not been a clear definition of the keiretsu system, many studies seem to have implied that Japanese automobile firms or at least the leading ones have a keiretsu supplier group and maintain a relatively exclusive relationship within the group. A typical expression explaining the manufacturer-supplier relationship could be " *The Japanese also appeared to be organized more in a pyramid structure, with many more affiliated suppliers that each had their own suppliers, creating a high level of 'group' integration*" (Cusumano and Takeishi, 1991, pp. 564). Despite the notion of the group integration, there is actually a complicated manufacturer-supplier network across these groups. This study analyzes details of the network structure to determine the different sourcing strategies each Japanese assembler follows.

It is important to analyze sourcing strategies as part of a network of relationships, rather than as relationships only at the dyadic level. This perspective of the sourcing strategy influences the nature of inter-firm transactions (Porter, 1980; Williamson, 1988; Nohria, 1992). This study tries to conceptualize variations in sourcing strategies in the context of the entire network. For example, some firms may buy a

certain type of components from a single supplier that does not deal with other automobile manufacturers at all. This type of sourcing strategy features one-to-one manufacturer-supplier transactions, which this study considers a typical example of the quasi-hierarchy strategy. Others may buy the same type of components from several suppliers that sell the components also to several other manufacturers. This sourcing strategy features multi-to-multi transactions, which is an example of a firm that follows the quasi-market strategy.

As in these examples, there are two dimensions with which the sourcing strategy may be determined: the "sourcing concentration" and the "common supplier sharing."[1] There are some studies that have discussed the first dimension, explaining that Japanese automobile manufacturers do not actually rely on a single supplier for each component (Itami, 1988; Asanuma, 1989; McMillan, 1990). However, in order to capture the whole picture of the network, it is necessary to analyze these two perspectives simultaneously. Different sourcing strategies within a network with respect to these two variables may affect the efficiency and the effectiveness of component procurement transactions. This study particularly explores the following two questions:

1. Are there any differences among Japanese auto manufacturers regarding sourcing strategies in terms of these two dimensions?

2. If differences exist, how do they affect a firm's performance?

The next section discusses a conceptual framework that contains the two dimensions of the sourcing strategy, which leads to a distinction between the quasi-market strategy and the quasi-hierarchy strategy. Section 3 and 4 analyze data on the sourcing strategy at six Japanese automobile manufacturers with respect to 95 different components. In these sections, we provide an evidence that the quasi-market strategy, which features a low sourcing concentration and a high supplier sharing, has a positive influence on firm's profit performance. Section 5 discusses findings from the data analyses. This section also considers relationships between findings in this study and those in the existing literature that has focused on dyadic inter-firm

1 These two variables are similar, in concept, to "Sourcing Dispersion per Automaker," and "Customer Dispersion per Supplier," which Fujimoto and Takeishi (1994) use to analyze the industry-wide manufacturer-supplier relationships on different types of components.

relationships.

2. Framework of Sourcing Strategy

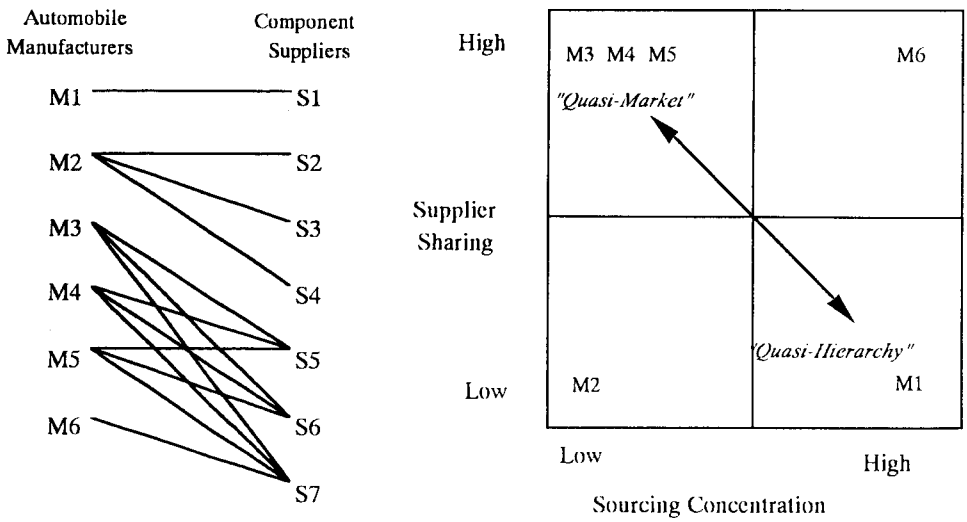
In order to conceptualize sourcing strategy, this section develops a framework using two strategic dimensions in component sourcing. The first dimension, the sourcing concentration, determines the degree of reliance on a small number of suppliers such as on a single supplier. This dimension is similar in concept to the number of suppliers from which a firm procures a certain type of components, which some existing studies have treated as one of the important dimensions of sourcing strategy (Asanuma, 1989; Cusumano and Takeishi, 1991; Nishiguchi, 1994). The concentration dimension, such as an application of the 2-firm concentration ratio or the Herfindahl index, may be more useful than the simple measurement of the number of suppliers to capture the degree of a focused reliance. Even when a manufacturer buys a certain component from many suppliers, it may concentrate on one or two firms with respect to the values or units of components purchased. In this case, the degree of reliance on a limited number of suppliers is high.

The sourcing concentration, however, does not fully capture a firm's sourcing strategy in the context of the entire assembler-supplier network. The second dimension in this framework determines the degree of supplier sharing with competing assemblers. Some assemblers may buy a certain type of component from a supplier that exclusively sells it to the manufacturer, while others may rely on a supplier that sells the same type of component to other manufacturers as well. Despite the importance of this dimension, few management studies have fully explored it either conceptually or empirically. One specific example related to this issue in the Japanese automobile industry is the strategic alternative of whether a firm such as Toyota encourages its group suppliers to sell a component to Toyota's competitors such as Nissan and Honda.

These two dimensions lead to a framework that contains four different sourcing strategies as shown in Figure 1. In order to illustrate the framework, Figure 1 also shows a simple hypothetical example of a network that consists of six manufacturers and seven suppliers. In this model, six manufacturers buy a certain type of component in the

component market where seven suppliers compete. M1 is an example of a manufacturer that has a high sourcing concentration and a low supplier sharing. It buys this component from a single supplier that does not deal with any of the other automobile assemblers at least on this particular type of component. On the other hand, M2 buys the component from three suppliers. Therefore, its sourcing concentration is lower than M1. M2 does not share these suppliers with other competitors either, and the degree of supplier sharing is as low as M1. M3, M4, and M5 have a low concentration ratio and high supplier sharing. M6 concentrates only on one supplier, but the supplier sells the component to other manufacturers, which position this assembler as the one following a high concentration ratio and high supplier sharing.

Figure 1 A Framework and an Example of Different Sourcing Strategies



By using these dimensions, this framework features a distinction between the quasi-hierarchy and the quasi-market sourcing strategies. The strategy followed by M1 forms a sourcing structure featuring one-to-one manufacturer-supplier relationship with respect to a certain type of component, which is similar to the notion of a hierarchical relationship. However, it is called "quasi-hierarchy," rather than "hierarchy," because this study discusses only relationships with outside suppliers, including only components that no firm internally sources using vertical integration. Because there is not a perfect

"market" mechanism anywhere in the Japanese automobile component market, the opposite extreme of this dimension is called "quasi-market" (Itami, 1988; Asanuma, 1989). Quasi-market nature of the sourcing structure increases when manufacturers lower sourcing concentration and increase supplier sharing, such as M3, M4, and M5.

Using this framework, the rest of this section attempts to develop hypotheses regarding advantages of the quasi-market strategy and its combination of a low sourcing concentration and high supplier sharing. We do not want to generalize this framework of the sourcing strategy too much, because we believe that the influence of strategy with respect to the industrial structure and inter-organizational relationship depends considerably on the nature of different industries, markets, and social institutions (Galaskiewicz, 1985). During the following discussions, therefore, we primarily consider the Japanese automobile and component supplier industry.

For example, first, we assume that in the Japanese automobile industry there is not a perfect competition or arms-length manufacturer-supplier relationship in a practical sense (Itami, 1988; Asanuma, 1989). Automobile manufacturers and component suppliers usually maintain "cooperative" relationships at least to some extent regardless of the sourcing strategies that this study discusses (Helper, 1991a; Fujimoto and Takeishi, 1994). Second, Japanese auto manufacturers, on average, outsource as many as 70% of components in values and 90% of the number of components. Therefore, transactions with suppliers tend to have a strong influence on the entire firm performance. Third, in the automobile component industry, while the speed of product and technology changes is quick, most changes are incremental in a pure-technical sense (Fujimoto and Takeishi, 1994).

The following discussions consider potential influences of different sourcing strategies. With respect to the first dimension, the sourcing concentration, it is rather clear from the existing literature that too much concentration on a small number of suppliers such as M1 and M6 may be inappropriate for buyers (Itami, 1988; Asanuma, 1989; McMillan, 1990; Cusumano and Takeishi, 1991; Richardson, 1993). It may prevent the suppliers from competing with each other in supplying high quality components at a low price, and provides suppliers with some monopolistic power (Porter, 1980). With respect to this argument,

we emphasize that concentrating on a single supplier in particular may have a strong negative impact. Japanese automobile manufacturers seem to be able to maintain competitive behavior among suppliers when there are multiple suppliers competing with each other (Itami, 1988; Asanuma, 1989; McMillan, 1990).

A high concentration particularly with one supplier also limits the assembler to accumulate important information. For example, multiple sources would provide the assembler with a sense of industry standard for a certain component with respect to quality and production cost (Riordan and Sappington, 1989; McMillan, 1990; Richardson, 1993). This type of information is critical for assemblers to monitor suppliers. For example, a manager at Toyota mentioned that when it cannot avoid sourcing a certain component from a single supplier, it then sometimes internally produces some portion to gather information to evaluate supplier's performance. In this case, sole sourcing may not have a negative influence in this aspect. However, analyses of this particular study include only components that assemblers do not internalize at all.

Too much dispersion to a large number of suppliers may also have some negative impacts. It may deter a manufacturer from closely monitoring individual suppliers or may increase supplier management costs. In other words, the number of suppliers may have a curvilinear relationship with the effectiveness of manufacturer's management of suppliers. However, Japanese auto manufacturers do not usually have a problem of too many suppliers, because they seldom buy a type of component from more than five suppliers (Itami, 1988; Cusumano and Takeishi, 1991), which this study also supports in a later section. Therefore, this framework hypothesizes only the first part of the relationship: too much concentration may have a negative influence on the supplier management efficiency. In conclusion, the quasi-market strategy with respect to the sourcing dispersion, then, is hypothesized as an effective strategy, because it enhances inter-supplier competition, as well as assembler's monitoring capabilities.

With respect to the second dimension, supplier sharing, there may be several advantages to buy a component from suppliers that sell the same type of component to multiple automobile manufacturers. These advantages may be associated with various types of benefits from the positive network externalities, if the term is interpreted in a broad sense. Positive network externalities arise when a component is more

valuable to a user the more other users adopt the same component or compatible ones (Tirole, 1989).

First, suppliers could enjoy the economies of scale by selling the same type of components to multiple customers, which may, in turn, benefit each customer. The more assemblers buy the same components from the same supplier, the more the price of components decreases.

Second, multiple manufacturers that procure a component from the same supplier may benefit from quality assurance because of multiple applications. Suppliers that manufacture auto components are also usually involved in the design and development stages in Japan (Clark and Fujimoto, 1991). Product or component development is, in a sense, a collection of iterations of testing, which includes internal testing such as simulation, prototyping, and general try-and-error in design, and external testing such as feedback from users. Suppliers are involved with testing in multiple stages including engineering development, manufacturing, and market transactions. The number of testing iterations for one type of component increases when the supplier develops and sells a type of component to a larger number of automobile manufacturers. The number of iterations usually has a positive influence on the quality of components[2]. Suppliers may obtain more information and data regarding technological drawbacks and customer needs when they apply a basic component design to components at many different manufacturers. Therefore, manufacturers that procure a component from multi-user suppliers may have a better opportunity to buy high-quality components.

Lastly, when there is an extensive "manufacturer - supplier - manufacturer" linkage, there may be a positive influence on inter-firm learning through the network. Suppliers may learn specific capabilities from transactions with various manufacturers. For example, Toyota's suppliers learned the Toyota production system and increased productivity earlier than other suppliers that did not have transactions with Toyota (Liberman, 1994). Other manufacturers that also bought components from the same suppliers may also have been able to enjoy the benefits from the productivity improvement. Toyota may have also benefited from what suppliers learned from other manufacturers. By increasing learning opportunities, suppliers that deal with many

2 This hypothesis is drawn from our interview with an engineering manager at a major bearing supplier, Daido Metal Corp.

manufacturers may become more productive suppliers than those that have transactions only with a single automobile manufacturer. Therefore, manufacturers that buy components from multi-user suppliers may procure components at a lower cost.

Moreover, automobile manufacturers that share the same suppliers may learn technical or management knowhow from each other through the learning network in which a supplier is positioned at the center. Suppliers could be one of the most effective tools for inter-competitor diffusion of intangible capabilities.

Although this section has discussed the positive aspects of the supplier sharing strategy, which is one dimension representing the quasi-market strategy, there might also be some negative influences. First, by sharing suppliers with competitors, manufacturers may not be able to protect their proprietary knowledge or information from spillover. In automobile technology, however, manufacturers primarily compete over the ways to integrate different components, rather than state-of-the-art technologies for each component (Clark and Fujimoto, 1991). In addition, key technologies such as engine block and engine heads are mostly manufactured internally. The styling of the automobile is also a key competitive factor. Therefore, all manufacturers also internally press external body panels.

Second, a manufacturer's negotiation power over suppliers may be in jeopardy when the suppliers also sell components to other competitors. This may be a problem particularly when the sourcing concentration is high. However, the combination of high supplier sharing and the low concentration may ease this threat.

In conclusion, in this study, we hypothesize that the advantages of the quasi-market strategy, which combines high supplier sharing and low concentration, may surpass the potential disadvantages. Therefore, this section hypothesizes that firms that follow the quasi-market strategy may perform better than those following the quasi-hierarchy strategy. As mentioned earlier, this hypothesis is based on the assumptions that apply to the industrial conditions in the Japanese automobile and component industry. Therefore, external validity could be limited within the assumptions. On the other hand, we believe that the single-industry single-nation study is advantageous in testing the specific hypotheses in this study, because other conditional factors do not have to be controlled.

3. Sample and Data

In order to collect data on the relationship between the sourcing strategy and performance, this study uses a publicly available database (Sogogiken Corp., 1995), which contains a manufacturer / supplier transaction matrix for 235 components. The database includes transactions only for production in Japan. Figure 2 shows an example of the matrix on the fuel filter from the database. The data are only in units not in values. However, we assume that there would not be much differences in results between these two numbers, because the data are on a specific type of component. For example, with respect to the door lock system, the manual door lock and the power door lock systems are separately listed.

Sogogiken collected the 1993-1994 data between December 1994 and April 1995. In order to verify the preciseness of this database, we compared it with another publicly available database developed by IRC Co., LTD. (1994 & 1995), which some other researchers have used in their analyses (e.g., Itami, 1988). We did not find major differences between these two sources of database with respect to the manufacturer-supplier network, even though the IRC database did not have data on sourcing amounts.

Figure 2 An Example of Data from the Database

Component: Fuel Filter (in thousand units / year)

Supplier	Toyota	Nissan	Honda	Mazda	Mitsubishi	Suzuki
Nippon Denso	2258			645	735	194
Kyosan Denki	564					
Tuchiya Seisakusho		1350				
Toyoroki Seizo			898			584
Tokyoroki			100	215	184	
Total	2822	1350	998	860	919	778

This study focuses on the six major car manufacturers in Japan, namely Toyota, Nissan, Honda, Mazda, Mitsubishi, Suzuki[3]. Among 235 components covered in the database, this study uses data on 95 components that satisfy the following two conditions. First, this study

3 Daihatsu and Fuji are excluded because they are not independent, being partially owned by Toyota and Nissan, respectively. One of the primary concepts of this study is the supplier sharing with competitors. Inclusion of Daihatsu and Fuji would bias the data.

focuses only on car manufacturers and excludes components used exclusively for trucks. Industry structure and assembler-supplier network for car industry and truck industry are relatively separate. Second, components that at least one manufacturer internally sources are excluded. As mentioned in the earlier section, influences of sourcing concentration cannot be fairly compared between a firm that entirely outsources a component with others that internally source some portion of the component.

Appendix 1 lists the 95 components in this study. In addition, Appendix 2 shows the characteristics of individual components by plotting them on a figure consisting of two dimensions: the average number of suppliers from which automobile manufactures buy and the average number of automobile manufacturers to which suppliers sell. These appendices indicate that the sample covers a variety of components in the nature of transactions. At the same time, however, because the sample does not include components any one manufacturer internally sources, some major components such as seats and wheels are not in the list.

In order to interpret the data analyses for the discussion section, in 1994 and 1995, we also interviewed purchasing or product planning managers at all six manufacturers in this sample. In addition, we interviewed managers at 19 suppliers during the period[4].

This study measures the first variable, the sourcing concentration, primarily by applying the idea of the Herfindahl index, which is equal to the sum of the squares of the sourcing share from each supplier on a certain type of component. For example, if a manufacturer buys a component from two suppliers, 30% from one and 70% from the other, the Herfindahl index on this component is $0.3^2+0.7^2=0.58$. In order to obtain the sourcing concentration at the manufacturer level, there are three steps of calculation. First, a Herfindahl index for each of the 95 components at each manufacturer was obtained. Second, in order to adjust for the biased influence of different types of component, the Herfindahl indices of the six firms were standardized at the component level. In this way, differences in the sourcing strategy among

4 Suppliers we interviewed include Tokairika, Kojima Press, Daido Press, Aishin Seiki, Araco, TRW Japan, Aichi Kikai, Toyota Shatai, Sumitomo Denso, Zexcel, Nippon Denso, Diamond Electric, Topy, Kayaba, Nihon Hatsujo, Kansei, Calsonic, Houwa, and Nichirin.

manufacturers at the component level can be precisely aggregated. Then, an average of the 95 standardized Herfindahl indices at each firm was obtained.

We also measured other complementary variables related to the concentration dimension. First, a simple average of 95 Herfindahl indices without standardization at the component level was also obtained for each firm. Another potentially important variable is the one-supplier ratio, which measures the ratio of components that each firm buys from a single supplier. For example, if a firm procures 10 components from only one supplier, the one-supplier ratio would be 10.5% (=10/95). As discussed earlier, procuring a certain type of component from one supplier may, in particular, have a negative influence on the firm. We also measured an average number of suppliers each manufacturer procures with respect to the 95 components.

In order to obtain data on the second variable, the supplier sharing index, we first counted the number of car manufacturers to which each component supplier for a certain component sells. If a manufacturer buys the component from multiple suppliers, we averaged the numbers of manufacturers to which each supplier sells. For example, in Figure 2, Toyota buys fuel filters from Nippon Denso and Kyosan Denki. Nippon Denso sells the component to four manufacturers, and Kyosan Denki only one (= Toyota). The supplier sharing index for this component at Toyota equals 2.5, an average of the two. Then, sharing indices for six manufacturers with respect to a certain component were standardized in order to adjust for different types of components. Lastly, we averaged the 95 standardized sharing indices for each firm to obtain a sharing index for each firm. We also measured similar variables as in the sourcing concentration, which included supplier indices without standardization at the component level, and one-customer ratios. The one-customer ratio is the percentage of components for which a manufacturer does not share any suppliers with its competitors.

For the performance measurement of the automobile manufacturers, this study uses the annual operating profit divided by sales in multiple periods ending in March 1994 and March 1995 to avoid any single-year data biases (Kaisha Shikiho, Fall 1995). We do not use changes in performance, because the supplier strategy variables are

also one-time measurements.

4. Results

Table 1 summarizes results from the data analyses. This table shows that there are two distinct groups of manufacturers with respect to the sourcing strategy, those that follow the quasi-market strategy and those that follow the quasi-hierarchy strategy. One group consists of Toyota, Mitsubishi, and Suzuki, which all show characteristics of the quasi-market strategy including both a low sourcing concentration and a high supplier sharing. On the other hand, the second group including Nissan and Honda shows the characteristics of the quasi-hierarchy strategy including both a high sourcing concentration and a low supplier sharing. Mazda seems to be positioned between the two. One-supplier ratio of Mazda is low, but its Herfindahl index is not as low as those of Toyota, Mitsubishi, or Suzuki. The supplier sharing index also seems to be in between. Therefore, we judge that Mazda is in between the two groups.

Table 1 Summary Table

	Toyota	Nissan	Honda	Mazda	Mitsub	Suzuki	Ave.
Sourcing Concentration	***LOW***	***HIGH***	***HIGH***		***LOW***	***LOW***	
Herfindahl Index (Std.)	-0.09	0.13	0.14	0.03	-0.09	-0.12	0
Herfindahl Index (Raw)	0.68	0.72	0.72	0.72	0.68	0.66	0.70
One-Supplier Ratio (%)	25.26	31.58	28.42	17.89	17.89	24.21	24.21
Supplier Sharing	***HIGH***	***LOW***	***LOW***		***HIGH***	***HIGH***	
Sharing Index (Std.) ***	0.14	-0.44	-0.16	0.03	0.05	0.39	0
Sharing Index (Raw) ***	3.45	2.87	3.08	3.35	3.36	3.62	3.29
One-Customer Ratio (%)***	7.81	28.12	29.69	15.62	9.38	9.38	16.67
Avg. Number of Suppliers ***	2.22	2.12	2.01	2.38	2.45	2.12	2.22
(Minimum/Maximum)	(1/6)	(1/5)	(1/5)	(1/5)	(1/6)	(1/4)	
Production '93 (Million Units)	3.56	1.81	1.15	1.03	1.36	0.80	1.62
Operating Profit/Sales (3/94)	**0.94%**	-1.02%	0.75%	-2.50%	**1.63%**	**2.17%**	0.33 %
Operating Profit/Sales (3/95)	**2.52%**	-2.20%	1.29%	-2.10%	**2.55%**	**2.94%**	0.83 %

*** Difference significant at the 0.001 level (ANOVA).

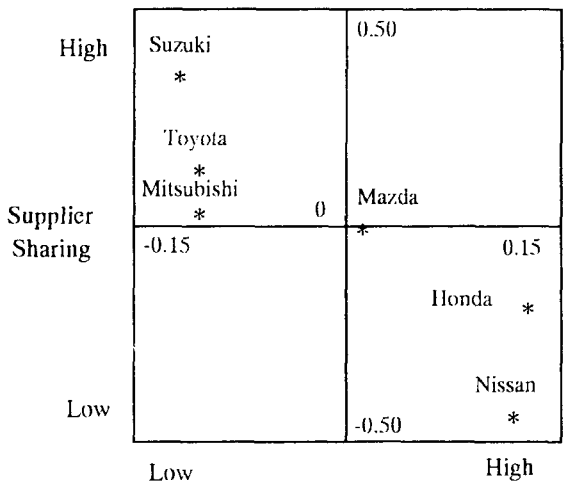
First, with respect to the sourcing concentration, the Herfindahl Indices (Std.) of Nissan and Honda are 0.13 and 0.14, respectively, which are higher than those of Toyota, Mitsubishi, and Suzuki. Even though the ANOVA test did not show that the inter-firm differences

were statistically significant, t-tests revealed some significant differences. For example, the difference between Nissan and Suzuki is significant at the 5% level, and the one between Nissan and Toyota at the 10% level.

The differences in the supplier sharing indices among the six firms are large and statistically significant. There are also two distinct groups with respect to this dimension. The standardized sharing indices of Toyota and Suzuki at 0.14 and 0.39 are much higher than those of Nissan and Honda, which are -0.44 and -0.16, respectively. Those of Mazda and Mitsubishi are in between at 0.03 and 0.05, respectively. However, because the one-customer ratio of Mitsubishi is low and similar to those of Toyota and Suzuki, we categorized Mitsubishi into the group with a high supplier sharing index.

Figure 3 plots the six manufacturers on the two dimensions: the sourcing concentration and the supplier sharing. The standardized Herfindahl index and the standardized supplier sharing index are used for the measurements. It visually shows that Suzuki, Toyota, and Mitsubishi are close to each other and make one group, while Nissan and Honda make another group.

Figure 3 Sourcing Strategy of Six Manufacturers



In Table 1, there seems to be a relationship between a firm's performance, which is measured by the operating profit / sales ratio,

and the sourcing strategy it follows. Manufacturers that follow the quasi-market strategy, Suzuki, Toyota, and Mitsubishi, are the three best performers with respect to the profit/sales dimension in both years. Mazda and Nissan are the two worst manufacturers, while Honda is in between the two groups. There are not much differences in data between 1994 and 1995. Table 2 shows results from the rank-order Spearman correlation among the sourcing concentration, the supplier sharing, and operating profit/sales. Even though this is a crude analysis, there are statistically significant relationships among these variables. Firms with a low sourcing concentration and a high supplier sharing, which are the characteristics of quasi-market strategy, tend to perform better than the other firms.

Table 2 Results for Rank-Order Spearman Correlation Analyses (n=6)

	Operating Profit/Sales 1994.3 / 1995.3	Herfindahl Index (Std.)	Supplier Sharing Index (Std.)
Operating Profit/Sales	1.00	-	-
Herfindahl Index (Std.)	-0.77 * / -0.83 **	1.00	-
Supplier Sharing Index (Std.)	0.77 * / 0.89 **	-0.89 **	1.00

Significant at: ** 5% level, * 10% level

Table 1 contains several other interesting data regarding the manufacturer-supplier structure in the Japanese automobile industry in general. With respect to the degree of sourcing concentration, the data are compatible with findings in existing studies. For example, the average number of suppliers from which each manufacturer procures for various types of components ranges between two and three, and there are, at most, only five or six suppliers (Itami, 1988; Asanuma, 1989). By limiting the number of suppliers, Japanese automobile manufacturers facilitate a close relationship with suppliers, while encouraging inter-supplier competition. It is also interesting to see no influence of the production volume on the number of suppliers. The two largest firms, Toyota and Nissan, do not necessarily deal with more suppliers than other smaller firms.

One of the most interesting data in Table 1, though, is that Japanese automobile manufacturers, in general, tend to share the same suppliers. In particular, one-customer ratios for firms in the first group, Toyota, Mitsubishi, and Suzuki, are all less than 10%. With

respect to more than 90% of the components, these firms share at least one supplier with competitors. This data indicate that the supplier relationship in Japan may be characterized, in general, as "quasi-market" transactions, rather than "quasi-hierarchical" transactions. However, at the same time, this study shows that there are considerable differences among Japanese manufacturers regarding this dimension. For example, Nissan and Honda buy almost 30% of their components from suppliers that do not have interactions with any other Japanese competitors[5].

Data analyses in this section have shown that manufacturers that follow the quasi-market strategy tend to be more successful with respect to operating profit. The data analyses are primitive, especially because the sample size is too limited for the findings to be generalized. In order to supplement the findings, therefore, the next section discusses these and related issues more extensively primarily based on findings in our interviews.

5. Discussion

Considering the exploratory nature of the analyses, this section further develops propositions related to the sourcing strategy in this study. First, in order to understand the findings, we propose an analytical framework that features both the inter-firm relationship dimension and the quasi-hierarchy/quasi-market dimension. Second, we further discuss benefits and negative influences with respect to sharing common suppliers, which is, this study argues, an important feature of the quasi-market strategy. Finally, we argue strategic implications of the sourcing strategy, focusing on ways to consider it as a strategic option.

5.1 Quasi-Hierarchy/Quasi-Market and Inter-Firm Relationship

Many studies on the Japanese supplier relationship have mostly focused on the nature of the inter-firm relationship (Asanuma, 1989; Helper, 1991a and 1991b; Nishiguchi, 1994). These studies have argued

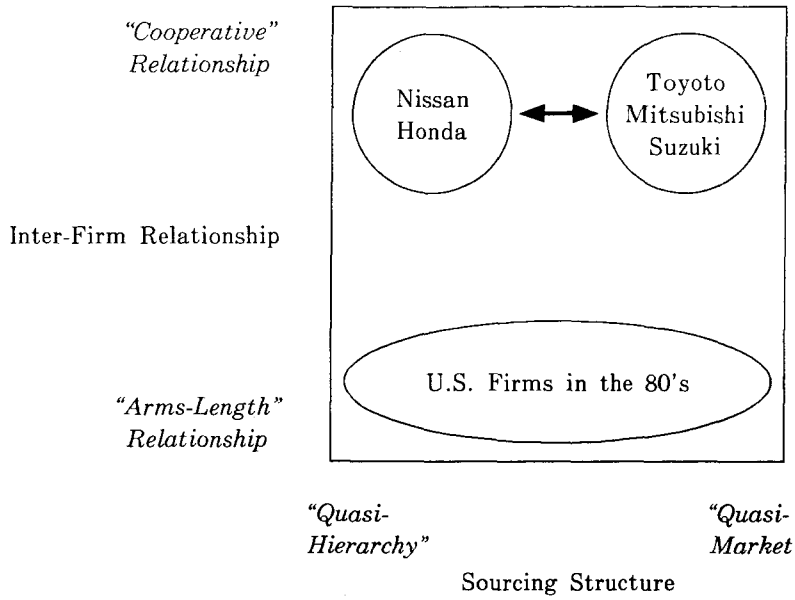
5 As discussed earlier, this study does not include Daihatsu and Fuji. Nissan may share many suppliers with Fuji, which is in the Nissan group. However, Daihatsu, with which Toyota shares the same suppliers even more extensively, is not included, either. Therefore, we believe that the exclusion of Daihatsu and Fuji had a conservative influence on the analyses.

that Japanese system is based on the cooperative relationship, which is much different from the U.S. system that is based on the arms-length relationship. The cooperative relationship is characterized, for example, by an intensive communication for inter-firm coordination and joint problem solving. These studies are important to determine the nature of the dyadic manufacturer-supplier relationship. However, the sourcing strategy cannot be determined solely by the nature of dyadic relationships. This study has proposed a sourcing structure dimension that considers the manufacturer-supplier relationship as part of the entire network of relationships.

Specifically, this study has provided evidence that supports the existence of a sourcing strategy dimension that ranges from quasi-hierarchy to quasi-market characteristics (See Figures 1 and 4). The distinction between the two groups of firms, Group 1: the quasi-market strategy (Toyota, Mitsubishi, and Suzuki) and Group 2: quasi-hierarchy strategy (Nissan and Honda), is actually the difference between firms that benefit from market characteristics and those that do not. Firms in Group 2 follow the quasi-hierarchy strategy that is closer to the one-to-one transaction between a manufacturer and a supplier than those in Group 1. On the other hand, firms that follow the quasi-market strategy may be able to enjoy both the competitive mechanism of the market by reducing one-supplier concentration and the benefits of network externalities by sharing common suppliers with competitors. This strategy is characterized by a more extensive usage of the market mechanism than the strategy firms in Group 2 follow.

It is important to distinguish this dimension from the inter-firm relationship dimension. Discussion of cooperative supplier relationship based on the keiretsu system sometimes seems to create misunderstandings. For example, Takeishi and Cusumano (1995) have mentioned in their extensive literature-survey paper that "*Japanese manufacturer-supplier relations are sometimes thought to be exclusive, with the assumption that only one supplier can enter the market for one automaker.*" In other words, cooperative relationships in the Japanese automobile industry are sometimes directly associated with "quasi-hierarchical" relationships, which, this paper argues, are misleading.

Figure 4 Sourcing Structure and Inter-Firm Relationship in the Japanese Automobile Industry



The framework in Figure 4 distinguishes the sourcing structure dimension from the inter-firm relationship to determine the manufacturer-supplier relationship from both perspectives of these dimensions. The inter-firm relationship dimension ranges from "cooperative" to "arms-length", while the sourcing structure dimension ranges from quasi-hierarchy to quasi-market. Cooperative relationship between assemblers and suppliers may be enhanced by such factors as long-term relationship and joint problem-solving behavior. However, these factors do not necessarily determined by the sourcing structure such as degrees of supplier concentration and supplier sharing.

One of the empirical supports with respect to the independent nature between the inter-firm relationship and the sourcing structure dimensions can be found in Helper (1991a), which has argued that the degree of cooperation or coordination is not necessarily high between an automobile manufacturer and its internal component division that is often a sole source for certain components to the assembler. This finding indicates that even when manufacturers and suppliers form a quasi-hierarchical relationship, inter-firm relationship could be either cooperative or arms-length depending on the nature of management.

With respect to the inter-firm relationship, based on the empirical results of other studies, this study assumes that most Japanese

transactions are through cooperative relationships, compared to those in the U.S. at least in the 1980's (Helper and Sako, 1995). For example, Nippon Denso, which is partially owned by Toyota and is considered as a major Toyota keiretsu supplier, shows cooperative joint product-development efforts even with Toyota's competitors such as Mitsubishi, when it supplies components.

With respect to sourcing concentration, existing studies have already argued that Japanese automobile firms concentrate on a few suppliers to maintain a cooperative relationship with them, and yet try to avoid concentrating on a single supplier. This strategy facilitates sufficient levels of competition between the multiple suppliers, while the competition is carefully monitored by manufacturers (Itami, 1988; Asanuma, 1989; McMillan, 1990). Among the six manufacturers in the sample, three are firms that are more successful in dispersing reliance into multiple suppliers than the others, though. These three firms have also achieved a higher profitability than the others. This finding implies that as long as there is a cooperative relationship and careful monitoring, manufacturers should enhance competitive mechanism among a limited number of suppliers using the quasi-market strategy.

A unique contribution of this study is that our data have also supported the theory that there may be another type of benefit of the quasi-market mechanism, which is related to sharing suppliers with other firms, again as long as cooperative relationship is maintained. The data have shown a positive relationship between the common supplier sharing and assembler's performance. Firms could enjoy various types of benefits related to the positive network externalities by sharing common suppliers.

In conclusion, the data analyses in this study have found that some Japanese firms that extensively use the quasi-market mechanism, while maintaining cooperative relationships with suppliers, tend to be more successful than other competitors. We believe that these leading firms have capabilities in balancing benefits from both the cooperative supplier relationship and the quasi-market mechanism.

5.2 Benefits of Sharing Common Suppliers

With respect to supplier sharing, we have listed three perspectives of benefits from a broad sense of positive network externalities in the hypothesis section. This section further discusses the benefits and

potential hazards behind the benefits.

First, manufacturers, by buying the same type of component from common suppliers, can benefit from the scale economies in the supplier. Even when a supplier manufactures the same type of components with different specifications to different users, it may leverage the same basic design platform, manufacturing equipments, and test results. In our interviews, an engineering manager at Suzuki, which is the smallest firm with respect to production and still has a reputation as a low cost manufacturer, seems to be most enthusiastic in sharing similar components with its competitors. He says that Suzuki often tries to find a component that has already been used by other manufacturers. This kind of component is less expensive because it does not need much investment on new Suzuki-specific manufacturing equipment.

Suzuki, for example, shares almost the same automatic transmission components with Mitsubishi, Daihatsu, and Fuji for most of its mini-cars by sharing the same supplier, Aishin Seiki, with these firms. Honda, on the other hand, does not share the same automatic transmission design with them for its mini-cars and cannot benefit from similar scale economies that the other firms are enjoying.

This type of economies of scale may be more important to smaller firms than to large firms. However, efforts for inter-firm component sharing are not limited to a small firm such as Suzuki. At Toyota, a product planning manager mentioned that it was asking a wire-harness supplier to increase common components with Toyota's competitors that also procure from the same supplier. A large firm such as Toyota is also fully aware of the importance of this type of scale economies.

Second, each manufacturer can buy a quality component from a multi-user supplier. Even when a supplier sells a similar component with minor variations to multiple users, it should test different applications individually in the context of different vehicle models. The number of testing iterations with respect to the basic design platform considerably increases. The frequent iterations improve the basic quality level of a certain type of component. In addition, a manager at Daido Metal, which sells the engine metal to all six manufacturers in the sample, mentioned that they have accumulated much more testing data than its competitors that sell the same type of component to fewer users. The accumulation of the data also contributes to high-quality components in the following periods.

Related to this perspective, an engineer at Toyota also pointed out that when Toyota knows that a certain component has already been used by other car manufacturers, Toyota could sometimes simplify internal testing processes. This type of component has already been tested by the supplier and the market, as well as the assembler that has already used it. On the other hand, a component that is completely new to the firm should be thoroughly tested within the firm from scratch. Therefore, by sharing a component with a competitor, a firm could also save some testing cost.

Third, effective usage of common suppliers may enhance inter-manufacturer learning. For example, an engineer at Toyota mentioned that Toyota used to buy clutch unit mostly only from Aishin Seiki, a Toyota keiretsu supplier, but it was considering to add a foreign supplier. One of the reasons for this strategic change was that Toyota wanted more information about technologies that its competitors and their suppliers were developing. The engineer said that it is risky, with respect to effective information collection, to exclusively rely on a Toyota keiretsu supplier that deals with only one or a few limited customers.

If all competitors share the same supplier, learning within the network may not create much competitive advantage, except for weak firms that could learn from competitive ones. However, if only some manufacturers develop such networks with suppliers positioned in the center, that group of firms may be in a better position to benefit from the inter-firm learning than those that do not participate in this type of network. Even though analyses of a specific network are beyond the interests in this paper, we have found that Toyota, Mitsubishi, and Suzuki, the three best performers, actually have formed this type of relatively exclusive network sharing many common suppliers.

In spite of these advantages, there are disadvantages in the supplier sharing strategy. Sharing common suppliers leads to information spillover that some manufacturers may want to avoid. There are two factors related to influences of the information spillover. First, when changes in technology are rapid, spillover would be a big problem for a technically leading firm. Second, spillover is beneficial to technological followers, while it has a negative impact on leaders. Regarding the first issue, most technologies in the automobile design have not changed fundamentally in recent years. With respect to the

second issue, there may not be much differences in technical competencies among Japanese automobile firms with respect to components this study used. In addition, generally, they do not compete against state-of-the-art technologies, but compete more over organizational capabilities, which cannot be copied easily (Clark and Fujimoto, 1991).

Even though most technologies in the automobile are in a mature stage, there are a few unique technologies belonging to a specific firm. For example, the super-charger system at Toyota and the automatic transmission at Honda, which is called the Honda-Matic, are unique technologies to each firm. In these cases, however, Toyota and Honda entirely internalize development and production of these technologies. When a firm wants to avoid any spillover, it may think about internalization. Therefore, spillover problems may be more related to the make-or-buy decision, which this study does not focus on. The analyses in this paper concentrate on components that no firm internalizes, although we recognize that the make-or-buy strategy is also critically important.

Finally, we realize that the strong positive influence of sharing common suppliers this study found may also be attributed to the timing of data collection especially with respect to the performance measurement. Since the booming economies ended in the early 1990's in Japan, competition among the automobile firms have been based on product price as opposed to technical features (Fujimoto and Takeishi, 1994). If competition was based more on technical innovations with respect to the sample components, there would be stronger negative impacts from the technical spillover that is associated with the supplier sharing strategy. In that case, the benefits of sharing suppliers in some firms could be traded off by the technical spillover to competitors.

5.3 Sourcing Strategy as a Strategic Option

One of the critical issues related to sourcing strategy from the network perspective could be whether supplier sharing is actually a strategic option for manufacturers. For example, manufacturers can not choose the supplier sharing strategy when only suppliers can decide the number of customers they want to or can sell to. There are two approaches to achieve a high supplier sharing. First, a leading firm such as Toyota or Nissan that has already developed a keiretsu

supplier group may have a strategic choice whether to actively encourage these suppliers to sell components to other firms or discourage it. In our interview with a purchasing staff at Toyota, he said that Toyota has been encouraging its keiretsu suppliers to sell components to other automobile manufacturers. Second, a smaller and newer firm such as Suzuki may have more flexibility in its choice of strategy. As discussed above, Suzuki often tries to find a component that has already used in other firms. A manager at Mitsubishi also said that it deliberately bought the same door locking system as the one that Toyota had ordered from a supplier that these two firms shared.

However, in the first case regarding the firms with a strong keiretsu suppliers, a manufacturer's strategic orientation alone cannot determine the degree of supplier sharing. A keiretsu supplier should be competitive enough to sell a component to other users. In the example shown in Figure 2, Nippon Denso, a keiretsu firm of Toyota, sells fuel filters also to Mazda, Mitsubishi, and Suzuki. On the other hand, Tuchiya Seisakusho, a Nissan keiretsu supplier, is not selling it to any other firms in the sample. There are many examples like this. For further comparison, strategies for the entire components in the sample at Toyota and Nissan are shown in Appendix 3. This difference could be outcomes led by different strategies at Toyota and Nissan. However, it may be attributed to a mere difference in competitiveness of these two suppliers.

This issue is even more complicated, because, as discussed earlier, suppliers may improve their competitiveness by selling to more users. Therefore, one hypothesis could be that in the very early period Toyota may have encouraged Nippon Denso to sell to competitors. Over time, Nippon Denso may have been accumulating capabilities through transactions with many customers, which may have helped it become more competitive. On the other hand, Nissan may not have encouraged Tuchiya Seisakusho to supply components to other firms. As a result, in recent years, Tsuchiya Seisakusho may not have the capability to sell the component to other firms, because it is not as competitive as Nippon Denso. We would like to study details regarding this type of dynamism in our future research.

Finally, we would like to briefly discuss the strategy at Honda. The data regarding Honda do not perfectly fit with our conclusions. Honda,

like Nissan, has followed the quasi-hierarchy strategy, which is characterized by a high sourcing concentration and low supplier sharing with competitors, and yet does not perform as poorly as Nissan. Many auto industry experts share an opinion that Honda is the manufacturer that has been focusing on its unique technologies in its competitive strategy. Hirotada Komatsu, a purchasing director at Honda, acknowledged in an interview that Honda tends to stick to its proprietary technologies and avoid sharing common suppliers with its competitors (Japanese Automotive Parts Industry Association, 1995, pp. 68). Honda's differentiation strategy and its engineering capabilities to implement it may have fitted with the quasi-hierarchical approach, in which Honda avoids technology spillover to its competitors.

However, Honda's uniqueness in technologies seems to have been fading and the competition in the industry also seems to have become based less on unique technologies. Komatsu at Honda actually adds a comment in the same interview that under the "borderless" age in terms of keiretsu system, Honda also needs to change its strategy to procure more components from other suppliers in order to be competitive in cost. Therefore, we believe that at least in the Japanese automobile industry, benefits from the network externalities may surpass those from procuring from proprietary suppliers for most components.

6. Conclusion

This study has discussed the sourcing strategy of the Japanese automobile manufacturers, focusing on the sourcing concentration and the sharing common suppliers with competitors. We have found that firms using the quasi-market mechanism in the context of the manufacturer-supplier network tend to be more profitable. This result implies that the leading Japanese automobile manufacturers have management capabilities in benefiting from both quasi-market dynamism and integrated cooperative relationship with individual suppliers.

Even though the data analyses have a clear limitation due to the sample size, we believe that our interviews support our conclusions. In particular, our conceptual discussions and data with respect to the

positive influences of sharing suppliers that form an extensive manufacturer-supplier-manufacturer network should be relevant at least to some other industries. The automotive industry may even have shown rather conservative results, compared to some other industries where de facto standard is a key competitive factor such as computer and audio-visual industries.

However, this study has proposed many potential research areas that need to be studied further. First, we would like to analyze data at the component level, which would provide us with sufficient data points, even though it is difficult to collect performance data at this level. In addition, further study needs to be done in other industries to modify and generalize our findings. As discussed earlier, in industries where technological changes are fast, the quasi-hierarchy strategy at a technically leading firm may perform better because the strategy is appropriate to limit information spillover. Alternatively, however, benefits of the network externalities such as enhanced standardization and inter-firm learning could still surpass the benefits regarding the limited spillover. The personal computer industry seems to be supporting the latter case.

Secondly, in order to analyze the benefits with respect to common supplier sharing, further studies need to be done to analyze more details regarding its positive mechanisms. Specifically, three competitors, Toyota, Mitsubishi, and Suzuki, have formed a network containing common suppliers and seem to benefit from the network. It is important to analyze firms and relationships as part of the network of relationships, rather than relationships only at the dyadic level (Granovetter, 1985; Takeishi and Cusumano, 1995). It is also important to see the mechanism by which Nissan and Honda have been positioned outside the network. Historical studies may be needed to answer this question.

Network of firms, rather than a mere inter-firm relationship, have been attracting more attention in recent years (Nohria, 1992). We believe that this study has proposed one useful analytical tool that may be applicable to studies in other industries. Much more study of the network using a variety of approaches would be beneficial to our research community.

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Appendix 1 A list of Components in this Study

Engine

1 Engine Metal
2 Piston
3 Piston Ring
4 Cylinder-Head Gasket
5 V-Belt
6 Valve Spring
7 Valve Guide
8 Timing Belt
9 Carburetor
10 Elec. Fuel Injection Control
11 Pulsation Damper
12 Circuit Opening Relay
13 Injector
14 Pressure Regulator
15 Throttle Body
16 Idling Speed Control
17 Gasoline Fuel Filter
18 Electric Fuel Pump
19 Mechanical Fuel Pump
20 Fuel Tube
21 Charcoal Canister
22 Air Cleaner
23 Air Control Valve
24 Anti-vibration Rubber
25 O2 Sensor
26 Oil Filter
27 Oil Cooler
28 Radiator
29 Thermostat
30 Battery
31 Alternator
32 Starter
33 Distributor
34 Voltage Regulator
35 Ignitor
36 Ignition Coil
37 Sparkplug

Transmission

38 Clutch Unit
39 Clutch Facing
40 Clutch Master Cylinder
41 Clutch Release Cylinder
42 Clutch Pedal
43 Change Lever
44 Synchronizer Ring
45 AT Lever

Chassis

46 Power Steering Pump
47 Power Steering Hoses
48 Steering Wheel
49 Steering Unit
50 Steering Lock
51 Suspension Springs
52 Stabilizer
53 Brake Lining Pad
54 Brake Wheel Cylinder
55 Break Booster
56 Proportioning Valve
57 Break Hoses
58 Break Pedal
59 Break Tube
60 Tyre

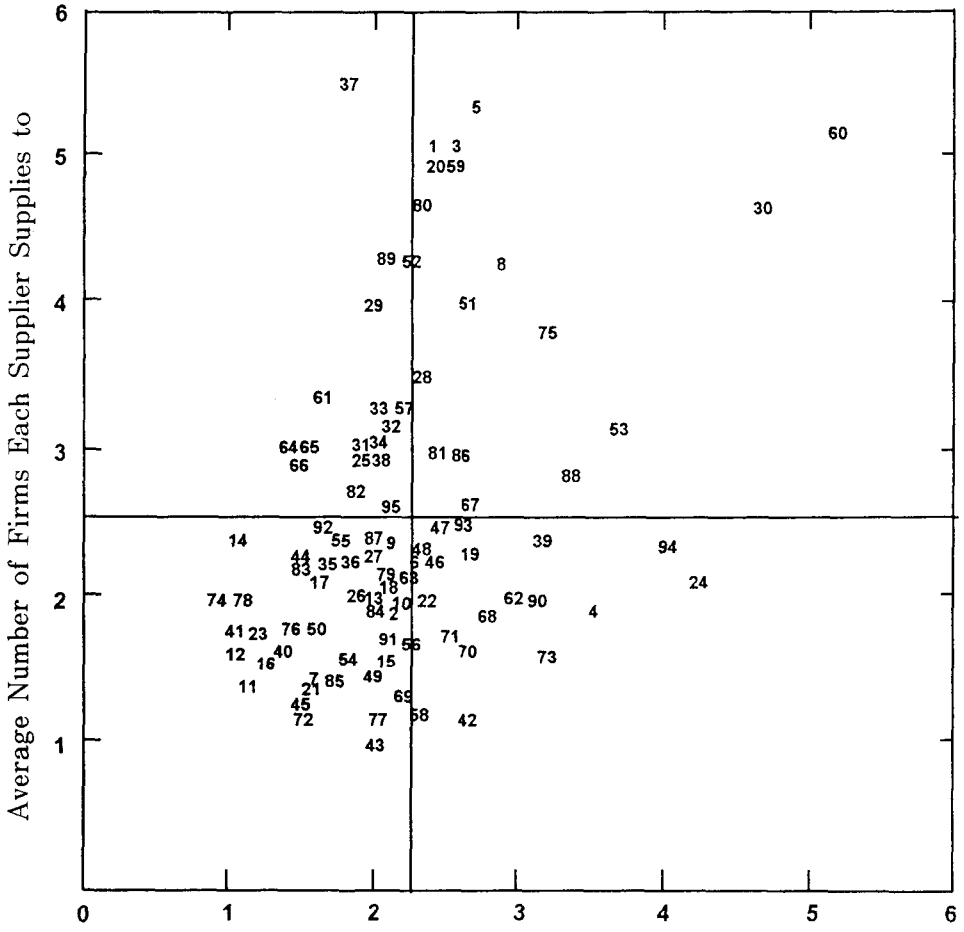
Ex/In Equipment

61 Glass
62 Mirror
63 Side Molding
64 Wiper Assembly
65 Wiper Blade
66 Wiper Washer System
67 Door Weather Strip
68 Wind Regulator
69 Door Handle
70 Door Lock
71 Power Door Lock
72 Door Hinge
73 Headrest
74 Sun Visor
75 Seat Belt
76 Key Sets
77 Ashtray
78 Cigarette Lighter
79 Mark

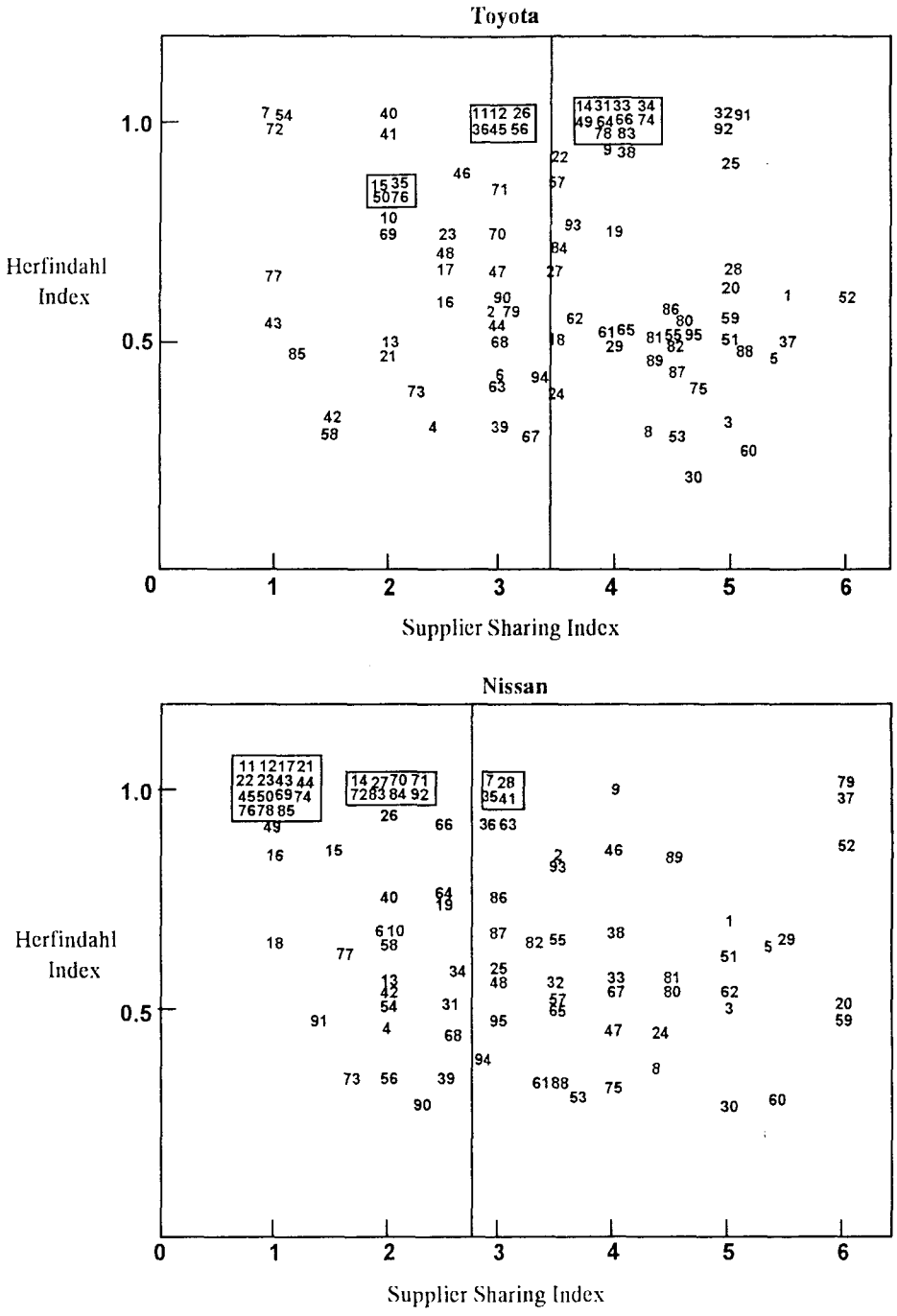
Electric/Electronics

80 Headlamp
81 Rear Combination Lamp
82 High-mounted Stop Lamp
83 Flasher Unit
84 Combination Switch
85 Horn
86 Meter Set
87 Speedometer Cable
88 Wire Harness
89 Junction Block
90 Power Relay
91 Air-conditioner
92 Heater
93 Clock
94 Audio System
95 Control Cable

Appendix 2 Basic Characteristics of the Sample Components



Appendix 3 Sourcing Strategy at Toyota and Nissan



Note: 1) Rectangles in the picture mean that all data points inside the rectangles are supposed to be at the same position at the center of the rectangle. 2) Refer to Appendix 1 for the component numbers.

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VALUE NETWORKS, INDUSTRY STANDARDS, AND FIRM PERFORMANCE IN THE WORLD-WIDE MOBILE COMMUNICATION INDUSTRIES

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Abstract

This paper uses the concepts of enactment and value networks to explain competition in the mobile communication industries. The most successful suppliers of mobile communication services, equipment and phones for a particular technology have been located in countries which have successfully enacted these effective value networks. These effective value networks include suppliers of services and products where the services and products adhere to a communication standard that is widely adopted throughout the world. Although incumbents have by and large been successful in the adoption of competence-destroying innovations, most firms have been trapped by their own value networks and thus have been unable to be successful in more than one generation of technology. Although these firms have and continue to expect technological discontinuities to occur and thus restart the competition between dominant designs, most firms have been unable to participate in or have ignored the competition between dominant designs which has occurred outside of their own value network.

JEL classification: L14; L62

Keywords: Mobile; Communication; Standards; Enactment; Phones; Technology; Management; Innovations; Competencies

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1. Introduction

Changes in technology are accelerating particularly in the information technology industries. For example, waves of technological discontinuities are causing major changes in public (e.g., internet) and private (intranet) computer networks, public wireline and mobile voice communication networks, private wireline and mobile (private branch exchanges) communication networks, and content providers for these networks. These changes in technology are quite different in several ways from the technological changes that have been the focus of most previous studies on technological change.

First, the pace of technological change has accelerated to such an extent that many incumbents expect these changes and thus they have became much more proficient at adapting to these changes than the firms who have been the subject of many past studies (Tushman & Anderson, 1986; Anderson & Tushman, 1990; Utterback, 1994). Many incumbents have been able to adopt both competence-destroying and enhancing innovations (Christensen & Rosenbloom, 1995; Iansiti, 92). When technological discontinuities are occurring once every few years, it is difficult for firms not to be aware these changes are occurring and will continue to occur.

Second, many of the information technology industries that are experiencing these rapid technological changes are network related industries. Since these industries provide network related products and services, network externalities have a strong effect on competition in these industries (Rofles, 1974; Oren & Smith, 1981). The success of individual firms will therefore depend on their successful establishment of industry standards and the creation of these standards will require a subtle combination of collaboration and competition (Asaba, 1995).

Third, these network-related industries are extremely complex. A single firm cannot supply all of the equipment needed to create such a system. In addition to the firms that operate the services and provide content for the services, multiple firms are typically involved with constructing these networks. Furthermore, technological changes are occurring at multiple levels in these network related industries; at the network level (both in service and content), the equipment level, the handset or terminal level, and the component level.

Fourth, the information technology industries are very different

from industries that have previously depended on networks such as the utility industries (e.g., telecommunications, electric power, gas, and water) where regulated monopolies managed the entire system. The regulated monopolies determined the system and sub-system's technological standards, the technologies that would be used in each sub-system, and the way in which complementary technologies would interact. Since the start of deregulation however, the utility and the information technology industries have changed dramatically. New technologies are not being introduced in a controlled manner by a regulated monopoly. Instead, a combination of competition and collaboration are determining the technological standards and the choices of individual technologies in the systems and sub-systems (Asaba, 1995).

Fifth, governments play a much more important role in the information technology industries than in the non-information technology industries and this role is much different from the role they played in the regulated networks. Part of this required role is related to standards and their associated network externalities, but it is also due to the shortages of public resources such as communication frequencies and the large effect that information technology is expected to have on many aspects of society.

Sixth and of greatest import, competition between alternative designs is occurring both at the national and the world-wide level in the information technology industries. Countries are developing different information technology networks in response to different needs, different institutional settings, and different philosophies about competition and technological change. Therefore, there is competition occurring simultaneously between designs at both the country and the world-wide level. Although this competition is first occurring at the individual country level, as different dominant designs emerge in various countries, the competition eventually changes to competition between the dominant designs from a variety of countries.

This study looks at competition in the mobile communication industries which display the six attributes mentioned above. There have been multiple technological discontinuities and additional discontinuities are underway and expected to occur in the future at the network, equipment, and handset level. Network externalities and governments have and continue to play a strong role in the competition between

firms at the country and the world level even with the deregulation of these industries. With each technological change, there has been competition first at the individual country level and then subsequently between dominant designs from multiple countries at the world-wide level.

Further, the technological discontinuities in the mobile communication industries are not just effecting mobile communication networks; they are also effecting public and private computer networks, public wireline voice and data communication networks, private branch exchanges, and content providers for these networks. Since the evolution of the mobile communication networks and the interplay between the mobile and non-mobile communication networks are both country dependent, they will cause each country's information technology networks to evolve in different ways.

Some readers will argue that it is too early to draw conclusions about competition in the mobile communications industry since technological changes are still underway in this industry. The author agrees that conclusions about an industry that is undergoing a great deal of technological change cannot be as robust as those in an industry which has matured. However, most segments of the information technology industries are undergoing similar changes and thus the same argument could be made against trying to explain competition in most segments of the information technology industries. This would be unwise given the importance of these industries.

There are also multiple benefits to such a preliminary investigation. First, such an investigation may shed light on future competition in both the mobile communication and other network-related information technology industries. Second, there is 20-20 hindsight; it is very easy to mold theories to fit the past. On the other hand, the limitations of theories becomes much clearer when they are used to predict a priori the expected technological changes and their effect on competition in an industry.

This paper uses the concepts of enactment and value networks to explain competition in the mobile communication industries. Similar to previous research on enactment, mobile communication firms and their governments have differed in their capability to enact effective environments. In the case of mobile communication it is the enactment of effective communication networks or to use a more general term,

effective value networks that has been central to success in the world-wide market. A value network represents both the nested architecture for a system or product and the nested network of producers and customers in the system (Christensen & Rosenbloom, 1995).

Each technological discontinuity has required the enactment of effective value networks. The most successful suppliers of mobile communication services, equipment and phones for a particular technology have been located in countries or regions which have successfully enacted these effective value networks. These effective value networks include suppliers of mobile communication services, equipment and phones where the services, equipment, and phones adhere to a communication standard that is widely adopted throughout the world. Institutional, philosophical, and market differences have caused countries to create different types of value networks.

In the US and Scandinavia, the early choice of analog cellular standards and the realization of low costs caused the number of subscribers to rise in both the US and Scandinavia. With digital cellular technology, while the US emphasized competition between a variety of standards it was Europe that set an early standard (GSM) which has subsequently been adopted by most of the world. With personal communication services, Japan's early choice of a standard (PHS) and the creation of a system that is much cheaper albeit somewhat functionally inferior to digital cellular has opened up an entirely new market for mobile communication services. It appears that the PHS standard will be adopted by a large number of Asian and South American countries. Further, the emergence of new technologies has already started a new round of competition between dominant designs in both the cellular and personal communication services markets. In particular, the merging of mobile phones, pagers, laptops and personal digital assistants is expected to cause changes in both the mobile and wireline, both public and private, and both voice and multimedia communication networks.

Although incumbents have by and large been successful in the adoption of competence-destroying innovations, most firms have been trapped by their own value networks and thus have been unable to be successful in more than one generation of technology. Although these firms have and continue to expect technological discontinuities to occur and thus restart the competition between dominant designs, most firms

have to some extent ignored the competition between dominant designs which has occurred outside of their own value networks and thus found it difficult to participate in the creation of these dominant designs. Therefore, while US and Scandinavia firms dominated the analog cellular market, it was difficult for US firms to participate in the creation of Europe's GSM standard and the result is that European firms are the leading suppliers of digital cellular technology. Most recently, Japan's Personal Handyphone System (PHS), which has been ignored by non-Japanese firms, appears as if it will enable Japanese firms to become for the first time significant exporters of telecommunications infrastructure equipment and services.

This paper first discusses previous research on technological discontinuities and dominant designs including value networks, network externalities, and enactment. Second, it describes the methodology used in the study. Third, it uses a modified form of Christensen and Rosenbloom's (1995) concept of the value network to explain the success of incumbents or new entrants in the three major (North America, Europe, and Japan) regional markets of the world. Fourth, the paper argues that the most successful firms for a specific technology are from countries that have enacted an effective value network. However, most firms have been trapped by these value networks and have been unable to succeed in the subsequent technology. Fifth, the paper uses the results from competition in analog and digital cellular and personal communication services to predict how competition will evolve in future generations of mobile communication technologies and how this competition will effect public and private wireline networks.

2. Previous Research

There are three lines of academic research which are central to the arguments made in this paper concerning technological change and competition in the information technology industries: 1) technological discontinuities and dominant designs; 2) network externalities; and 3) enactment. The concepts of technological discontinuities and dominant designs were first proposed by Abernathy and Utterback (1978) in the late 1970s. These technological discontinuities have either overturned the concepts that underlay the product (Utterback, 1994) or the product's

architecture (Henderson & Clark, 1990). In several industries, multiple generations of these technological discontinuities have been identified (Utterback, 1994; Anderson & Tushman, 1990; Tushman & Anderson, 1986).

The success of incumbents vs. new entrants has been an important research question within the area of technological discontinuities and dominant designs. Incumbents have usually been the successful adopters when the innovation enhances the incumbent's competencies whereas new entrants have usually been the successful adopters when the innovation destroys the incumbent's competencies (Utterback, 1994; Anderson & Tushman, 1990; Tushman & Anderson, 1986; Henderson & Clark, 1990).

However, studies of recent technologies have found that incumbents have also been successful with the adoption of competence-destroying technologies (Iansiti, 1992; Christensen & Rosenbloom,1995). Christensen and Rosenbloom argue that value networks are a better explanation for the success of either incumbents or new entrants in the adoption of new innovations in the disk drive industry. Their concept of a value network builds off of Henderson and Clark's (1990) differentiation between system-wide and component-based innovations. They extend this concept by demonstrating that many products involve multiple layers of systems and components which they call value networks. These value networks not only describe the nested physical architecture of a product system, they also represent a nested network of producers and markets through which the tradable components are made and sold to integrators at the next higher level in the system. A firm's competitive strategy, in particular, the markets that it has chosen to serve are reflected in the value network that the firm operates within and the firm's position in that network.

It is difficult for a firm to adopt an innovation that best meets the needs of customers that are not within a firm's value network. The formal and informal establishment of a firm's organizational routines tend to focus the firm's attention on existing customers. On the other hand, when an innovation is particularly suited to the needs of existing customers, it is more likely that firms will adopt the innovation, even if the innovation may destroy some of the firm's competencies. This was found to be the case in the disk drive industry. The incumbents developed competence-enhancing and destroying innovations which

helped them better meet the needs of firms above them in their value network (i.e., existing customers) and they did not develop those innovations which would have helped them better meet the needs of new customers (i.e., firms in a different value network). The incumbent's linkages with existing customers and their lack of linkages with new customers caused them to focus on those innovations which helped them meet the needs of existing customers. New entrants developed the innovations that were of interest to new customers (Christensen & Rosenbloom, 1995).

Network externalities have direct and indirect effects on technological innovation and competition in network-related industries (Rofles,1974; Oren & Smith,1981). The direct effect of network externalities is that the value-to cost ratio of a product is a function of the number of users. In the telecommunication industries, the value of a product is related to the number of people with which a person can communicate. For example, although ATT originally had higher charges for calls than the competition in the early 1900s, the ability to make long-distance and overseas calls increased the number of people with whom a user could communicate and thus increased the value of a subscription to ATT (Asaba, 1995)

The indirect effects of network externalities are when the number of users has an impact on complementary products (Katz & Shapiro, 1985; Hayashi, 1992). For example, as the amount of hardware (e.g., MS-DOS computers) available to a particular software type (e.g., Microsoft's operating system) increases (or visa versa), the value of the software increases. In particular, if there are economies of scale as there are with software, the price reductions of software provide substantial positive feedback. Therefore, software producers produce software for the most popular computers and visa versa (Conner & Rumelt, 1991)

The strong effect of network externalities on competition in network-related industries such as the information technology industries increases the importance of creating industry standards which primarily occurs by increasing the number of users. However, the competition between VHS and Beta and between NEC's Series 98 and other personal computers suggest that price and features are not the only factors that increase the number of users and thus drive the creation of industry standards (Asaba, 1995).

Asaba (1995) argues that a subtle combination of cooperation and competition is needed to succeed in both the creation of industry standards and the subsequent competition once a standard has been determined. Firms share information in order to create a standard while they simultaneously create a competitive advantage in order to profit from the fixed standard. For example, in the video disk market, the most profitable firms participated in the creation of a hardware standard and then made their profits through the sale of software.

However, it is still unclear how this subtle combination of cooperation and competition should be carried out. It is particularly unclear how it should be carried out in the information technology industries which are more complex than the cases which have been considered in previous research on network externalities. The networks in the information technology industries are more complex in terms of the number of components, the interplay between service, component, and content providers, and the degree of technological change in both the system network and its components than the cases considered in the previous research. Further, competition at both the national and world-wide level and the role of national governments has not been considered in the previous research.

This paper uses the concept of value networks and enactment to explain competition in the mobile communication industries. Firms enact their environments and these environments include customers and suppliers (i.e., value network), government regulations, labor markets, and sources of technology. However, firms often do not recognize that they are enacting their environments.

In particular, decisions made during a technological discontinuity concerning choice of customers often have a large impact on the firm's subsequent ability to compete.

3. Research Methodology

This research on the mobile communication industries grew out of a study on the management of product development in the cellular phone industry where about 20 interviews where conducted with engineering and marketing personnel in five producers of cellular phones between 1993 and 1995. Questions were asked about project selection, management of project portfolios, management of individual

projects, measures of product performance, methods of reducing cycle time, and market share (Funk, in press). Through these interviews, it became clear that the generational changes in technology and the relationships between cellular phone, base station, and service providers, retail outlets, and the final users are critical issues in the mobile communication industries.

Therefore, a broader set of interviews along with a broader literature search was conducted to understand the key technological innovations in the industry, the effect of these innovations on the incumbent's competencies, the relationships between cellular phone, base station, and service providers, retail outlets, and the final users, and the reasons for success in these industries. These interviews have been carried out during the fall of 1995 and the spring, summer, and fall of 1996. More than 30 interviews have been conducted with engineering, research, marketing, and director level personnel in not only cellular phone companies but also in service providers, base station providers, mobile communication consulting organizations, government agencies concerned with the communication industries, and in universities (communication engineers).

4. The Value Network and the Success of Incumbents or New Entrants in North America, Europe, and Japan

Table 1 summarizes the major technological innovations in mobile communication, the effect of these innovations on the incumbent's competencies, the changes in the value network, and the success of incumbents or new entrants. Although there were mobile communication system predecessors to analog cellular in many countries, analog cellular was the first mobile voice communication system that was available to a large percentage of the public. Digital cellular is now available in most industrialized countries while analog cellular is being phased out in most countries albeit slowly in the US. Personal communication services are being installed in most countries but only Japan has a significant number of subscribers.

In the case of analog cellular, the change in competencies is in reference to wireline technology while for digital cellular and personal communication services, the change in competencies is in reference to analog cellular and digital cellular respectively. As shown in Table 1,

Table 1. Changes in Competencies, the Value Network, and the Success of Incumbents vs. New Entrants in Major Regions (US,Japan,and,Europe)

New Technology	Product Type	Change in Competencies	Change in Value Network	Top Market Share Firms
Analog Cellular	Service	destroying	none	Incumbents
	Base Stations	destroying	none	Incumbents
	Phones	destroying	Deregulation	New Firms Enter
Digital Cellular	Service	destroying	none	Incumbents
	Base Station	destroying	none	Incumbents
	Phones	destroying	Deregulation	New Firms Strengthen
PCS	Service	enhancing	none	Incumbents
	Base Station	enhancing	none	Incumbents
	Phones	enhancing	Deregulation	New Firms Strengthen

Deregulation: Relationship between service provider and handset producer weakens.

analog and digital cellular technology are characterized as competence-destroying innovations. Different models of propagation and attenuation are used in wireless systems (through air) than in wireline (through copper wire or fiber) systems. There are well-developed mod els/rules of thumb that are used to estimate attenuation of signals through copper wires and fiber that do not account for the different types of attenuation that exist in wireless systems (e.g., attenuation in wooded vs. urban areas

Digital cellular technology is also characterized as a competence-destroying innovation. However, according to engineering and research personnel who were interviewed, digital cellular technology requires less new competencies than analog cellular technology. It requires a different set of design skills than those found in analog technology and for this reason it is often characterized as a competence-destroying innovation (Utterback, 1994; Anderson & Tushman, 1990; Tushman & Anderson, 1986; Christensen & Rosenbloom; 1995). Although it has several advantages over analog technology, it has been primarily implemented because it uses the frequency spectrum about twice as efficiently as analog cellular technology.

Personal communication services is characterized as a competence-enhancing technology. According to the engineering and research personnel who were interviewed, most of the technology used in

personnel communication services are not new. The same communication protocols are used in both digital cellular and personal communication services. The major difference is in the size of the cells. While digital cellular systems have cell radii on the order of 1-3 miles, some personal communication service systems have cell radii that are as small as 100 yards. Since the allocated portion of the frequency spectrum can be reused in multiple cells, personal communication service systems use the frequency spectrum much more efficiently than digital cellular systems; potentially as much as 100 times as efficiently. In addition, the small cell sizes enable low power base stations and low power phones to be used that are much less expensive than digital cellular base stations and phones and in the case of phones, have much longer battery lives.

Standards are now being developed for the Future Land Mobile Telephone System (FLMTS). This system is expected to have high speed data communication capability including the capability to transmit moving pictures. It is also expected to integrate existing mobile phone systems by being accessible by phones that are based on most existing analog and digital standards. CDMA is the major candidate for the FLMTS standard.

Multimedia communication is expected to represent a significant percentage of the calling volume in mobile phone services in the future. Although data communication services and terminals already exist (e.g., alphanumeric paging), it appears that mobile phone service providers will begin to take over this market due to the limitations of pagers, the advantages of mobile phones, and the desire not to carry multiple handsets. Pagers have limited data communication and display capability and most mobile communication users also want the capability to communicate with voice. Laptops and personal digital assistants that can be connected to mobile phones via a modem have existed for several years and devices that contain mobile phones have begun to appear. The market for these devices is expected to grow as their prices drop and additional services become available that are accessible by these devices.

5. Success of Incumbents and New Entrants

As shown in Table 1, there is no relation between the effect of the

innovation on competencies and the success of incumbents or new entrants. Success is measured in terms of market share and this is discussed in more detail below. In all cases, the incumbents are assumed to be the providers of wireline service, equipment, and phones before deregulation was introduced in the communications industries. Incumbents have been successful in providing service and base stations while new entrants have been successful in phones.

In mobile communication services, although there have been a number of new entrants due to the ending of national telephone monopolies, wireline service providers have been able to maintain a large share of the mobile service market and their market shares have actually increased following the emergence of digital technology. In the US many of the new small cellular service providers have since been acquired by incumbents such as AT&T, Sprint, GTE, and the Bell Regional Holding Companies (RHCs) who now have more than a 75% market share in cellular services. In Japan, all of the long-distance wireline service companies also provide cellular and personal communications service through a variety of majority owned subsidiaries (Kojima, 1996). In Europe, the national telephone companies still provide most of the cellular service and the recent newcomers are consortiums that include wireline service providers from multiple countries.

Most of the mobile communication equipment makers were and still are the major producers of wireline equipment. Of the top 15 wireline and mobile communication equipment providers, only Ascom, a Swiss provider of small central office switches and Bosch do not produce mobile communication equipment while Motorola is the only mobile communication equipment producer that is not a supplier of wireline equipment or telephones. Motorola made the transition from supplying mobile radios, pagers, and the initial wireless equipment for the predecessor to analog cellular to become the number two supplier of mobile communications equipment in the world (Morone, 1993).

However, new entrants, particularly firms with experience in the consumer electronics industries have been much more successful in the phone market. Motorola and Nokia, neither of whom produce wireline handsets are the two largest producers of cellular phones in the world. Nokia is a producer of consumer electronics products such as televisions and monitors and Motorola is a producer of pagers and it

was a producer of consumer electronics products such as televisions and radios until the late 1970s. In the US, Motorola and Nokia have 40% and 20% of the market respectively. In Europe, Nokia is number one and Motorola is number 2. The remaining firms are primarily Japanese. As is described below, although in the 1980s the strongest Japanese firms were once wireline phone producers, their shares have steadily decreased in the US, Europe and in Japan while the shares of new Japanese entrants has increased.

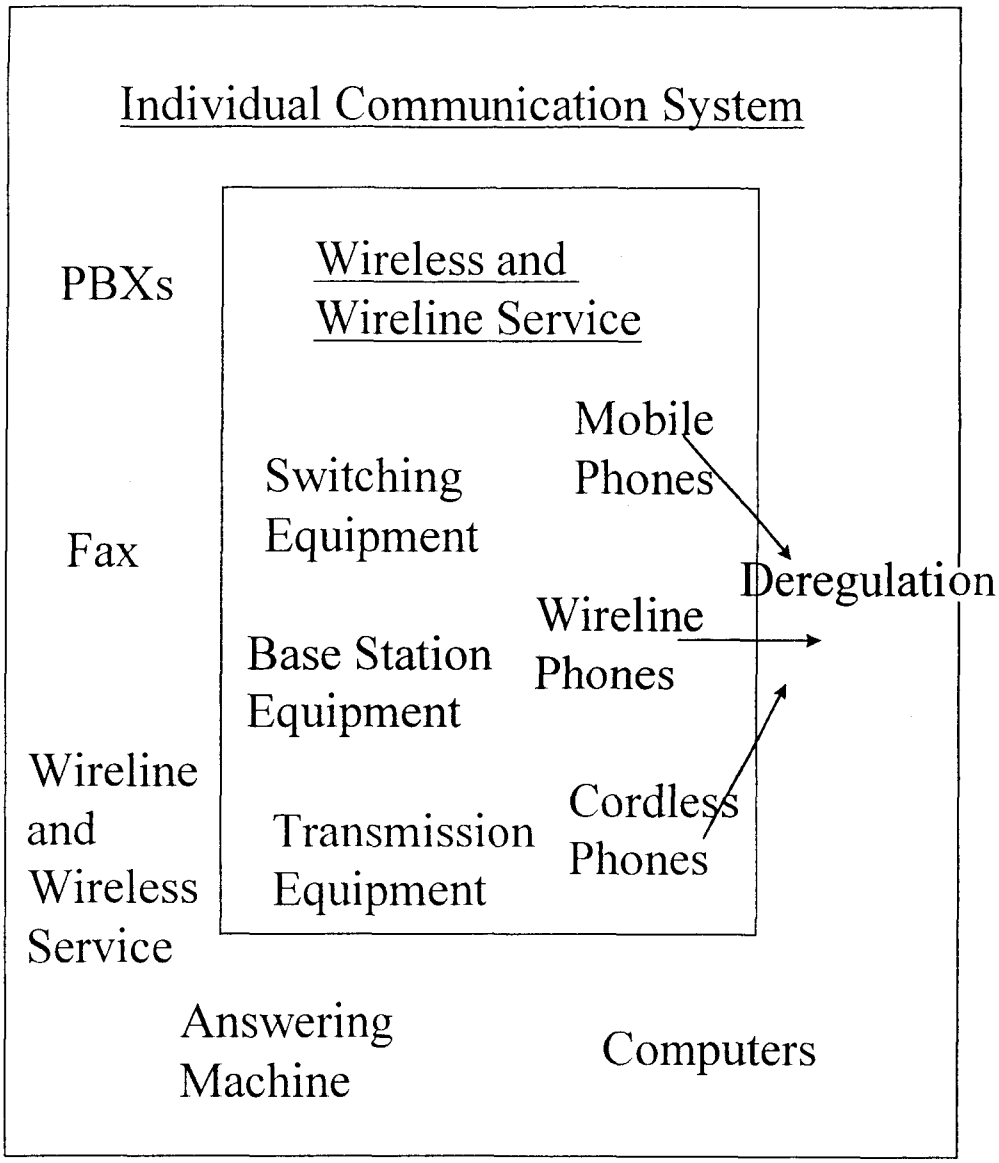
The Value Network and the Success of Incumbents and New Entrants

The success of incumbents in the service and base station markets and the success of new entrants in the phone market can be explained in terms of the value network. Figure 1 shows an example of a value network for the mobile communication and wireline communication industries. Individual businesses or consumers create their own communication systems. They purchase a variety of devices such as phones, facsimiles, and computers along with a wireline or mobile communication service. The wireline service providers construct a communication system with switching and transmission equipment while the mobile communication service providers use switching equipment and base stations.

One important difference between the value network shown in Figure 1 and the value network used by Christensen and Rosenbloom in their study of the disk drive industry is the role of the government and government-industry organizations. All of the devices shown in Figure 1 interact through standards that are created by government agencies and government-industry organizations. Firms attempt to develop and sell products that support adopted standards while also lobbying governments to adopt certain standards that are supported by their designs. In addition, since spectrum space is the limited resource in mobile communication, governments or government-industry organizations allocate spectrum space to various companies which also results in determining the amount of competition in the market.

In the case of service providers there has not been a major change in their value networks at the regional level and thus the wireline service providers have been able to make the transition to analog cellular, digital cellular, and personal communication services. The users of wireline service and their particular needs have not

Figure 1. Value Network for Wireline and Wireless Communication



significantly changed. More importantly, the wireline service providers have used their connections with government agencies to acquire the necessary spectrum space for analog and digital cellular and personal communication services. In the case of digital cellular and personal communication services, since these technologies use spectrum space more efficiently than their predecessors, government agencies have basically forced companies to adopt these new technologies by only

allocating new spectrum space for the new technologies.

There has also not been a change in the value network for base station providers and thus most of the wireline equipment makers have also been able become the dominant suppliers of base stations for analog cellular, digital cellular, and personal communication service. Since most national telephone companies were awarded the initial contracts for mobile communication service, the wireline equipment makers have used their connections with the national telephone companies to understand mobile communication equipment needs and technology and to obtain the mobile communication equipment contracts. More than 70% of the mobile communication equipment orders that have been received by traditional wireline equipment makers have been from the telecommunication authorities. Motorola, which does not produce wireline equipment and thus did not originally have connections with the national telephone companies, has only received 30% of its orders from the national telephone companies. It has been the most successful supplier of equipment to mobile communication service providers who are either new to a particular region (e.g., US service providers who have started services in other countries) or new entrants to the business (USITC, 1993).

In the phone market, there has been a change in the value network and this has enabled new entrants to succeed. However, the way in which changes in the value network have caused new entrants to succeed is different from Christensen's and Rosenbloom's study of the disk drive industry. In the case of disk drive industry, since the new technology was more appropriate for new customers as opposed to existing customers, the incumbents ignored the new technology because they were too focused on their existing customers. Therefore, new entrants become the suppliers of the new technology for the new customers. In the mobile communication industries, when new entrants succeeded in the phone market, it was not because the technology was more appropriate for new customers. Instead, deregulation of the telecommunication market has caused changes to occur in the relationship between phone producers, service providers, and the final users. These changes have enabled new firms, particularly firms which experience in the consumer electronics industries to become the most successful providers of mobile phones.

As shown in Figure 1, these changes were concerned with the

relationship between the handset producers, the service providers and the final customer. The relationship between the service providers and producers has weakened thus enabling new entrants to enter the market. In particular, as deregulation has proceeded, phones have become more like consumer electronics products that are sold directly to consumers for use in their individual communication systems (outside box) without any interaction with the service providers (inside box). This has enabled firms with consumer electronics experience to succeed. For traditional wireline and analog cordless phones, this change has already occurred; consumer electronics firms now dominate these markets in most countries.

For mobile phones, however, the pace at which this has occurred has varied by country depending on the openness of the standards and the tightness of the relationships between service providers and phone producers. Open standards were adopted the fastest in the US where new entrants such as Motorola have replaced the incumbents (e.g., GTE and ATT) as the major suppliers of mobile phones. Japanese firms (e.g., Matsushita, NEC, Mitsubishi, Fujitsu, and Oki Electric) who were also once the main providers of wireline phones in Japan provided the majority of mobile phones in the US in the mid- and late 1980s. However, their shares have subsequently dropped for the reasons described below while a new entrant Nokia has become number 2 in the US market and Motorola's market share has continued to increase.

In Europe, although open standards were not adopted as quickly as in the US, by the late 1980s most countries had adopted an open analog standard such as AMPS, TACS (similar to AMPS) or NMT. New entrants such as Motorola, Nokia, Technophone (subsequently purchased by Nokia) and the Japanese firms mentioned above quickly became the dominant firms. Similar, to the US, the Japanese firms have subsequently seen their shares steadily decrease in Europe during the 1990s for the reasons described below.

In Japan, these same firms who originally provided NTT with wireline phones have also seen their shares of the mobile phone market decrease. However, these changes have taken longer than in the US and Europe because long-term relationships are more important in Japan than in other countries, until recently the standards were not open, and there was little competition between service providers in Japan. Until recently, one firm (NTT) provided most of the mobile communication

services, it controlled the specifications for the system, and it would only work with a certain set of phone suppliers. These suppliers had worked with NTT almost since its inception more than 100 years ago and they held the largest share of the Japanese cellular phone market in the following order (1 Matsushita; 2 NEC; 3 Mitsubishi; and 4 Fujitsu) until the early 1990s.

It was only as other service providers (non-NTT firms) entered the cellular market in the late 1980s and standards were made open in the early 1990s that new entrants have succeeded. As non-NTT service providers have increased their share of service subscribers, their cellular phone suppliers have also increased their share of the cellular phone market. These firms had not worked with NTT on cellular phone development nor did NTT's phone partners work with non-NTT service providers. By early to mid-1990s, new firms such as Kyocera, Toshiba, Motorola, and Sony had become leading producers of mobile phones in Japan.

New entrants with consumer electronics experience have become even stronger in the PHS phone market. The market share rankings for fiscal 1995 (through March, 1996) were: 1) Matsushita; 2) Sharp; 3) Kyocera; 4) NEC; 5) Kyushu Matsushita; 6.)Toshiba; 7) Sanyo; and 8) Casio. Of these firms, four of them are not in the top eight producers for digital cellular handsets and only two firms, Matsuhita and NEC, were providers of wireline phones before deregulation of the phone market occurred. The primary reason for the change in market shares is that PHS communication standards were made open from the beginning and non-NTT service providers have more than 70% of the service subscribers. Both of these factors have enabled new firms to enter and succeed in the market. In particular, the two PHS service providers who together have more than 70% of the subscribers primarily work with non-NTT phone suppliers most of whom are consumer electronics firms.

6. The Enactment and Entrapment by Effective Value Networks

Success at the regional level does not necessarily translate into success in the world market, again measured in terms of market share. Each technological discontinuity has required the enactment of effective value networks. The most successful suppliers of mobile communication

services, equipment and phones for a particular technology have been located in countries which have successfully enacted these effective value networks. These effective value networks include suppliers of mobile communication services, equipment and phones where the services, equipment, and phones adhere to a communication standard that is widely adopted throughout the world.

The adoption of a communication standard that is widely adopted throughout the world is important since the direct and indirect effects of network externalities are very important to mobile communication products. First, the value of a mobile phone is strongly related to the number of people which can be contacted with the phone. For the initial applications of mobile phones, this was not a major issue since most phones were used in a local area and most calls were connected with wireline users. However, as the number of mobile phones has increased, the demand for using the same mobile phone in multiple areas including multiple countries has increased and the demand for calls to other mobile phone users has increased. Both of these trends increase the importance of interconnnectivity between phones.

Second, there are significant economies of scale associated with mobile communication. Although for service providers these economies of scale are also extremely important, this is a different issue than the issue concerned with creating a communication standard that is adopted by a large number of countries.

Countries and service providers choose standards partly based on their forecast of which standard will be most widely used and thus will have the lowest cost phones and equipment in the future. Further, as non-voice mobile communication becomes more important, countries and service providers will choose standards partly based on their forecast of which standard will be used for these applications and thus have the lowest cost complementary products.

Institutional, philosophical, and market differences have caused countries or regions to value the importance of interconnectivity and economies of scale and thus enact different types of value networks including different types of communication standards. The creation of these value networks and the choices of these standards has largely determined the level of success for a firm and a particular technology.

However, few firms have succeeded in more than one generation of technology. Most firms have been trapped by their own value networks

and thus have found it difficult or in some cases ignored the competition between dominant designs which has occurred outside of their own region. Similar to Christensen & Rosenbloom's findings that it is difficult for a firm to adopt an innovation that best meets the needs of customers that are not within its own value network, it is also difficult for a firm to consider dominant designs that are developed outside of the firm's value network. The formal and informal establishment of a firm's organizational routines tend to focus the firm's attention on existing customers and the dominant designs they are considering.

Table 2 summarizes the most successful firms for each technology, the firm's geographical regions, and the standards that underlay the successful value networks. North America (AMPS) and Scandinavia (NMT) each adopted a single analog communication standard and the number of users increased rapidly primarily due to falling prices. Both countries believed that a single standard was necessary in order for connectivity; for example, in order to reduce the risk of obsolescence to early users in the US, the US government required that all subsequently made phones be made compatible with the AMPS standard. The US experienced falling prices through the introduction of competition (a duopoly was introduced in each region) while Scandinavian countries realized falling prices through government oversight. The result of the single standards and the growth in subscribers is that most of the rest of the world has adopted either the US or Scandinavian analog standards and US and Scandinavian firms provide most of the analog service, equipment, and phones in the world.

However, with digital technology, the US used its success in the personal computer industry as a model for setting standards in digital cellular technology. It approved a number of communication standards and encouraged competition between them in the expectation that the best "defacto" standard would emerge. Further, since the needs for digital technology are much lower in the US than in Japan or Europe, the US have been very slow in the adoption of digital technology. The major benefit of digital technology is its greater efficiency in terms of frequency spectrum. However, due to the differences in population density, the US has sufficient frequency space even with analog technology.

Europe on the other hand, had multiple analog standards and

Table 2. Most Successful Firms in the Worldwide Wireless Communication Industries

New Technology	Product Type	Most Successful Firms	Country	Communication Standard
Analog Cellular	Service	AT&T, Baby Bells	North America	AMPS
		Scandinavian	Scandinavian	NMT
	Base Stations	Motorola, Northern Telecom, AT&T	North America	AMPS
		Ericsson, Nokia	Scandinavian	NMT
	Phones	Motorola	North America	AMPS
		Nokia	Scandinavian	NMT
Digital Cellular	Service	European	European	GSM
		AT&T, Baby Bells	North America	TDMA
	Base Stations	Ericsson, Nokia, Siemens, Alcatel	European	GSM
		Motorola, NT, AT&T	North America	TDMA
	Phones	Nokia, Ericsson	European	GSM
		Motorola	North America	TDMA
PCS	Service	Japanese firms?	Japan?	PHS?
	Base Stations	Japanese firms?	Japan?	PHS?
	Phones	Japanese firms?	Japan?	PHS?

wanted to adopt a single digital standard (GSM) in a effort to promote European integration; it was hoped that the same phone could be used in different countries. Discussions concerning a digital standard began in the early 1980s between European service providers, equipment makers and ministries of telecommunications and they occurred simultaneously with discussions to create a single European common market. With expectations for and the subsequent realization of price reductions in equipment and phones using the GSM standard, the rest of the world, including many parts of the US have adopted GSM as the communication standard for mobile communication. The result is that European firms have seen their shares of the mobile communication service, base station, and phone markets increase dramatically.

With personal communication services, it appears as if Japan's standard (PHS) has the greatest chance of becoming a world-wide standard. Japan has adopted a significantly different philosophy than the US and Europe. Through a desire to create a mobile communication system for the masses, Japan has created a system that is much cheaper, albeit somewhat functionally inferior to digital cellular which has opened up an entirely new market for mobile communication. Japan's system takes full advantage of the low cost potential of the small cell, small base station approach whereas the Europe and the US have decided to create personal communication systems that are almost

identical to digital cellular. Because both US and Europe have decided that communication in a fast moving vehicle is a necessary capability in a mobile communication system, their personal communication systems do not utilize as small of cells as the Japanese system and they include complex switching equipment which also raises the costs of the system.

The Japanese Ministry of Posts and Telecommunications would only approve a system that was 1/4 as expensive as cellular technology in order to bring mobile communication to a large number of people. This directive caused Japanese firms to design a very inexpensive system in which calls cannot be made when users are travelling more than 20 miles per hour. However, due to its low cost, there is almost 4 million subscribers and they are increasing at more than 10% each month. Further, more than ten countries have adopted the standard and many people are predicting that PHS will become the standard for personal communication services in much of Asia (Economist, 6/22/96).

Services

The adoption of the US analog standard, Advanced Mobile Phone System (AMPS), by most of the world has enabled US firms to dominate the market for analog services. As of July, 1995, 65% of the awarded analog service and equipment contracts were for AMPS. The result of this large-scale adoption of AMPS by the rest-of the world is that 48% of the cellular service licenses that had been awarded to foreign firms by 1993 had been awarded to US firms while 38% of the cellular services subscribers in the world were provided service by US firms as of 1993 (USITC,1993). GTE, AT&T and the Bell Regional Holding Companies participate as a sole provider or as a partner in 30% of the contracts that offer AMPS-based service (51 out of 177 contracts). On the other hand, they have only participated in 15% of the contracts that offer NMT-based service (12 out of 81 contracts) and 9% of the contracts that offer TACS-based service (5 out of 57 contracts) (USDOC, 1995b).

Similar to the US, the adoption of the Scandinavian analog standard, NMT, by a number of countries has enabled Scandinavian firms to be awarded the second highest number of analog licenses to foreign firms (23%) (USITC, 1993). As of July, 95, 23% of the awarded service and equipment contracts were for NMT (USDOC, 1995b). In particular, most Eastern European countries including Russia and

other countries from the former Soviet Union have adopted NMT and Scandinavian service providers participate in half of the awarded contracts in these countries (Zehle, 1994).

Japanese and other European countries have been much slower to introduce competition and some of them have adopted somewhat unique standards. For example, Germany, Japan, France and Italy were slow to introduce competition into mobile communication services and as a result the growth in subscribers has been very slow. Germany (CNETZ), France (RC2000), Italy (RTMS-450), and Japan (NTT HCS) also initially adopted standards which have not been used much outside of these countries (USITC,1993).

With increased competition in most European countries and the adoption of GSM as a digital standard by Europe and many Asian countries, non-Scandinavian European countries have seen their share of the market increase. As opposed to the case of analog standards where most European countries either adopted a unique standard or borrowed NMT from Scandinavia, Europe as a whole has chosen GSM thus providing European cellular providers with a greater opportunity to provide this service in foreign countries (USITC, 1993).

Equipment Market

Similar to the market for mobile communication services, the most successful equipment producers are from countries which have successfully enacted and exported their value networks. As shown in Table 3, North American and Scandinavian (Ericsson, Nokia) firms have participated in the most analog equipment orders. Further, most of the participation in equipment orders has been when the requested standards are used in the equipment provider's value network (i.e., domestic standards). Ericsson is the lone exception. As the largest telecommunications equipment firm in the world in both the wireline, it has the broadest value network (i.e., largest number and customers) and the most resources. It was able to make a strategic decision to develop expertise in a US standard and subsequently participate in a number of equipment orders that were based on the US standard.

A similar story can be told with the digital equipment orders. Most of the participants in the equipment orders supplied equipment that was used in the equipment provider's value network (i.e., domestic standards). Here, Motorola and Ericsson are the exceptions. Motorola

Table 3. Percent Participation in Non-US Equipment Orders for Both Domestic and Non-Domestic Standards

	Analog		Digital		Both Domestic and Non-Domestic Standards	
	Domestic	Non-Domestic	Domestic	Non-Domestic		
Firm	Standards	Standards	Standards	Standards	Analog	Digital
Motorola	26%	2%	2%	32%	28%	34%
Northern Telecom	12%	<1%	1%	3%	13%	5%
AT&T	12%	<1%	12%	3%	12%	16%
Plexsys	8%	0%	0%	0%	8%	0%
Total North America					55%	43%
Ericsson	13%	21%	39%	5%	35%	44%
Nokia	7%	<1%	22%	0%	8%	22%
Siemens	1%	0%	29%	0%	1%	29%
Alcatel	2%	0%	15%	0%	2%	15%
Other	7%	3%	9%	0%	10%	9%
Total Europe					44%	82%
Japan	6%	2%	0%	1%	8%	0%

recognized early that GSM would become the world-wide standard and it made a strategic decision to invest in both the US and European standards. Ericsson also made a strategic decision to invest in both the US and European standards. Since the data in Table 3 is only for non-US equipment orders, the data in Table 3 does not show the extent to which Ericsson has succeeded in the US market. It is the number two supplier after AT&T in the US market.

The adoption of the European standard, GSM, by most of the world has enabled European firms to become the leading suppliers of base station equipment. European firms were able to increase their participation from 44% to 82% of equipment orders. In particular, Siemens and Alcatel increased their participation dramatically in the base station market. Unlike with analog cellular, they were able to participate in the enactment and export of the GSM based value network. Because of the inability of US firms to enact an effective digital value network, their participation dropped significantly (from 55% to 43%) and it would have dropped even more had not Motorola (see below) also participated in the enactment of the GSM value network.

Mobile Phones

Similar to what has occurred in the mobile communication services and equipment markets, Motorola's and Nokia's mobile phone businesses have benefited from their location in countries that have successfully enacted an effective analog value network. As the AMPS and NMT standards were adopted by the rest of the world, Motorola and Nokia became the leading suppliers of mobile phones in the world.

In digital phones, European firms have benefited from Europe's creation of the GSM standard. Motorola's share in the digital phone market is lower than its share of the analog phone market while Ericsson and to some extent Siemens have seen their shares increase dramatically. Ericsson is now the third largest producer of GSM phones after Nokia and Motorola (total for three firms is about 80%).

Japanese firms occupy many of the other top ten positions in terms of world market share for analog and digital cellular phones. As discussed above, the market share of new Japanese entrants has gradually increased at the expense of the Japanese incumbents as the value network has changed. In addition, Japanese firms have seen their overall market share drop over the last ten years. In the mid-to late 1980s Japanese firms appeared as if they would dominate the world market for cellular phones in much the same way they have dominated other products that require similar miniaturization and manufacturing skills.

However, Japanese firms suffered from both the inability of Japan to successfully enact an effective value network in either analog or digital technology and their lack of consumer electronic experience. Japan enacted analog and digital value networks that revolved around unique standards. These unique standards required Japanese firms to use valuable resources to develop phones and base stations for the small Japanese market. Further, the lack of growth in subscribers (due to lack of competition) coupled with Japan's unique standards and their domestic purchasing and production practices resulted in the use of high-priced domestic components. Although Japanese firms were able to obtain more than 60% of the US market in the late 1980s by selling below cost in the US, a dumping conviction resulted in tariffs as high as 100% which lead to a rapid decrease in Japan's market share.

Japanese firms were much slower than Motorola and Nokia to develop world-wide purchasing and production capability which is

extremely necessary in the consumer electronics industry where razor thin margins are the rule. Unlike the major Japanese consumer electronics firms such as Sanyo, Sony, and Panasonic who began to develop world-wide production and purchasing capabilities in the late 1970s, the Japanese mobile phone producers did not begin to develop these capabilities until the early 1990s after their market shares had declined precipitously in the US. The shares of the Japanese firms have increased slightly since their development of local production and purchasing capability in the US.

With the adoption of GSM as a digital standard by most of the world, Japanese firms have seen their shares also drop dramatically outside the US particularly in Europe. For example, NEC, Matsushita, and Mitsubishi were once the third through fifth largest producers of analog phones in Japan but their shares have dropped dramatically with the adoption of GSM by Europe.

According to representatives of these companies, they were unable to either effectively participate in the standard setting process and effectively obtain patents for the GSM standard. Participation in the standard setting process was necessary in order to simultaneously develop the phones as the standards were finalized. Critical details concerning the standards were not fully available without sufficient participation in the standard-setting process.

Patents were even a larger problem. Foreign firms are required to pay a licensing fee for each patent concerning the GSM standard. For some firms, the licensing fees for all of the necessary patents are more than 10% of the sales of the GSM-related products. Further, the negotiations for these patents was extremely time-consuming and delayed the development efforts by Japanese firms. The increased complexity of the air interface for digital GSM as opposed to analog cellular has increased the effect of this delay.

Although Motorola has also seen its shares in the European mobile phone market decline with the change to the GSM standard, it has succeeded far better than the Japanese firms. Motorola recognized in the early 1980s the importance of GSM and of obtaining patents on GSM. The early acquisition of these patents enabled Motorola to play a larger role than the Japanese firms in the GSM standard-setting process and to obtain other GSM patents through cross-licensing.

7. Future Competition in the Mobile Communication Industries and Its Effect on Other Information Technology Industries

As discussed above, new generations of technology continue to be introduced in the mobile communication industry. Although it appears that Japanese firms have enacted an effective value network in personal communication services technology through their PHS standard, due to a number of emerging technologies, there may be only a 3-5 year window for PHS. CDMA is expected to narrow the cost gap between cellular and PHS since it is about twice as effective as cellular in terms of both the use of the frequency spectrum and the base station cost per potential conversation. It is being introduced in the US, it is being considered by Japan's Ministry of Posts and Telecommunications as the next generation of digital cellular technology in Japan, and it is a leading contender for the standard in the Future Land Mobile Telephone System (FLMTS). The standard for FLMTS will be chosen by the year 2000.

In order for CDMA to become an world-wide standard, however, there needs to be a large number of initial users somewhere in the world in order to convince the rest of the world that CDMA base station and phone costs will decline. Given the slow growth in subscribers and the capacity of existing analog systems in the US, it seems unlikely that the US will be a major consumer of CDMA technology unless virtually all providers of personal communication services adopt CDMA (which is not occurring). Europe will not be a major user of CDMA since Europe is pushing for the adoption of GSM as the standard for FLMTS. Japan has the highest growth in mobile communication users and it has a large shortage of frequency spectrum due to its high population density. However, it seems unlikely that the Japanese Ministry of Posts and Telecommunications and the Japanese service providers will adopt a foreign technology unless they receive a very large benefit from the developers of CDMA technology such as inexpensive licenses to use and subsequently sell CDMA-based products and services.

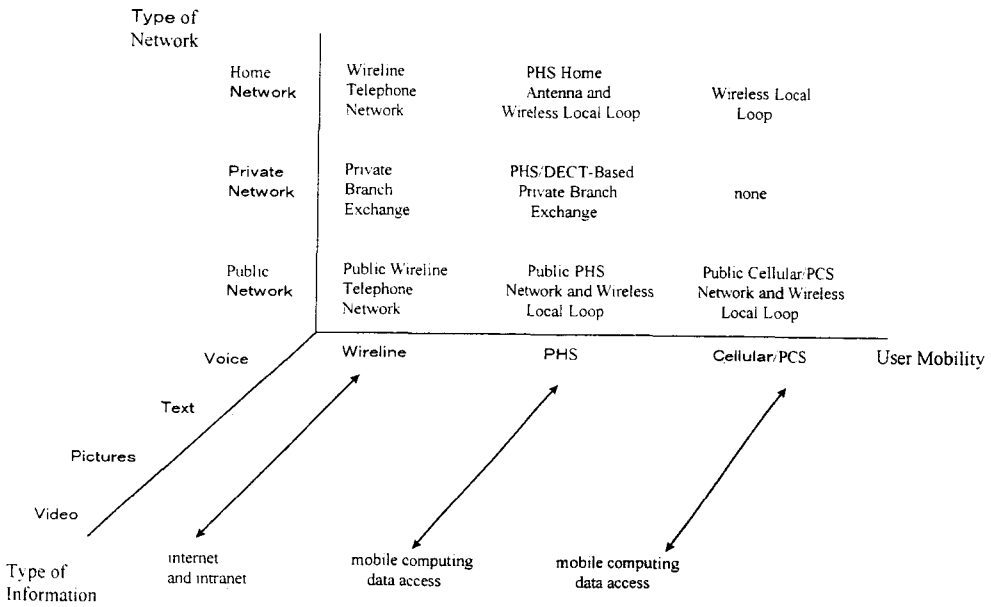
A potentially much larger trend in mobile communication is the move towards multimedia communication and the competition between mobile communication and wireline communication. The move towards multimedia communication represents a large technological

discontinuity in mobile communication. New services and handsets for accessing these services have started to appear, particularly in Europe and Japan where personal digital assistants are very popular. These new handsets reflect a merging of PHS phones, cellular phones, pagers, laptops, and personal digital assistants. A variety of combinations now exist and it is expected that costs will drop and new features will continually be added to these new handsets.

As shown in Figure 2, there is already competition between wireline, PHS, and cellular systems not only in the public systems but also in private and home networks. This competition is causing information networks in Japan, the US, and Europe to evolve in very different ways. PHS and DECT (a European technology that is similar to PHS in the office) -based private branch exchanges allow much greater user mobility in the office for only a slightly higher cost. They are now major competitors to wireline-based PBX systems. PHS home antennas also increase user mobility and they have lower initial costs than Japan's wireline system. Therefore, some Japanese people are subscribing to PHS in lieu of subscribing to NTT's wireline system and this trend is expected to accelerate as the cost of home antennas decrease. Further, in developing countries where wireline phones are still rather rare, wireless local loop is much cheaper and faster to install than wireline phone systems. Six countries have already decided to install PHS-based wireless local loop systems.

As multimedia information becomes available to users of mobile communication, there will be new forms of competition between wireline, PHS and cellular and this competition will most likely cause information networks to evolve differently in Japan, the US, and Europe. For example, if commuters on a train in Japan or Europe were asked about the type of electronic information they would like to have access to while commuting, few would mention access to the internet. They would most likely mention the types of information they already access to on the train in traditional mediums: newspapers, magazines, train schedules, maps, product and service information, and entertainment information on restaurants, bars, and events. Similarly, if people who commute by or work out of their car where asked the same question, they would probably respond in a very similar way except that the information would have to be available in a voice medium for drivers.

Figure 2. Competition between Wireline, PHS, and Cellular in Public, Private, and Home Networks



Access to this information does not require access to the internet. Much of this information already exists in an electronic format and services and handsets for accessing these services are beginning to emerge in Japan and elsewhere. As these services and handsets become widely available and accessed, different dominant designs for information networks in Japan, Europe, and the US will emerge. Eventually, these designs will compete at the worldwide level in much the same way that regional dominant designs have competed in the analog cellular, digital cellular, and personal communication services markets.

8. Conclusions

This paper uses the concepts of enactment and value networks to explain competition in the mobile communication industries. Each technological discontinuity has required the enactment of effective value networks. The most successful suppliers of mobile communication services, equipment and phones for a particular technology have been located in countries or regions which have successfully enacted these

effective value networks.

However, most firms have been trapped by their own value networks and thus have been unable to be successful in more than one generation of technology. While US and Scandinavia firms are the major suppliers of analog-based products and services, the adoption of Europe's standard by much of the world has enabled European firms to become the major suppliers of digital-based products and services. In personal communication services, it appears that the PHS standard will be adopted by a large number of Asian and South American countries. This will most likely enable Japanese firms to become major suppliers of these services and products.

Further, the emergence of new technologies, in particular the merging of mobile phones, pagers, laptops and personal digital assistants is beginning to cause changes in both the mobile and wireline, both public and private, and both voice and data communication networks. Since countries have different information needs, different institutional settings, and different philosophies about competition and technological change, their information networks will evolve in different ways and different dominant designs for these networks will emerge in Japan, Europe, the US, and the rest of the world. Eventually, these designs will compete at the worldwide level in much the same way that regional dominant designs have competed in the analog cellular, digital cellular, and personal communication services markets.

Firms need to be cognizant of how these country-dependent differences in information networks will effect competition in the world-wide markets. Firms are easily trapped by their own value networks in that firms tend to focus on existing customers and ignore changes outside of their own value networks. This is particularly a problem for firms with regional-based value networks.

In the mobile communication industries, firms with the broadest value networks such as Ericsson, Motorola, and Nokia have been the most successful. In particular, Ericsson has used its large customer based in wireline equipment to understand the evolution of dominant designs in a multitude of countries. This has enabled it to be the most successful firm in both the analog and digital technologies. However, it appears that even Ericsson (along with other non-Japanese firms) have overlooked the importance of Japan's PHS technology which is most

appropriate in countries with high-population densities. Since mobile communication will also effect other communication networks and these effects will be different in high-population and low-population density countries, information technology firms need value networks that extend into countries with both high-and low population densities.

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THE EFFECTS OF TRANSPORT INFRASTRUCTURE AND URBAN DEVELOPMENT INVESTMENT IN LONDON'S DOCKLANDS WITH PARTICULAR REFERENCE TO LEISURE AND TOURISM 1970 - 1997

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Abstract

The Docklands redevelopment area is the largest urban renewal programme in Europe. It covers an area of eight square miles (2,226 hectares) and extends for nearly twelve kilometres following the River Thames. This paper traces and analyses chronologically the land use and transport background, the changing planning, technical and social objectives during this period, and the reasons behind the selection of the new transport infrastructure. It further analyses the role and power of the newly created London Docklands Development Corporation (LDDC). The 'Learning Curve' associated with this urban development investment is also considered, with particular reference to (i) the spectacular growth of leisure and tourism redevelopment area, (ii) the incremental nature of the redevelopment; (iii) the major players involved in the success of this redevelopment and (iv) the winners and losers of the changes.

JEL classification: L83

Keywords: Redevelopment; Land uses; Transport planning/Investment; Measurable effects; Accessibility; Tourism/Leisure growth; Learning curve; Entreprenuership; Winners/Losers

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1. Introduction

This paper introduces the unique location of London Docklands. The role that the London Docklands Development Corporation (LDDC) has played in securing the regeneration in this once run down Metropolitan area. The effects and repercussions of change represented together with the importance of enhanced accessibility. The effects for tourism and leisure are particularly highlighted. The causation factors and the 'learning curve' associated with this particular creation of central Government and the implications for private and public sector structural co-operation are also considered. Finally some conclusions are presented.

The paper is presented in six sections.

1. London Docklands Redevelopment - the Location
2. Land Use and Transport Planning - the Historic Background
3. The Observable/Measurable Effects and Repercussions of Docklands Redevelopment
4. The Tourism and Leisure Dimension and Accessibility
5. The Causation factors and the 'learning curve'
6. Conclusions and Open Questions

2. The London Docklands Redevelopment - The Location

"This is one of the largest single urban opportunities in this country up to the present time and to implement redevelopment by 1991 would involve a programme of considerably greater speed than so far achieved in any new town."[1]

"There is no uniquely correct plan for the redevelopment of Docklands. Some sections of community will want one emphasis, others will want another conflicting emphasis. No plan can please all, and in selecting a particular plan the community as a whole will be choosing to meet the demands of some and to turn down, in part or completely, the claims of others."[2] The significance of these perceptive statements made over twenty-four years ago will become apparent later.

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1 These two quotations are taken from the London Docklands Study Team report, Volume 1, published in 1973.

2 As a point of accuracy very small parts of Greenwich (279 ha) and Lewisham (69 ha) were in the 1970s part of the present Docklands area.

The London redevelopment area stretches for nearly twelve kilometres. Its widest portion from north to south is approximately five kilometres. It has a total area of approximately 2,200 hectares (22 square kilometres) of which ten per cent (220 hectares) represents the water area of the enclosed former dock system (Figure 1 Appendix 1).

The most crucial characteristics, however, of the whole area is the River Thames which varies in width from 200 metres. Due to its meandering nature it conveniently divides the Docklands Redevelopment area into five land sub divisions: Wapping, Rotherhithe, Poplar, the Isle of Dogs and the Greenwich Peninsular Silvertown to Barking Creek (including Beckton).

Administratively the redevelopment area was within the confines of the Greater London Council (abolished 1986). It now incorporates former parts of three[2] London Boroughs: Newham (1,126 ha), Southwark (214 ha) and Tower Hamlets (562 ha). These administrations are the statutory plan making authorities. (They will resume their role, when the LDDC leaves the area at the end of March 1998).

London has been a port since Roman times due to the fact that direct access to the sea was afforded by the River Thames. As early as the 16th century both sides of he River Thames in the vicinity of the Tower of London were extensively developed with wharves and warehouses. These docks and facilities became considerably overloaded by the end of the 18th century. This congestion of sea traffic resulted in the building of numerous enclosed docks, between 1902 and 1921 when the final extension to the London dock system was opened (all within the present redevelopment area).

The Docklands suffered very badly during World War II, losing much of its traffic and sustaining extensive bomb damage. After the war mechanisation became widespread, resulting in a reduction in the labour force required. The older docks were not suited to modern vessels and mechanised cargo handling and closures followed.

The first to close was the East India dock in 1967, followed in 1968/9 by the London and St.Katherine Docks. The last ship left the Surrey Commercial system in 1970 and during the following ten years the remainder of the docks were gradually run down. Commercial freight activity of any significance ceased in the late 1970s in all of them.

Complementing the development and the demise of London's docks were population and employment changes (Table 1).

Table 1
Changes In The Docklands Populations (By Boroughs) 1901 and 1951

	Population (thousands)		% Change Borough
	1901	1951	1901 / 1951
Bermondsey MB	131	61	- 54
Deptford MB	110	75	- 32
Greenwich MB	96	90	- 6
Poplar MB	169	73	- 56
Stepney MB	299	99	- 67
East Ham UDC	96	121	- 26
West Ham CBC	267	171	- 36
TOTAL	1168	690	- 11

Source: 1901 and 1951 censuses

During the mid and late sixties the characteristics of London Docklands would have been accurately described as follows:
(i) A run down inner city area
(ii) Very poor public transport
(iii) A predominant proportion of unskilled workers
(iv) General lack of social and cultural facilities
(v) No new business willing to come to the area
(vi) A waste waterscape of abandoned docks and its adjacent landscape

3. Land use and Transport Planning - the Historic Background

Against this economic history and consequent social decline, a number of planning reports and proposals were undertaken for the area in the late sixties and seventies. In 1973 Travers Morgan & Associates produced a most thoughtful and technically future looking report. In their volume one, the implicit overriding aim was to produce a plan for the area which would satisfy physical and social objectives for the area, in particular to create an environment which would utilise the area two most outstanding features, namely, (1) its location

relative to the rest of London, and (2) its immediate proximity to the River Thames. The provision of social amenities and light industry were the key ingredients of the preferred strategy of that time.

In 1974, a Docklands Joint Committee (DJC) was created[3] which was made up of representatives from five London boroughs. This body was entrusted with the task of promoting a development plan for the area.

In 1976, the DJC published the 'London Docklands Strategic Plan' for a target population of 55,000 people. It dealt with such social issues as employment, health, education and recreation as well as its overall land use proposals for redeveloping the whole area was an explicit proposals for redeveloping the whole area. The importance of transport was critical to the plan. Other key requirements for success included:

1. A commitment by central government to invest public money in this area over a planned period.

2. The release of fand at an early stage by large landowners in the area. It was the public utilities, namely the Port of London Authority (PLA), gas, water, electricity and railway undertakings which were the large owners of land.

It is important to note that these public undertakings, together with the local authorities, accounted for as much as 80 percent of land ownership within the plan boundaries. Therefore, although the DJC may be credited with identifying the main social and economic problems and the necessity to control and own land in the docklands, however, it was unable to acquire this land. In 1979 DJC was abolished by the newly elected conservative Government, for by 1980, the Local Government Planing and Land Act was enacted and an Urban Development Corporation (on the British new towns model) was established by the Secretary of State. The London Docklands Development Corporation (LDDC) had a financier (Sir Nigel Broackes, Head of Trafalgar House Group) as similar to that of a private company, but was funded with an initial grant of around £250 million up to 1985, (this figure has risen to around £2,000 million of public

3 This committee was a result of the Local Government Act 1972 (Labour)

money by 1996)[4]. The internal structure, however, is now very similar to that of a traditional local authority, or any other new town corporation, with the usual range of chief officers.

The LDDC is divided into four organisational parts: Wapping and Limehouse, Isle of Dogs, Leamouth and Poplar, Surrey Docks and the Royal Docks, but at its core it had very much a centralised function. The individual directors of each sub area could have the task in theory of virtually competing with each other to initiate and market development[5] /LDDC as a whole uses a criterion of 'leverage' in order to assess the performance between areas.

It is important to note that there is no overall strategic land use plan for Docklands as a whole, in fact LDDC is not empowered to do so[6] in contrast the LDDC prepares a financial and corporate plan for its future strategy for the area, and after this stage relates the objectives to a physical plan of implementation.

The LDDC is able to do this due to the fact it was provided with considerable executive power by central government, which enables it to perform at least six most powerful identifiable functions:

1. To acquire and purchase land (compulsorily if necessary)
2. To hold land as necessary for a prescribed future use as decided by LDDC.
3. To dispose of land as and when it wishes.
4. To plan and build infrastructure as considered appropriate (e.g. the laying of fibre optic cables.)
5. To provide infrastructure services where and when required, e.g. gas, drainage, etc.
6. To plan and promote land for industrial, commercial, housing or to urism/leisure type developments for sale or lease to the private and public sectors.

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4 This figure has been more than compensated by private investment and the high profits occuring to LDDC through land sales especially during its early years due to the sale of land.

5 In practice this was not strictly the case and the markets for which they are competing are often different. In fact the dynamism of the first chief executive together with a corporate strategy tended to dominate decisions.

6 This procedure is completely different from all local authorities in England and Wales, who have to provide a statutory local land use plan for their areas. It should be remembered that there was a weak economic climate at this time in Britain post 1973 oil price crisis.

In addition, since 1984, the LDDC has had the powerful and important option to reinvest any revenues it earns from its activities, e.g. from land sales.

The special powers conferred by a Conservative Government of the era certainly enabled the LDDC to overcome the difficulties DJC had experienced with the former land owners, the utilities and the local authorities. The importance of being able to acquire land quickly and in key locations cannot be emphasised too much.

The three key methods which have been employed for land acquisition in Docklands by the LDDC are:

1. Compulsory purchase at market rate.
2. Acquisition by mutual agreement.
3. Vesting, i.e. transfer of land from one state organisation to another, e.g. from the utilities and from the local authorities to the LDDC. (This power again being conferred by central government).

This last method, although sparingly used, was most important in the early stages of the LDDC programme. It was this fact, together with high guaranteed government funding initially that was a major reason for the new LDDC to take its opportunities and to succeed. The financial acumen of all the subsequent LDDC chairmen, the vision of its first Chief Executive[7] together with the professionalism of appointed staff have all been ingredients in the LDDC achievement since that time.

Turning to the transport planning background, during the post war years public transport provision, comprising bus service to the Isle of Dogs area and rail and bus service to the other parts of the area had decreased both in actual numbers and in efficiency. Throughout the sixties it was hoped to solved the problem with the building of the Fleet Line (later renamed the Jubilee Line) which was to have served the area and increased mobility opportunities for the local communities in Docklands, providing direct access to the whole London subway network. However, it was not built on economic grounds at that time and its rejection to the docklands was followed up by a study of low

7 Undoubtedly, Mr. Reg Ward with his entrepreneurship and marketing abilities contributed significantly at this crucial period.

cost alternatives in 1980*. The passenger traffic forecasts provided at that time ranged from only 2,900 - 3,800 persons per hour in each direction (pphed), travelling to and from central London in the morning peak in 1990, for the proposed bus way and street tram options while 3,400 - 4,300 pphed were predicted for a new light rail system. The variations reflecting the different postulated catchment areas to be served by the different options.

This 1980 study did attempt to highlight the fact that on the basis of its evaluation (although admittedly limited) that 'the transport benefits of the options do not increase in proportion to the investment. A decision on which options to pursue, therefore needed to reflect the importance attached to the social planing and economic benefits and the actual funds available'. The options put forward during this period for further investigation included both a light rail and bus way solution.

A further study in 1982 'Public Transport Provision for Docklands' eventually decided upon an east/west and north/south light rail network system with an estimated capital cost of £65 million. This particular decision being influenced by an earlier independent London Transport report which stated:-

"In the Docklands situation a light rail system would have the following objectives;

a) To link together the main development areas of Docklands without incurring the high costs of river crossings in deep tunnel and to provide a link to central London.

b) To provide an high quality public transport service in terms of frequency, journey time and day to day reliability.

c) To provide an intermediate capacity public transport system appropriate for a forecast demand level of up to some 4,500 passengers in one direction during the maximum peak hour over the heaviest section.

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* Report no. 376/4244/BB/AR 'A Study of Lower Cost Alternatives to the Jubilee Line in Docklands' provides a detailed account of recommendations and the options suggested.

Formal Government endorsement of the scheme came quickly in the autumn of 1982 and was based on a strict cash limit of £67 million for the combined east/west and north/south schemes (later increased to light rail project that further design work determined and suggested that the new system should be an automatic one).

4. The Observable/Measurable Effects and Repercussions of Docklands Redevelopment 1980 - 1996

The physical transformation on the ground of a large part of the 22 square kilometres (8.5 square miles) of once derelict and enclosed land into a high technology, accessible, vibrant, modern area has been quite dramatic to witness. To date the record stands as follows:-

4.1 Transport Infrastructure

The Docklands Light Railway (DLR) initially consisted of a 12.1 km line with a carrying capacity of only around a maximum of 4000 persons per hour in each direction (pphed).

It started operation in August 1987 and immediately added a dramatic commercial visual impact, especially to the Isle of Dogs. This line was built largely on old rail alignments and infrastructure and it cost only £77 million at that time of Government funding. During the same year the highly speculative London City Airport was built and subsequently owned (until very recently) by Mowlem Construction Plc[8] on the site of the Royal Docks, Beckton.

In 1992 the 'catalytic' DLR one kilometre Bank extension was opened. It cost £130 million and was funded by private capital. This event marked the real signal of Docklands existence to the rest of London, via the extensive Underground of the metropolis, (and to the rest of the world!). The much criticised Limehouse dual carriageway road tunnel link was opened in 1993. It is 1.8 kms. long and cost around £450 million.

In 1994 the £ 280 million DLR Beckton extension became operational. The DLR now operates seven days a week (in line with the London Underground schedule) on all routes - the City, Isle of Dogs, Island Gardens, Stratford and Beckton. More than 300,000 passenger

8 London City Airport has recently been acquired by an Irish Consortium

journeys are completed each week and peak capacity to Canary Wharf has been boosted from 15,000 to 24,000 pphed[9] (a dramatic rise from the low capacity railway of nearly a decade ago!).

In summary, London Docklands is now accessible by an extensive new integrated transport network which is to be further enhanced by the opening of the Jubilee line in 1998, and the important extension (especially for tourists) of the DLR to the Cutty Sark, Greenwich and eventually to Lewisham (excepted to be completed by 2000AD). Major road improvements (Canning Town flyover) are also scheduled for completion by 1999. The accessibility section discusses the implication for the tourism and leisure trip later.

Investment in transport infrastructure by LDDC and private capital is summarised in Table 2.

Table 2
Transport And Infrastructure Investment 1981 - 1996

	£ million	% of Total LDDC expenditure
Roads and Transport	638	32%
Docklands Light Railway	310	16%

Note: Total cash expenditure 1981-1996 up to 31 March 1995 was £1,966 million. i.e. Transport took nearly half the budget
Source: LDDC Finance Department

4.2 Housing Infrastructure

Approaching 19,000 new houses/flats have been built in the four areas by the LDCC. The scale and quality of housing, particularly in the Surrey Docks area has been dramatic. Complete and imaginative refurbishment of 'old warehouses' in Wapping and Limehouse also has been spectacular. The building of social housing however would seem very limited (a point that is discussed later). Table 3 summarises LDDC's housing effects.

9 DLR since its inception has been continually upgraded in every facet of its operation signalling track, computer software, etc.

Table 3
Housing Built For LDDC 1981 - 1996
By Area And Ownership

	Private	Housing Association	Local Authority	Total
Isle of Dogs	2,680	625	0	3,305
Surrey Docks	4,873	1,794	114	6,781
Wapping & Limehouse	2,856	376	184	3,416
Royal Docks	2,861	1,746	576	5,183
TOTAL	13,270 (71%)	4,541 (24%)	874 (5%)	18,685

Source: LDDC executive office Housing Database

4.3 Commercial And Industrial Infrastructure

The most observable building in London's Docklands is the Canary Wharf Tower (800 feet/244 metres high). It has fifty floors and is the tallest building in Britain*.

Canary Wharf* however at this stage of its development (end of phase one) comprises approximately 4.5 million net square feet of office space, together with approximately a further 210,000 net square feet of retail space. In fact Canary Wharf extends over 80 acres, containing Canary Wharf (71 acres) and Heron Quays (15 acres) and comprises of some 10 office buildings - a retail cectre, confrence and banqueting centre, DLR station, 4 car park and landscaped grounds. Over 80 percent of the space is currently leased (September 1996) and there are nearly 14,000 people now working at Canary Wharf area.

According to LDDC London Docklands has potential for a further 4 million square metres of commercial and industrial infrastructure. Up to the present time only 2¼ million square metres (36%) has been built.

The commercial and industrial infrastructural development in Docklands 1981 - 1995 may be summarised in Tables 4 and 5 below.

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* Until recently, it was the tallest building in Europe but Frankfurt now boosts this honour!

* Canary Wharf is so named due to the fact that it was the major duck for produce from the Canary Islands.

Table 4 The Total Commercial And Industrial Infrastructure Built By LDDC Between 1981 - 1995 In Docklands

Status	Total Gross Floor Area (million sq.ft)	Total Gross Floor Area (million sq.m)	%
Completed	24.3	2.26	34
Under Construction	0.2	0.02	*
Planned Development	3.5	0.31	5
Potential	42.9	3.99	61
TOTAL	70.9	6.58	100

Note: *Less than 0.5% *Source:LDDC key facts and figures (1996)*

Table 5 The Location Of The New Commercial And Industrial Infrastructure Built By LDDC Between 1981 - 1995 In Docklands

Gross Floor Area (thousand sq. metres)

Status	Isle of Dogs	Surrey Docks	Wapping/ Limehouse	Royal Docks	Total
Completed	1,380.4	368.1	303.2	297.1	2,258.8
Under Construction	5.4	1.3	0.2	8.0	15.5
Planned Development	45.9	138.7	34.0	95.7	314.3
Potential	2,378.5	222.4	184.3	1,205.0	3,990.2
TOTAL	3,810.2	730.5	522.3	1,515.8	6,578.8

Source: LDDC key facts and figures (1996)

4.4 The Tourism / Leisure And Indoor / Outdoor Space Facilities Infrastructure

The newly created tourism/leisure and open space facilities include numerous parks and signed tourist walks especially around Marina developments, e.g. St.Katherine's Docks (now an established London tourist destination).

4.5 Indoor Sports Infrastructure

An all purpose large indoor arena, known as the London Arena, was opened on the Isle of Dogs in 1989. This is one of London's largest single indoor spaces and has been used for various events: pop concerts, exhibitions, sporting events, boxing, etc. It can accommodate up to 15,000 persons.

4.6 Outdoor Sports Infrastructure

A purpose built athletic track and football stadium are now in use. Also a mountain top ski village at Beckton Alps - it is one of the

highest profile outdoor sports facilities in Docklands.

Sailing, board sailing, wet biking, jet skiing and wind surfing, canopying, sub aqua, rowing, as well as fishing are all increasing in intensity, directly as a result of such newly built centres as the Surrey Docks Water Sports Centre. The Shadwell Basin and Canada Water also now offer attractive venue for water sports.

4.7 Some Repercussions

It is claimed by both central Government and the LDDC that London Docklands has been a success story for attracting venture capital - a major repercussion. This is quite true when the accounts are scrutinised. Up to 31 March 1995 the LDDC had invested £1,966 million of public money via central Government Funds (see appendix 1), while the private sector had invested £6,100 million up to this date (i.e. over a fourteen year period) giving a ratio of around 3.2 to 1 (a figure incidentally which is much lower than earlier years when a ratio of 6 to 1 was the norm!).

The inflated increases in the value of land in Docklands, particular on the Isle of Dogs may be analysed as the second major repercussion attributable to the LDDC and its redevelopment policies. When LDDC came to dockland housing land could have been bought for £33,000 an acre. Nearly ten years later, 1990 waterfront land for office development had risen to around the astonishing amount of up to well over £3 million an acre (although this was its zenith*). Housing land varied from £1.2 to £1.5 million per acre in 1995. The current land prices are comparable to the 1990 figures.

It should be noted however the rest of office space per square metre in the 'Square Mile' in the City is still (1996) almost 80% more on average than compareble office space in Docklands.

Certainly all this entrepreneurial activity and the resultant investment especially during the period 1981 to 1990 has some six years later (1996) given Docklands a momentum of its own and financiers are now postulating that critical mass* and has been achieved. A viewpoint to which I would subscribe.

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* Following the 'boom' of the Thatcher years 1981 - 1989 the first half of the 90s saw economic recession in the UK, which in 1996 is beginning again to show upward trends.

* The term is applied by financiers to mean that there is enough infrastructure in place and personnel to generate further investment opportunity.

A third major positive repercussion of Docklands redevelopment is directly attributable to the DLR or more particularly the City extension at Bank. This direct linkage to the Isle of Dogs enterprise zone was the raison d'etre of the Canary Wharf project. Situated in the heart of Docklands and strategically placed between the City (London's established financial centre) and the London City Airport.

Originally it was proposed that the office element would largely be accommodated in three 600 to 800 foot high skyscraper blocks. A number of large public concourses, smaller tower blocks and shopping malls were also incorporated in the plan. However the scheme eventually built, comprises a single massive structure and is integrated with the DLR rail station and soon with the Jubilee extension.

The initial idea and commitment for the project came from a consortium of American and European banking and financial organisations (including Credit Suisse, First Boston and Morgan Stanley). However in 1987 the entire scheme was taken over by the Canadian Development Conglomerate Olympia and York. In 1992 unfortunately this particular organisation went into liquidation and Canary Wharf went into 'administration'under LDDC. However in 1995 a consortium of the North American and Far Eastern investors agreed to buy Canary Wharf.

The scheme was almost entirely within the enterprise zone which meant that the occupiers did not have to pay local authority rates until April 1992, a considerable saving compared to other areas in London. This particular concession however did not represent the major raison d'etre for the consortium. More fundamental, theoretical and pragmatic reasons may be suggested in terms of geography, history and timing. The man-made peninsular of Canary Wharf (just under 3 kilometre long) is located exactly on the 0° Greenwich meridian of longitude. This tends to reinforce Britain's artificially created location as centre of the world, particularly in respect of the important time zones between New York 74° W and Tokyo 140° E. The then Chairman and Chief Executive of Credit Sussie, First Boston (Mr. J M Hennessy) clearly recognised its importance when he stated in as early as 1968 that 'for historical reasons, for cultual reasons, London really is the centre of today's global market place' and it is an important and accepted fact that financial markets operate over a twenty-four hour time cycle.

The timing of this project in relation to the 'Big Bang' may be considered important and cannot be over emphasised too strongly. In December 1986 the New York Chairman of Merrill Lynch Capital Markets (Dr. Michael von Chemn) summed up the situation quite succinctly: 'One has to create a new kind of working space for firms which are trading in securities and money and exchange on a global basis. These very large financial trading firms are soffering in terms of costs and efficiencies and management control because their operations are scattered in different locations in the existing Square Mile ... the City of London is not able to provide this kind of space ... that is why Canary Wharf is so exciting, it is an unbelievable historical coincidence of an overriding need being met by an extraordinary urban development in just the right location.

The fact also that LDDC had thoughtfully laid out much of Docklands with a fibre optic cable network meant that good telecommunications was assured - a most important factor for modern business.

Certainly the existing 90 million square feet of office space located within the Square Mile can only be increased gradually in the short term. Even allowing for some relaxation in planning controls which came about in early 1986 and which did allow for the creation of substantial floor space. Initially City of London local government planners were understandably, unofficially, against the Canary Wharf project, They realised (almost certainly correctly) that the City's dominant role as a provider of very lucrative office space would be partially undermined by the consortium's development. In September 1996 however both locations would appear to be benefiting from each other, and the 21st century is likely to witness a twin financial role on a world scale for the two centres! (see Conclusions and Open Questions Section).

Two negative and disturbing repercussions of the Docklands redevelopment are already identifiable. The indigenous local residents (largely unskilled and predominantly council house tenants) for whom the numerous plans produced by the consultants and the local authorities in the early seventies were really intended, are becoming completely overwhelmed by the scale, type and pace of development. Clealy of the new private housing the majority developments are predominantly targeted at the very wealthy. The price of a number of

units being within £0.25 milion category, thus this area is becoming one of the most expensive in London. A memorandum prepared by the ex Greater London council and the local neighbouring Tower Hamlets Council recognised in the mid 80s that one of the most controversial issues in Docklands is the question of how much and (and money) is allocated for public housing by LDDC. The surrounding boroughs however are short of land for public housing but now cannot afford to buy in Docklands. This repercussion is still a major concern for the 50,000 'non rich' population. Written abuse in the form of graffiti with the slogan 'People before Profits' may still be seen in some parts of the area, as a direct and honest response to what has happened. The relative housing stock created by LDDC 1981 - 1995 (Table 3) shows that only a ratio of 5 to 7 percent private housing.

According to Phillips, R, Chairman 94/95 Docklands Forum (a social pressure group) "The LDDC is set to finally exit in March 1998. From the lead up to that date, it is pursuing land sale programmes with added vigour leading to even more houses for sale and little social housing for the communities."

Axiomatic to the highland values being paid for office, leisure/ shopping, leisure and housing developments, this policy has had the effect to 'squeeze out' existing local industries (employing predominantly local labour) with little or no chance of them being able to afford to return even to an enterprise zone (when it existed 1982 - 1992) presumably created originally on their behalf. Again the vast majority of long term jobs being created are in the tertiary sector and not suitable in the short term at all for the traditional 'blue collar' worker from the east of London. However this particular problem is tends to resolve itself.

It will be interesting for new owners and the multi international tenants and others to witness Canary Wharf's future in the next century. Will it become a ture satellite of the City or vice versa? They could be destined to become the major geographically twin financial centres of the world which long term should benefit Britain's economy and position in the world! A discussion of these ideas is given later.

5. The Tourism/Leisure Dimension and Accessibility

Post LDDC during the 80s and especially the early 90s, accessibility

to London's Docklands has undergone a revolution by rail and air. Apart from the pragmatic need of good accessibility for the people who now work and whose numbers are likely to continually increase in Docklands, tourism and leisure activities have gained enormously from the enhanced accessibility. In certain cases the Water Sport Centre at Surrey Docks would argue that good accessibility is its raison d'etre. Looking at each new accessibility mode in turn, the following features emerge:

- **Rail**

The Jubilee Line extension will provide the necessary accessibility for many passengers using the line for leisure and tourism. The benefits of this accessibility have not been included in an analysis, because their diverse nature makes quantification difficult, but are likely to be significant particularly to occasional users. A large umber of existing (already described) and planned leisure facilities will be served by the extension. Also access from south east London to the West End and Wembley Stadium and from the whole of London to the South Bank will be greatly increased once the Jubilee Line is completed by the year 2000 AD.

Other main line (ex British Rail) routes do and will make a major contribution to bringing visitors and workers to and from the area, especially when certain rail infrastructure developments become operational in the next millennium.

- **Road**

The Department of Transport's A B trunk road, together with the Docklands Highway and its infamous Limehouse link provide good road accessibility to the area when some other major junctions are completed accessibility will be even further enhanced. The proposed East London river crossing again (by road tunnel) again will consolidate Docklands as a major focus North and South of the River Thames by car or coach for would be tourists!.

In 1996 approximate and average driving time from the City (Bank) to the Canary Wharf is around 15 minutes. The City Airport from the Canary Wharf is also around 15 minutes while Canary Wharf to the M11/M25 is around 30 minutes. All these times are subject to the congestion conditions.

- Air

Docklands can boast its own airport, London City Airport (LCY) opened in the Royal Docks, the runway actually being built on a former Wharf. It has an expanding network of direct routes to Europe and other major business centres. Almost 650,000 passengers used LCY in 1996 - a 25% increase since 1994.

Destinations include Antwerp (YLM); Augsburg / Cologne (Augsburg Airlines); Berne (Air Engiadina); Brussels (Sabena); Dublin (Virgin Atlantic Cityjet); Frankfurt (Lufthansa), Geneva (Crossair); Lugano (Crossair), Paris (Air France Express and Airject);Rotterdam (KLM); Zurich (Crossair); Dusseldorf (KLM); Amsterdam (World Airlines); Milan (Alitalia). Low noise jet aircraft mainly serve these services.

London City Airport was bought in October 1995 by Irish businessman Dermot Desmond from the construction group, John Mowlem & Co. Plc for the sum of £23.5 million. (Dermot Desmond is Chairman of International & Underwriting Limited based at Dublin's International Financial Services Centre).

Since the early 1990s LDDC have undertaken visitor surveys. Tables 6 and 7 summarise the main attractions visited and the reasons for visiting Docklands. Enhanced accessibility (although at high public cost) has certainly been the major factor in making Docklands an important tourist attraction for visitors to London. An average of 1.5 million visitors were recorded of the years 1995 and 1996 .

6. The 'Causation' Factors and the 'Learning Curve'

In essence the Docklands regeneration to date represents a classic case history of generally uncoordinated, fortuitous and incremental decision making. Certainly LDDC's market led approach, has been highly successful in encouraging the developers to take advantage of the land availability. Not that the developers needed much wooing with the accelerating high demand for offices for the financial and ancillary sector, by domestic and international companies (post 1979) new Exchange Control Regulations), also the guaranteed accessibility provided by the new light rail system (although its needed capacity was completely misjudged at the time).

This accessibility factor was particularly enhanced by the decision

Table 6 Major Attractions Visited By Leisure Vistors/Tourists Intending To Visit(1994)*

Canary Wharf	29%
Docklands Light Railway	28%
St Katherine's Docks	26%
Island Gardens	24%
Hays Galleria	22%
Butlers Wharf	21%

* Respondents could choose more than one option
Source: London Docklands Visitors Survey's 1991, 1992, 1993, and 1994.

Table 7 Reasons For Visting Docklands*(1994)

Just to look around	41%
See the architecture	13%
Greenwich / Cutty Sark	12%
Tower Bridge	10%
Design Museum	10%
Tower of London	9%
Canary Wharf	7%

* Leisure visitors only
Source: London Docklands Visitors Survey's 1991, 1992, 1993, and 1994.

(rather late in the day) to build automatic light rail system, which provided the forward looking and high technology image* for Docklands, which was exactly what was needed in the early 80s period. Two other critical factors may also be postulated for the regeneration the strong powers which were given to LDDC by central government, enabled the 'vesting' procedure to overcome the hitherto stubbornness of the utilities releasing strategically placed land. This being placed subsequently on the open market by LDDC. An injection of government funding at this critical period was also fundamental importance.

The last but undoubtedly the major significant factor is Dockland's location, close to the major established financial centre of the world - the City of London. The fact also that part of Docklands lies symbolically exactly aside the O' meridian gives it a perceptive edge in

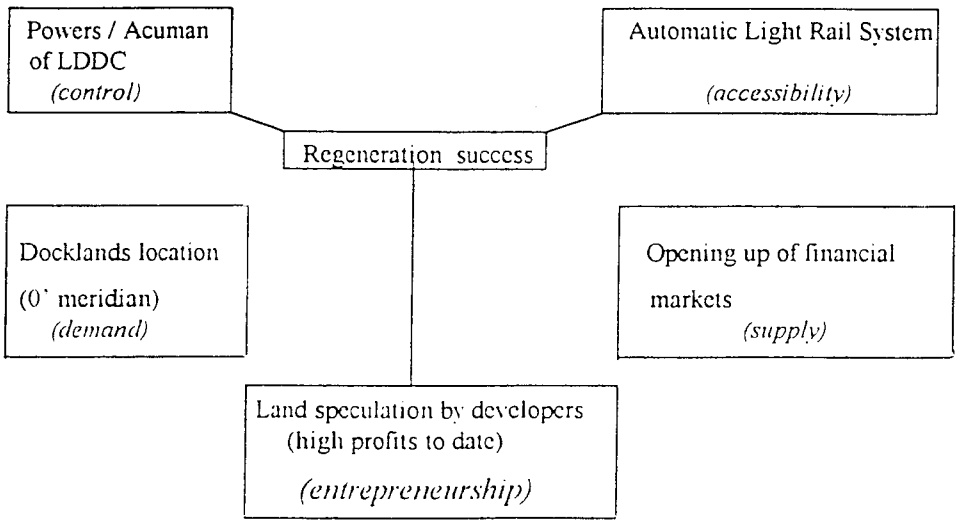
the 'global' world of revolving finance.

It is highly probable tat if there had been an absence of any of these factors/cornerstones present especially during the period 1980 - 1990 (together with the 'developer'), it is most unlikely that London's Docklands would have been regenerated in such a rapid and spectacular way (figure 4).

Certainly the 'learrung curve' has shown the power of the LDDC and the strength of this type of quasi governmental strucure to 'get things done'.* However, the character of Docklands' regeneration 1980 - 1996 would indicate that the LDDC has not been orientated or motivated directly towards the local and social needs of the former population and employers of the ares, which was clearly the main objective of the regeneration plans produced in the 70s. The 'on the ground' evidence reveals that the needs of the developer and more lately the demands of new high income residents have received most attention.

Although the LDDC Is responsible to the Department of

Figure 4 The Major Causal Factors In Docklands' Regeneration 1980 - 1996



* It is doubtful however if any future urban development corporation in Britain even if given powers to LDDC will be bale to achieve so much so quickly due to the unique location of Docklands.

Environment there would appear to have been few checks and balances exercised throughout the period (especially during the Thatcher era).

7. Conclusions and Open Questions

An overwhelming conclusion of Dockland Redevelopment 1981 - 1997 must be the incremental (sometimes dramatic) sequence of change. These changes have illustrated (i) definite 'laissez faire' market led approach by a powerful LDDC, (ii) the increasing importance of the Canary Wharf location. The bias has been (at least post '85) towards offices, high income housing and leisure and tourism generation facilities. The 90s undoubtedly was and is characterised by high investment in transport infrastructure to enhance accessibility to the area especially the Canary Wharf development. For example, the very expensive 1.8 kilometre Limehouse road link (which incidentally has been criticised by the Government's spending watchdog!).The main beneficiaries besides the office commuters of this increased accessibility to the area and its attractions old and new will be the tourist and leisure traveller (as indicated in an earlier section). It is highly Docklands.

It is highly likely over 2 million tourists a year will be visiting the area by the turn of the century, with the consequent economic and social effects positive and negative. The losers in part have been the local population especially those blue coller workers which have lived in the area for generations. It will be interesting to see whether Southwark, Tower Hamlets and Newham, i, e. the boroughs that will be responsible for planning and policy of the area post March 1998 will be able to redress this imbalance of social provision via their urban development plans (especially in the Isle of Dogs and Surrey Docks areas). Clearly the past discussions of the LDDC will determine the destiny of the area for decades to come and certain trends will be unavoidable, for example, a steady rising resident population and accelerated number of employees working in Docklands. Three interesting questions may therefore be posed:

(1) What type of place is Docklands really destined to become in the twenty-first century? A vibrant 24 hour inner city activity generator or more sterile and grandiose office complex? Given the

mixture of expensive private and social housing-will demarcation lines be firmly drawn? Will security against rising crime in certain affluent residential sector result in a bleak environment where guard dogs and electronic surveillance become the norm?

(2) Was a truly unique opportunity lost to create a 'Venice' type environment for local people, employed in local type manufacturing or service trades as was envisaged by Travers Morgan and Associates in the early 70s, that would have certainly satisfied the sustainability arguments of the present time? Maybe physical planning is too difficult and 'no unique correct plan for redevelopment' is ever possible in the changing and continuing 'urban dynamic' of human existence?

(3) Are the Royal Docks and Beckton development destined always to be a very poor second compared to the quality scale of the Isle of Dogs and the Surrey Docks area.

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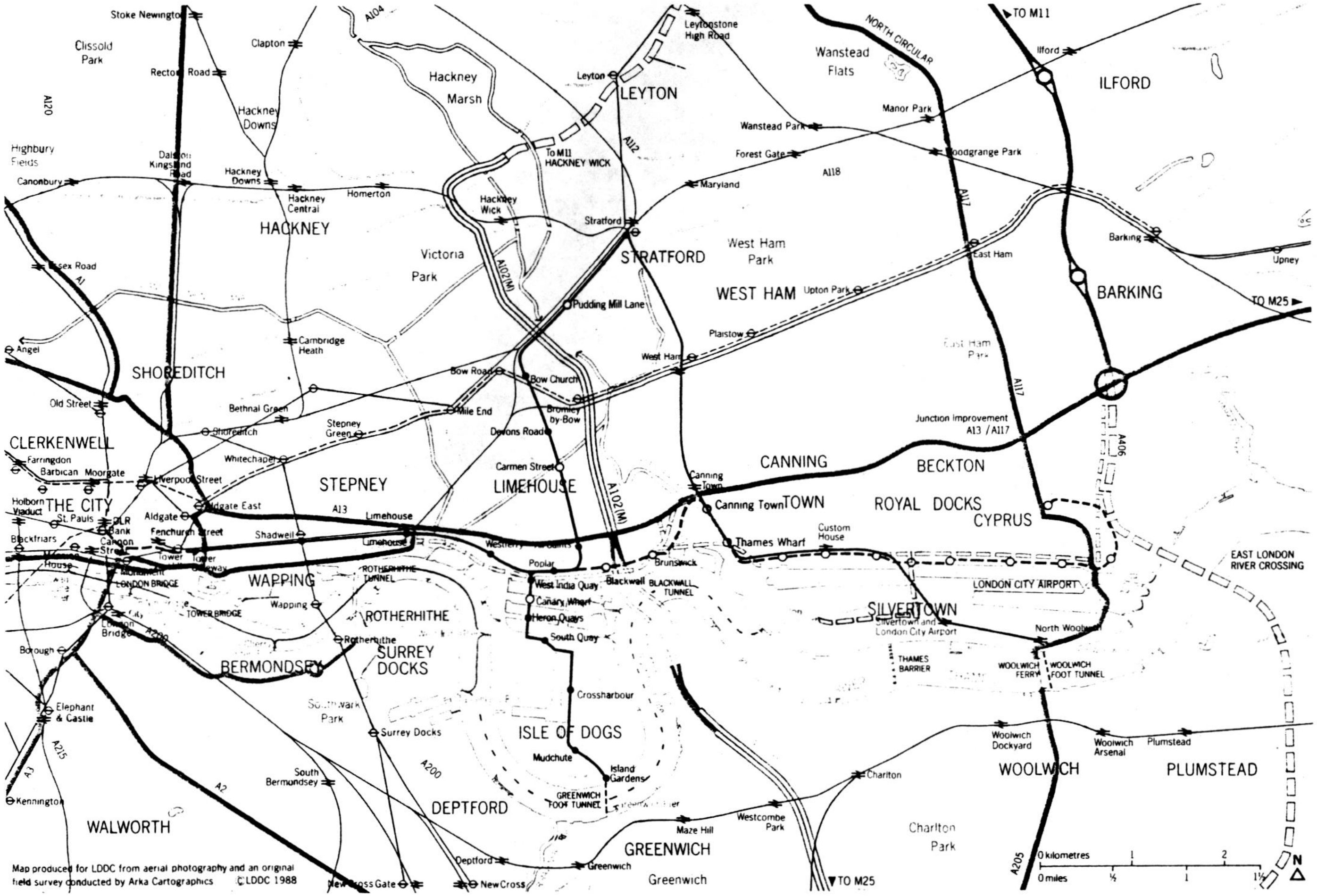
APPENDIX 1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Homerton
HACKNEY
Victoria Park
Essex Road
Angel
SHOREDITCH
Cambridge Heath
Old Street
Bethnal Green
Stepney Green
CLERKENWELL
Farringdon
Barbican
Moorgate
Liverpool Street
Whitechapel
STEPNEY
THE CITY
Aldgate East
Aldgate
St. Pauls
Bank
Fenchurch Street
Shadwell
Limehouse
Blackfriars
Cannon Street
Tower Hill
Tower Gateway
LONDON BRIDGE
WAPPING
Wapping
TOWER BRIDGE
ROTHERHITHE TUNNEL
ROTHERHITHE
Rotherhithe
London Bridge
Borough
BERMONDSEY
SURREY DOCKS
Elephant & Castle
Southwark Park
Surrey Docks
South Bermondsey
Kennington
WALWORTH
DEPTFORD
Deptford
New Cross Gate
New Cross
Greenwich
GREENWICH
Maze Hill
Westcombe Park
Charlton
Charlton Park
Leytonstone High Road
Leyton
LEYTON
To M11 HACKNEY WICK
Hackney Wick
Stratford
STRATFORD
Pudding Mill Lane
West Ham Park
WEST HAM
Upton Park
Plaistow
West Ham
Bow Road
Bow Church
Mile End
Bromley by Bow
Devons Road
Carmen Street
LIMEHOUSE
Westferry
All Saints
Poplar
Blackwall
BLACKWALL TUNNEL
West India Quay
Canary Wharf
Heron Quays
South Quay
Crossharbour
ISLE OF DOGS
Mudchute
Island Gardens
GREENWICH FOOT TUNNEL
Wanstead Flats
NORTH CIRCULAR
Wanstead Park
Forest Gate
Manor Park
Woodgrange Park
Maryland
Ilford
ILFORD
TO M11
Barking
BARKING
Upney
East Ham
TO M25
East Ham Park
Junction Improvement A13 / A117
CANNING TOWN
Canning Town
BECKTON
ROYAL DOCKS
CYPRUS
Thames Wharf
Custom House
Brunswick
LONDON CITY AIRPORT
EAST LONDON RIVER CROSSING
SILVERTOWN
Silvertown and London City Airport
THAMES BARRIER
North Woolwich
WOOLWICH FERRY
WOOLWICH FOOT TUNNEL
Woolwich Dockyard
Woolwich Arsenal
Plumstead
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Map produced for LDDC from aerial photography and an original field survey conducted by Arka Cartographics ©LDDC 1988

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RESEARCH INSTITUTE FOR ECONOMICS AND BUSINESS ADMINISTRATION, KOBE UNIVERSITY

HISTORICAL SKETCH

In 1919, a research organization named the Institute for Commerce was founded in Kobe Higher Commercial School, one of the chief predecessors of Kobe University, with a gift made by F. Kanematsu & Company, a leading mercantile firm in Kobe. The organization was designed to carry on and facilitate integrated research on business and commerce and to formulate and publish the results of these studies and investigations in such form as to make them available to the business community.

With the founding of Kobe University of Commerce, successor of Kobe Higher Commercial School, in 1929, the Institute extended its research activities by adding several divisions. One was the famous Latin-American Library, which soon became the center of research in this field in Japan. A room for statistics equipped with various computing machines was established and began publication of Júyo Keizai Tókei and Sekai Bóeki Tókei annually. A filing room was prepared to deposit press clipping files systematically arranged by topics and dates. Another room was designed to become the center of all possible original records and data having to do with the beginning and progress of Japanese business.

On the campus of Kobe University of Commerce, another organization named the Institute for Business Mechanization was founded in 1941 utilizing business machines donated by the IBM Corporation and others. With Professor Yasutaro Hirai as its head a broad and forward-looking plan for business mechanization in Japan was developed.

In 1944, Kobe University of Commerce changed its name to Kobe University of Economics. After the War, however, the University was consolidated with three other colleges in Hyogo Prefecture to become Kobe University. With this development, the two Institutes were also amalgamated into the Research Institute for Economics and Business Administration, Kobe University. At present, the Institute, with its twenty-four full-time professional staff members, carries on studies and investigations in international economics, international environment, international comparative economics, international business, management information systems and international cooperation.

ORGANIZATION

The Institute consists of six sections. Each section and its research subjects are as follows:

1. **International Economic Studies**
   International Economics, International Monetary Economics, Maritime Economics, International Labor Relations
2. **International Environmental Studies**
   Resource Development, International Organizations, International Industrial Adjustment
3. **International Comparative Economic Studies**
   Pacific Basin I (Oceanian Economy)
   Pacific Basin II (Latin American Economy)
   Pacific Basin III (North American Economy)
4. **International Business Studies**
   Comparative Business, Multinational Enterprise, International Business Finance
5. **Management Information Systems**
   Business and Accounting Information, Information Processing System, International Comparative Statistics

6. International Cooperation

In addition to the ordinary work of each section, several research Groups, whose members are not limited to the Institute staffs, are regularly held to carry on joint studies. At present, there are nine standing research groups, as follows: Group of International Trade, Maritime Economics, Dynamic International Economic Analysis, International Economic Environment, International Economic Comparison, International Comparative Financial Studies, Institutional Accounting and International Comparative Accounting Research, International Comparative Statistics and Information Strategy for Regional Development.

For convenience and greater efficiency in carrying out its research-activities, the Institute has a general office which is responsible for 1) the collection and preservation of a comprehensive collection of books, periodicals, pamphlets, and original records and data of finance, trade, commerce, industry and business generally: 2) the classification, cataloguing, indexing arranging, annotation and compilation of these research materials: and 3) the formulation and publication of the results of the investigations and studies accomplished by the professional staff members of the Institute.

As an affiliated institute, the Documentation Center for Business Analysis has been established in 1964. It is the first systematic information facilities in the field of business administration in Japan that has been recognized and authorized by the Ministry of Education. The purpose is to collect and to make intensive control of all kinds of materials on business administration and to make them available to scholars, universities, governments, and business world with the aid of modern documentation techniques.

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