

How the paper industry in Japan has technologically responded to the paradigm shifts of the Japanese society

Part 3: Groping in the 1990s

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Introduction

The Japanese paper industry faced many problems in the 1970s such as environment pollution, oil price hike, shortage in wood supply, and strong yen and oppression by imported paper products, and was regarded to be domestically unwelcomed. To cope with them, the industry implemented various measures of preserving environment and promoted paper recycling initiatives, and was regarded, on the contrary, as an eco-friendly and sustainable industry in the 1990s. Right at that time, technology of manufacturing based on iron and steel was stalemate and Japanese economy itself distinctly stagnated. How the industry advanced technology in that situation was a topic of this part. As chapters are consecutive in the series, this part starts from Chapter 3. The numbering of references is also consecutive from Part 1.

3. Groping from the 1990s

What did the industry head for in the 1990s? From that time on, the Japanese economy turned to be in low growth rate, and the volume of paper and paperboard consumption began to decline after 1995, which had not been experienced yet.

3.1 One advice

Hashimoto, the then chief of paper business section, MITI addressed and advised in 1994 as follows⁴⁹. "There were mistakes in forecasting long term demands in the past. ---(omit)---Let us look at the annual production volume of paper and paperboard. The forecast of demand in a long term made in 1970 was a miserable failure, badly unachieved. The second forecast made in 1979 was still on the higher side, and the real production volume at present is far behind. In 1989, another notorious forecast predicting 40 million tons a year was announced, but failed to achieve (note by the author: the maximum production volume up to now was 30 million tons a year)."

The paper industry could not understand that the

growth rate of paper and paperboard demand was declining since 1970, and made a bullish forecast repeatedly, which was unachieved every time. Then, it understood it had to deal with the decreasing growth rate. Table 9 is from data by Yoshikawa⁵⁰.

Table 9 Yearly growth rate of economic activity in money base (%)

	1975/ 1960	1985/ 1975	1995/ 1985	2005/ 1995
GDP(nominal)	6.45	3.39	1.86	0.04
Manufacturing sector(nominal)	6.05%	3.09%	0.99%	-0.37
Pulp and paper (nominal)	6.13%	2.30%	1.53%	-0.71%

How to deal with the stalemate? Following was an advice from Hashimoto. As he was a bureaucrat of MITI and informed internationally, and had close contact with executives of the industry, his advice was very timely and deserved to listen.

"Then, how to cope with the problems. The first choice is an Asian market, and how to have business in the region is an important subject. To do that, studying the present condition and forecasting demand in the region is a must. A study team of which Mr. Nishikawa, Executive Vice President, Shin-Oji Paper Co. is a leader, will visit Indochina and Thailand in the period from the end of February to the beginning of March. The other team of which Mr. Uchikoshi, Executive Vice President, Nippon Paper Co. is a leader will tour Dalian, Beijing and Shanghai in China from May 5 to May 14. They will witness the market for real, and investigate feasibility of future investment and technology transfer." For reference, the annual paper and paperboard production in those countries in 1994 was, China: 2.5 million tons, Indochina: 3.05 million tons, and Thailand: 1.66 million tons.

His first advice was advancing into overseas markets, and listed ways of doing in details

"The first: selling equipment of surplus capacity to overseas market. Making use of foreign aid funds like Overseas Economic Cooperation Fund is one of

measures.

The second: when customers move overseas, suppliers to them, one of which is a paper company, follow the move and expand overseas business. Rengo has already been expanding in this way with its corrugated boxes.

The third: by offering a technical license contract, license fee is received, which is also one of overseas projects.

The fourth: (omitted)

The fifth: joint research projects with partners

The sixth: overseas investment for developmental import. The paper industry has been doing it for pulp and paper products. "

"The second advice is to improve competitiveness of corporations themselves internationally. The first way to it is restructuring of the industry. Two large companies, Shin-Oji paper and Nippon Paper were born by mergers in the industry last year, and other companies which are interested in becoming large in output will conceive the same idea.

The others are about the distribution system and

raw materials"

The distribution system will not be discussed in this paper, as the distribution system is not a topic of concern of this series. Regarding raw material supply, it was reviewed in details in the other series such "The History of Technological Developments of the Paper Industry in Japan after World War II".

"The next and third advice is to have conferences and negotiations with the U. S. Historically, many kinds of industries in Japan have dealt with the counterparts of the U.S., such as textile, steel, TV, machine tool, automobile, VTR, solid-state and so on. Paper has been one of those products. Dealing with the U.S. has simulated industries to be international, and having a seminar aboard is one of examples. Please also join international occasions as much and as many as possible."

His second advice, the restructuring of the industry, moved steadily forward as in Fig. 24.

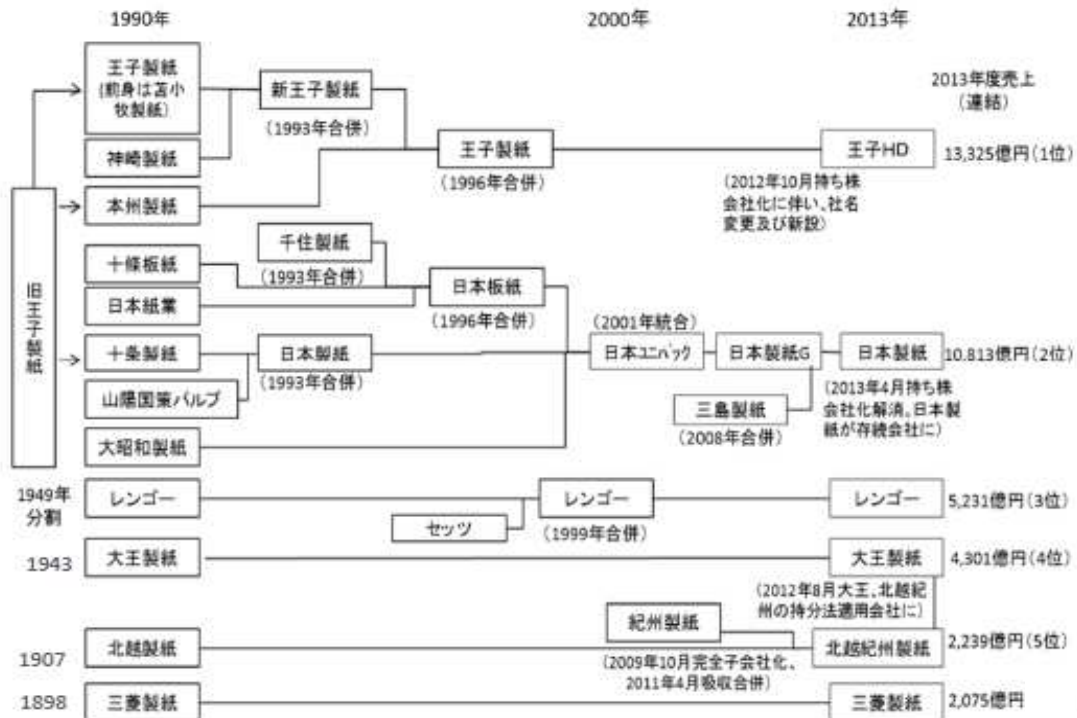


Fig. 24 Reorganizing of paper companies in Japan⁵¹⁾

(Though the diagram is in Japanese, it shows how paper companies, of which names were in frames, were merged.)

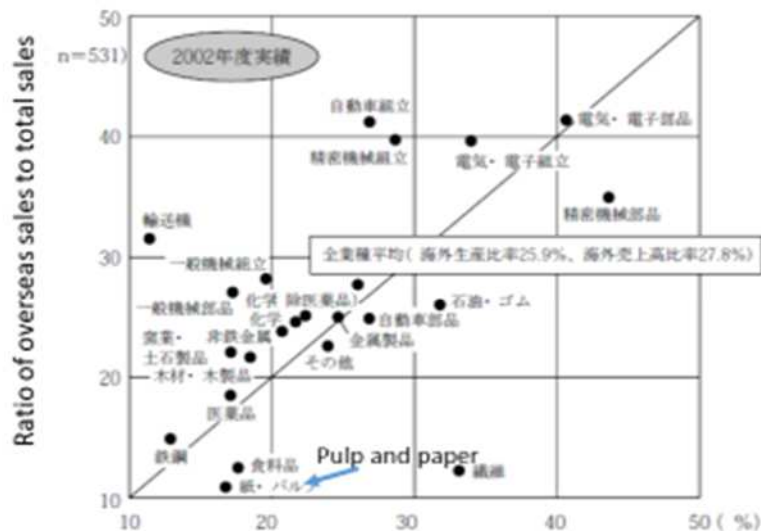


Fig. 25 Overseas business of Japanese industries in 2002

(Each dot represents one manufacturing industry. The dot of the pulp and paper is marked by an arrow and "Pulp and paper".)

He urged the industry to advance into international business, as the domestic demand was stagnating. Regrettably, the expansion of the paper industry overseas was very small, compared to other industries. As its overseas activity was reviewed in the other paper ⁵²⁾, only Fig. 25 is quoted ⁵³⁾, which was based on the year of 2002.

The paper industry belonged to a group whose ratio of overseas production to total production was small. Moreover, its ratio of overseas sales to total sales was the least of all. This feature little changed in 2013 ⁵⁴⁾. Overseas activity, which Hashimoto recommended, did not grow to be a common trend in the industry.

3.2 Groping in technology

Yoshikawa summarized the progress of Japanese economy in his sky-line analysis as follows ⁵⁵⁾.

"The period of years from 1990 to 1995:
The bubble boom of the late 1980s ended and the Heisei recession started. The nominal GDP growth rate, accumulated for 5 years, was as low as 12.9%, which had not been experienced. Above all, manufacturing industries turned to be in negative growths, which were also a new experience after the war. Besides, agriculture, forestry and fishery industries were in negative growths. The Japan's economy at those days could barely maintain small growth by a relatively large growth of the tertiary

industry to which wholesale and retail, real state and service belonged."

How did the paper industry react to this crisis of the Japanese economy? Followings are excerpts from addresses of the then presidents of JAPAN TAPP at the annual conferences as well as from their New Year's addresses in JAPAN TAPPI Journals.

Ikeda, in 1990, commented on information technology as follows ⁵⁶⁻¹⁾. "When information society comes into being and various kinds of new media become available, big impact on manufacturing industries and human society will be expected" He was afraid of its outcomes. Then, he talked on international affairs as follows. "Investment overseas by the paper industry began to secure wood resource. Then, the industry manufactured pulp at sites overseas where wood, energy and water could be obtained with lower prices, and brought some of pulp produced to Japan, called development-and import scheme. It took a further step of manufacturing final products like newsprint and printing paper at the sites. The investment also diversified. Starting with joint ventures with local enterprises, it moved from participating with capital to buying existing mills and then to building their own mills. The industry now has to deal with international business of full scale. (Note by the author: The progress of international business was reviewed in the reference 56-2, and it

was exactly what Ikeda said. The point was that the industry was interested in supplying products to domestic market, not in doing business genuinely overseas.) My understanding is that the way in which the international business is dealt is dependent on different circumstances specific to each company, and every enterprise has its own managing policy. Therefore, it will be hardly possible to generalize international business as a whole. The purpose of promoting international business is summarized as follows. Advancing international business is not an object to achieve, but we have to be international to survive and have business in the world. The industry is facing such an age to come."

"The paper industry has organized a workshop studying subjects which the industry should take in a long term, which works as an advisory committee to Director-General, Consumer Goods Industries Bureau in September. ----- We are looking forward to having the report soon. We, ourselves, also have to work to have a master plan for the coming 21th century, and to strengthen our standing for a next leap forward."

As in the address by Ohkuni introduced in Section 2 of Part 2, Ikeda was optimistic for the future, and a distinctive policy with which the industry should move was not found yet. Internationalization was not a must yet, and master plans was being looked for. That attitude and understanding were common in most of executives in charge of technology.

In 1992, Nakajima listed up long-term subjects of technology as follows⁵⁷⁾.

(1) Environment: Reduction of carbon dioxide emission complying an international pact

Dioxin problems of pulp mill effluent publicized since the news announced at October 23, 1991 (Note: it was reviewed in the second part of this series.)

(2) Pulp resource (Note: though recycled pulp was becoming a major resource, it was still a great concern of the industry)

(3) Human resources development and training (Note: it was listed for the first time in technological subjects.)

Technological subjects which would make the industry grow dynamically were not in sight.

In 2000, Kurosawa addressed as follows⁵⁸⁾.

"In most of developed countries including Japan,

the industrial structure is rapidly changing. Manufacturing industries except those still having leading-edges are losing their competitiveness and declining in their influences. The paper industry may be blessed among them, as it is mainly for domestic market. ----- If it lacks international competitiveness in price, quality and services, it will lose a share in the market and be unable to grow. There will be no chances of large investment and it will face the crisis of existence. ----- We definitely need a new strategy and have to remodel the industry." (Note: the paper industry faced exactly what he said.)

"New start-up companies can manufacture products of international quality and supply them in mass to world market by making use of up-dated large equipment with fine automatic control, if they have enough capital, even though they do not have technological know-how yet." (Note: China, indeed, increased its output in that way since 2005, and now is the largest producer in the world.)

"As production systems and equipment are highly sophisticated, the ability of personnel who engaged in business becomes more and more important. It is they who design, develop and manufacture products, maintain plants and prevent troubles beforehand. Their ability results from their experiences and is a source of being competitive internationally. ---If they up-grade their ability by education and training, and are able to solve problems, I believe that the industry they belong to will be a leader in the world in an era of great competition "

Though a paradigm of society was shifting since 1990, and the years following it were called "Heisei depression" or "lost ten years", the addresses by leaders of the industry looked rather optimistic. Their understanding was almost the same to that of Ohkuni in 1996, reviewed in the second part of the series, saying that the industry expected constant demand growth with no possible substitutes yet, was recyclable in nature and favorable in ecology, and was sustainable indeed. The year of 1996 was the calm before the storm.

3.3 Technological stalemate in process industries

A decade in which the paper industry was looking for a next key-technology was a period in which a new technological revolution was occurring. To show it, two figures in the first half of the second part and

one figure in the latter half of the second part of this series are quoted as follows.

As mentioned before, the size and operating speed of the largest paper machine installed in a certain year in the world were plotted against the year, the size being in Fig. 26⁵⁹⁾ and the running speed in Fig. 27⁵⁹⁾ respectively. Few equipment has such a long history as paper machine and can present their historical development during 200 years with real data.

Surprisingly, both the properties of paper machine increased lineally along years in graphs of which y-axis was logarithmic.

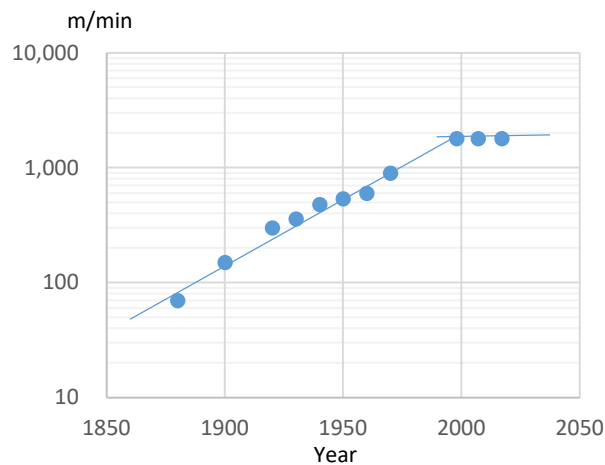


Fig. 26 Transition of paper machine running speed (designed)

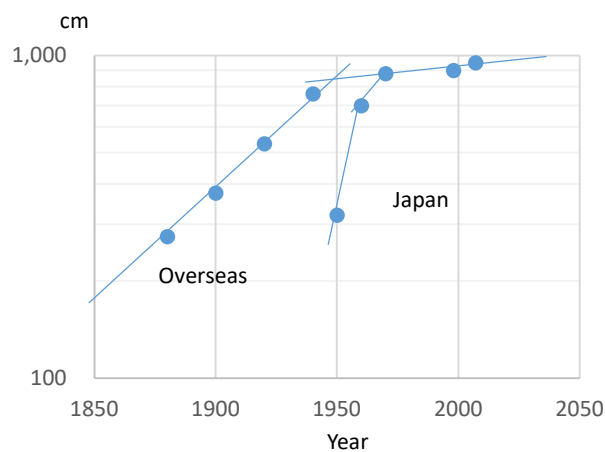


Fig. 27 Transition of paper machine width (designed)

So, their gradient, which is an annual growth rate, is calculated. The machine speed increased at the rate of 3% per year, and then leveled off at around 1990. The machine width that increased at the rate of 1.5% per year, reduced an annual increase rate to 0.4% per year at around 1950. Various technological

developments on paper machine after the Industrial Revolution have helped to maintain constant growth rates, but not to cause drastic jump-ups. Even the solid state technology reviewed in the last issue, which was regarded evolutionary, seems to have worked to make them stay in the same extended trend.

One other figure, Fig 28, is from the latter half of the second part, and is on the unit energy consumption of the paper industry⁶⁰⁾. It showed that the unit energy consumption decreased at the rate of 4% per year until 1990 and then leveled off like the machine speed did.

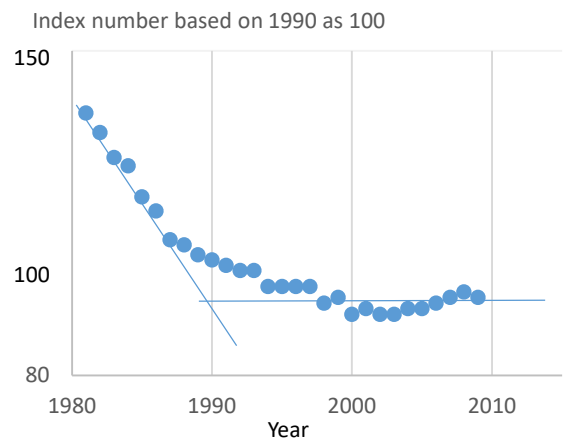


Fig. 28 Unit total energy consumption since 1980 by index number based on 1990 as 100

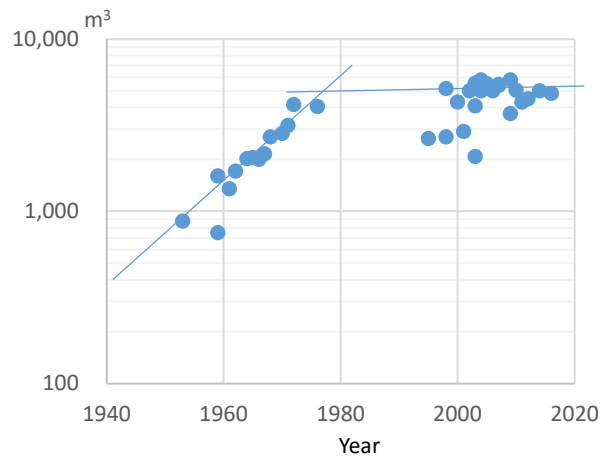


Fig. 29 Volume of blast furnace

A similar pattern was seen in the steel industry on the volume of its blast furnace (Fig. 29), which increased at the rate of 7% per year, and then leveled off at around 1980⁶¹⁾.

These facts suggest that technological developments which made process industries

enlarge their equipment at the annual rate between 1.5% and 7% stagnated at around 1990. The output of Japanese manufacturing industries increased at the rate of more than 10% per year after the war, reduced to 5% in the 1970s and then stagnated after 2000. It is suggestive that there would be correlation between the level-off of the output of the manufacturing industry and the technological stalemate.

The reason of technological stalemate in the paper industry after 1990 is that the industry could not find a new key technology which would induce innovations in a way the solid state technology did in the 1960s. The same stalemate happened in other manufacturing industries in Japan, which, I understand, resulted in "Heisei depression" or "the lost ten years". Right at that time, a new technological platform called internet was emerging. Japan was late for taking it as an edge, and it was after 2000 that Japan began to use it. The years after 2000 will be reviewed in Chapter 4

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