

training centres, and schools. Such efforts corresponded to the thorough rationalization efforts that were made in the cotton spinning industry with the aim of establishing monopolies.

Such rationalization efforts included the early introduction of Taylor's scientific management system and motion studies, which resulted in the establishment of standard motions, thereby making possible a rise in labour productivity because each factory girl was able to handle more machines than before. These efforts required greater motivation, too, on the part of workers.

Kato discusses in detail how a transplanted type of cotton spinning industry won out over the traditional Japanese cotton spinning industry with the successful operations of the Osaka Cotton Spinning Company. Since the transplanted type of cotton spinning industry, as represented by the Osaka Cotton Spinning Company, relied entirely on imported raw cotton, it had strong ties with trading companies. It was able to develop cotton-blending techniques based on the selection and use of raw cotton from throughout the world at prices and in quantities necessary and suitable for international competition.

Yonekawa makes a comparative study of the differences between the main cotton spinning countries during the introduction of modern spinning mills, stating that in the United Kingdom, which led the field in this area, there were many spinning companies with independent mills. In the case of the United States, there was vertical integration except in New England. The managing agency system was dominant in India and there was an even more highly integrated state of oligopoly in Japan than in the United States.

Finally, Kiyokawa discusses in detail the process of the improvement of silkworm varieties and their diffusion. It is pointed out that the initial stage of such improvement was carried out mainly by experimental stations in the provinces and by silkworm egg producers. An important role was played in the diffusion stage by such large silk thread producers as Katakura as well as by the graduates of sericulture training facilities throughout the country.

5. SMALL INDUSTRY

1. Salient features of Japanese small industries -- Johzen Takeuchi
2. The shell button industry -- Johzen Takeuchi
3. The brush industry -- Johzen Takeuchi
4. The hosiery industry -- Johzen Takeuchi
5. The bicycle industry -- Johzen Takeuchi
6. Industrialization and labour-intensive industries -- Johzen Takeuchi

The capital-intensive sectors of the prewar Japanese economy were an exceptional part of an industrial structure. After the middle of the nineteenth century, only textile industries, mining, railway operations, and shipbuilding (of iron ships) had developed. The communications industry was a state enterprise, the iron and steel industry started its development only in this century, and large-scale machine plants were operated by the military. Thus, the raw materials and materials sectors, as well as the transportation and communications sectors, were characterized by a substantial degree of capital-intensity and large-scale operation, but many of them received various types of government assistance and some were under direct government management.

The further one goes along toward the downstream of the secondary and third processing levels, the more labour-intensive the operation becomes and the smaller the unit of operation. These labour-intensive sectors can be subdivided into the following two categories; most of them operated on a small or medium scale: The first category inherited the traditional production patterns from the pre-Meiji days with little change. The second enjoyed the benefit of technology transfer from the advanced economies, and developed subsequently in a labour-intensive way.

Many industrial sectors had only small enterprises, creating such concepts as the "small industry" or "small- and medium-scale industry" used when describing the Japanese economy. These sectors embraced not only workers but also small owners, manager-cum-workers, family members, and other miscellaneous labouring strata, and in total numbers these people even outnumbered modern workers. Thus an adequate understanding of this sector calls for a sufficient understanding of the traditional "middle" class.

This sector has often been characterized by (1) a prevalence of low wages and long working hours, (2) its ability to absorb the excess labour force, and (3) its large role as a source of foreign reserves. But analyses from the perspective of the transformation of technology and the social mobility of workers have been lacking. This study focuses on shell button production, brush production, and the hosiery and bicycle industries, to examine the transformation of technology and the various resulting social relations.

All of the industrial sectors taken up in this study, except for the bicycle industry, succeeded in establishing modern management through technology transferred from advanced countries, although shell buttons had been produced partially with applied traditional technologies prior to the technology transfer. However, large-scale operation was short-lived in all cases, because craftsmen observed and otherwise learned the modern machine systems and developed one after the other various substituting tools and machines which were simpler and easier to operate and maintain. When these technologies were linked with the skills of workers and craftsmen who had a labour-intensive inclination, they attained a higher

efficiency than the imported machines, attesting to the need for an appropriate technology system for labour-intensive operations. The process of digesting advanced technology is referred to here as "adaptation." This phenomenon is observable in the bicycle industry also, which originated by repairing imported products and producing component parts.

Adaptation is a multiple, complex process. When a high-efficiency machine corresponding to a certain manufacturing process could not be produced, that process was subdivided and technologies were created for each subdivision. What is of greater interest is the fact that these subdivisions were manned by seemingly independent small producers. Thus, in the development of the labour-intensive sectors in Japan, the increase in total output was accompanied by smaller and smaller units of operation. This phenomenon is referred to as "differentiation."

The existence of independent small-scale operators was important in many ways: It was a convenient phenomenon for traditional merchants who had controlled these small producers, and it enabled an unlimited use of the family labour force, most of which was unpaid labour. In relation to the postwar high economic growth of the Japanese economy, one should mention that there was keener competition among the small producers and that spontaneous creativity was encouraged in individual enterprises. The high social mobility of workers into the ranks of small shop owners should also be pointed out in this context.

Within these small-scale units, the human relations between shop owners, skilled workers, and simple labourers were an important key for their success as businesses. The more successful an enterprise was, the greater the emphasis placed on nurturing co-operative human relations between labour and management. Owners also were shopfloor-oriented, not only in the bicycle industry but also in the rapidly growing machining and metal industries.

Despite the growing phenomenon of differentiation, conditions gradually became ripe for the establishment of capital-intensive, large-scale operations in various sectors. With expansion downstream, scale growth was possible in parts of the upstream, for instance, in celluloid manufacturing for brushes and in the knitting sector of hosiery. Some small-scale parts manufacturers, producing very complicated parts, grew by acquiring more than one market for their product, as was often seen in the bicycle industry.

On the basis of these case studies, the following characteristics seem salient in the labour-intensive manufacturing sector: (1) Labour-intensive production proved more efficient with smaller operational units. (2) In order for small enterprises to compete effectively with modern production methods with complicated manufacturing processes, small manufacturers sprang up covering smaller subdivisions. (3) Labour-intensive production

did undergo appropriate technological innovations, without which they could not have resisted modern plant management. (4) Production activities by simplified technologies often depended on the traditional skills of the workers, prolonging the life of traditional human relations and customs, as well as encouraging merchant control over the small producers.

(5) Labour-intensive production depended on the spontaneity and creativity of the individual workers to a far higher extent than is generally conceived. Social mobility and keen competition among small producers promoted such spontaneity. Changes occurred in these sectors and modern, large-scale operation emerged when (1) the market, particularly the domestic market, expanded, or (2) technology and production systems changed rapidly, and when merchant controls became lax.

It has often been pointed out that the rigid control of the small producers by merchants hindered the smooth development of the small producers. Without denying the general validity of this view, it must be mentioned that there are exceptions. In areas where traditional methods of production are guarded or must be guarded, there is a high dependency on the organizing and planning abilities of merchants. On the contrary, in areas where small producers attained a rapid development, co-operative relations with merchants could be observed. Of critical importance is their relations at the transitional points, where there was substantial room for financial and sales policies to be effective. What is needed is a far more detailed study of the internal conditions in each sector than has thus far been carried out.

The importance of medium- and small-scale industries of a labour-intensive nature must be emphasized in supporting the downstreams of various industries. In their absence, the products coming out of large-scale, modern plants in the upstream would have had to cater to the unstable international market. Japan, as a developing country, enjoyed the unique competitiveness of its labour-intensive sector.

However, there also existed conditions amenable to the birth of modern plants from among these sectors. In fact, cases of growth into big-scale operations from among these labour-intensive sectors constitute the main line of development in Japan. Although such a developmental path became prominent after the end of the last war, the necessary preconditions were laid out in the prewar days through technological innovations, employment conditions, and human relations in the small- and medium-scale enterprises.