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DYNAMISM AMONG THE JAPANESE SMALL  
AND MEDIUM MANUFACTURING  
ENTERPRISES AND ITS IMPLICATIONS  
FOR DEVELOPMENT OF MANUFACTURING  
SMEs IN KENYA

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## Japanese Small and Medium Manufacturing Enterprises: Lessons for Kenya.

### Governmental Assistance and the Business Practices

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#### Abstract

*This paper tries to provide an analytical explanation to the dynamic performance of the Japanese Small and Medium Industries from a technology management and organizational perspective. First, the transformation stages of these businesses is discussed to give a better understanding to the issue of dynamism amongst these industries. The approach of these businesses to technology upgrading and eventual innovation stage is then analysed. The Japanese system of small incremental improvements on technology known in Japanese as kaizen in combination with a system of business conversion method practiced by these businesses is examined. The organizational structure and characteristics of these businesses is also assessed since it is inseparable from the technology management method of these businesses. Enterprise networking, the most outstanding aspect of the organizational trait of these businesses is analysed as to how it facilitates technology upgrading and innovation. It is from the analysis of this combination of technology management practice and the organizational form of the Japanese manufacturing SMEs that lessons aimed at the development of manufacturing SMEs in Kenya is finally drawn in the last section of this paper.*

#### INTRODUCTION

To a higher degree than in any industrialized country, Small and Medium-sized business enterprises far outnumber the bigger businesses in Japan. Over 99 per cent of all Japanese enterprises are categorized as SMEs and employ over 80 per cent of the industrial workforce.<sup>1</sup> Precisely, Japan has twice as many small companies as the USA, and nearly ten times as many as Britain. For the last 30 years, the SMEs have been the critical first stage of the economic rocket that has made Japan a by-word for industrial competition. Between 1950 and 1980, the SME sector grew more rapidly in Japan than in any other country. As a matter of illustration, SMEs in Japan grew an estimated 60 per cent between the 1950s and the oil crisis of 1973.<sup>2</sup> This high rate of growth slowed down with the long recession that followed. It was until 1978 onwards that new but relatively slow rate of growth was realized again. Since this time several changes have occurred in relation to the increasing sophistication of the

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<sup>1</sup> Del I. Hawkins, *New Business Entrepreneurship in the Japanese Economy*, *Journal of Business Venturing*, Vol.8 No.2 (1993) p.137.

<sup>2</sup> Graham Bannock, *The Economic Role of Small Firms in Contemporary Industrial Economy*, in James Curray, James Stanworth, David Watkins (ed.), *The Survival of the Small firms; The Economics of Entrepreneurship*, Gower Publishers Co.Ltd (1986)p.60.

industrial structure. There has been a steady increase in the value added on products. By 1992, within the manufacturing SMEs the rate of growth in value-added on products increased faster than that for shipment value. The ratio of the value-added on products to the value of shipments for manufacturing SMEs even surpassed that for large manufacturers.<sup>3</sup> This highlights the pivotal role played by this industrial sector.

Japan has had a long history of the presence of small and medium industries dating back to over 250 years. SMEs in the manufacturing sector have had the longest history in Japan, perhaps only rivaled by the commercial sector. The manufacturing SMEs have undergone tremendous transformations since the industrial revolution in Japan, basically from the type confined to the peripheral and backward areas of the economy to a relatively technology-intensive manufacturing having a sophisticated marketing niche. Compared to the big firms, these industries have faced more problems yet they have still continued to do well.<sup>4</sup> Providing an analytical explanation to the dynamic performance and development of these industries could offer some possible lessons for the development of manufacturing SMEs in Kenya. As a matter of caution, extraction of lessons has to be done in a sparing fashion by way of examining issues which are unique to Japan and therefore cannot be duplicated elsewhere. As well the time period during which certain developments in the Japanese manufacturing SMEs took place has to be borne in mind. Time periods have a direct relation to the prevailing international conditions which on the other hand can have an impact on the business performance of SMEs.

#### Conceptual Issues

Technology means different things to different people, hence the proliferation of definitions. It is not possible to discuss all the various conceptions of technology here; a thorough overview of the various conceptions can be found in (Asian Development Bank: 1994: 12-23). In this overview, there are three main ways in which technology is perceived: in a narrow material sense; as tools, machines and instruments; in a wider purposive sense to refer to skills, methods, procedures or routines performed by people to achieve specific goals; in an organizational sense to refer to social arrangements such as factories and bureaucracies which have been

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<sup>3</sup> White Papers of Japan, Small and Medium Enterprises, (1991-1992)p.177.

<sup>4</sup> Since the majority of these firms are high achievers, it is therefore appropriate to make reference to their high performance by way of generalization while bearing in mind that there are a few low achievers as well within this business sector.

created to achieve specific planned objectives. In essence, these various conceptions refer to the embodiments technology, thus:

- ( i ) Physical facilities such as: tools; equipment; machinery and structures which enhance human physical powers in transformation operations;
- (ii) Human abilities such as skills, knowledge, expertise, and creativity which contribute to the utilization of available natural and technological resources;
- (iii) Documented facts such as design parameters, specifications, blueprints, and operation, maintenance and service manuals which facilitate rapid learning and save time and resources; and
- (iv) Organizational frameworks such as methods, techniques, linkages and practices which coordinate the productive activities at the enterprise in order to achieve positive results.

Technology plays a key role in the manufacturing sector, therefore its management is directly linked to the performance of the enterprises using a given technology. Technology management therefore refers to the coordination and integration of the various embodiments of technology. It is clear that the issues involved are quite diverse and transcend the firm boundary. Technology management at the firm level takes place within a national setting in which government economic policies and their implementation either facilitates or constraints enterprise activities. Usually, governmental policies are implemented by institutions assigned specific roles. In the case of SMEs, there may be a number of governmental agencies conducting various assistance programs. Therefore in analyzing the performance of SMEs in the manufacturing sector, the management of technology needs to be evaluated at both the firm in terms of business practices, and at the entire national level centering on the role played by the key agencies assigned the role of giving different types of assistance. Given the wider conception of technology which encompass human organizational issues, aspects such as culture also have a role to play especially in the management practices and ways in which business is transacted.

#### **Brief historical background of the transformations that have occurred within the Japanese manufacturing SMEs**

It is important to have a good grasp of the historical development of the manufacturing SMEs in Japan. An acquaintance with the history of these businesses enables one to fully comprehend the transformations that have taken place through

the past years starting from the time of the industrial revolution in Japan in the mid 1880s to the 1990s. However, it is important to specify that the history of the manufacturing small businesses dates far back beyond the time of industrial revolution in Japan.

Contrary to the industrial stage theory which posits that as large industries become dominant in the industrial structure, then the hand workers and domestic industries are destined to be eliminated, the Japanese manufacturing enterprises as it were, at this time never experienced this problem. The fact that these industries did not face the problem of elimination deserves an explanation. Were they consciously protected by well formulated policies? Certainly, the answer is no. In the actual sense these industries were neglected by the industrial policies of that time which put a priority on the development of large scale modern industries. It was the duality in the consumption habits that led to the sustained demand for both the modern and traditional sector goods. This was an insurance against elimination by the large modern businesses. All the same, these industries were poorly organized and badly equipped. While only very few radical people could call for a public policy that could cure the defects of these industries, the situation of neglect continued for a long time because in the old industrial circles of that time, men were accustomed to the feudal oppression and were likely to endure social sufferance silently. The public policy favoring the large enterprises was supported not only by the firms receiving favorable treatment, but also those which did not. That is to say that there was a national consensus in favor of a strong team of representative enterprises. The establishment of such a national consensus was not difficult in a society governed by

Confucian ethics. Those who had not been chosen were, as it were, 'resigned to their lot'.<sup>5</sup>

There was however relatively little government effort to improve the small industries. Such was like in the efforts aimed at the development of the productive skills in such industries as weaving by introducing looms from Europe. The government also set up industrial laboratories which made considerable contributions especially in cotton weaving industry as could be found in Hamamatsu and Shizuoka prefectures. These were models in the development of Japanese small manufacturing industries. Various types of laboratories were set up in several parts of the country which helped to improve the skills in the small manufacturing establishments. Still, compared with the efforts made by the government to develop large industries, the efforts in promoting these laboratories were almost negligible. The government also tried to control extreme competition amongst the small manufacturers. The most significant governmental measure was the promulgation of the Law for the Trade Associations to check on the quality of goods produced. This came as a result of the government's recognition of the importance of having a unified regulation on quality of goods produced nationwide. Though not rigorously adhered to during the late 1880s, it is important to notice that even as early as this period the very idea of quality control and its significance had been recognized.

Several important changes occurred silently in the small industries sector through the process of intense competition among these industries themselves. A process of weeding out industries that could not adapt themselves to the new market conditions took place. A case in point is the weaving industry where not all enterprises were able to develop and continue their business in modern forms. It was only those industries that resorted to the use of cotton yarn produced in the modern factory system a head of others that developed further and became core of small industry in the Meiji era. During this competition, localities sprang up with their production specialties such as the case of Ashikaga prefecture producing silk and cotton blended fabric and Tango of Kyoto prefecture and Nishiwaki in the Banshu district, all specializing in producing one type of fabric. Competition was also experienced with the large modern capital establishments as typified in the case of 'gara' hand spinning machine against yarn made in the modern factories using imported machines. In a case where some of these businesses were forced to close, the acquired skills in the previous area were then sometimes used to venture into new areas related to the previous activity. The indigenous nails industry which was

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<sup>5</sup> Michio Morishima, *Why Has Japan Succeeded, Western Technology and*

mainly situated in Sanjo and Tsubame near Niigata city had their market completely supplanted by imported nails after the 1880 Tokyo fire which dramatized the disadvantages of the indigenous nails vis a vis the imported ones. The impact of this is that the nail producers were made to develop other lines of work in metal industry and to the present times in the 1990s, Sanjo and Tsubame are still important areas in metal working especially cutlery.

Due to biased government policy in favor of the large enterprises, the small industries seriously lagged behind in several respects. Many of these businesses sprang up because of abundant cheap labor which was a mixed blessing in the sense that it operated against the improvement of their technological level and the modernization of their management. Low wages was a function of low labor productivity, and these two negative factors reinforced each other in a vicious circle of stagnation. In 1932, the wages of most SMEs was about 26 per cent that of the largest enterprises. Consequently, the young people preferred to enter the large firms, thus leaving SMEs with choice of picking workers from the left over. Table 1. shows the wage disparities in 1932.

Table 1. Wage disparities in 1932 ( Wage per worker in plants of 5 m yen or more =100)

	Scale of plant ( amount of capital in thousand yen)									
	0-1	1-5	5-10	10-20	20-50	50-100	100-500	500-1000	1000-5000	5000+
W.D	25.9	30.1	33.2	38.3	45.3	54.1	67.1	78.1	84.4	100

W.D- Represents wage differential

Source: Y. Ando (edit.), Kindai Nippon Keizai Yoran ( Survey of the Economic History of Japan), Tokyo University Press , 1975, p.119.

However, the period of high economic growth (1950s -1970s) marked the historical turning point in the performance of the SMEs. Other than the new business opportunities created by the high economic growth, a number of factors were also responsible for this positive development. First, the previously abundant labor supply had been depleted and this was accompanied by improved business conditions especially the transactions with the bigger enterprises. It was during this period that several SMEs increased their efforts to consolidate their production facilities and improving their technological standing. The disparity between the manufacturing SMEs and the larger enterprises in terms of wages and productivity

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the Japanese Ethos, Cambridge University Press, (1988), p.98.



greatly narrowed down. Thus by 1965, the wage ratio of these SMEs to that of the big enterprises climbed from the rate of 53 per cent of 1957 to 72 per cent.<sup>6</sup>

It would be inaccurate to paint a rosy picture of the performance and business conditions of these businesses since the time of high economic growth in Japan. There has been several persistent problems and challenges resulting in a lot of ups and downs in the performance of SMEs in manufacturing especially during hard times of economic recession. The trend has been that the manufacturing together with other SME sectors have been rather slow in recovering from sluggish performance as compared to the larger industries. This is evidenced in their performance after the long economic recession of the early 1970s. While the bigger industries fully recovered and increased their production by the late part of 1977, the entire SME sector including the commercial and service sectors still had not recovered to their pre-recession business peak by December 1978.<sup>7</sup> Similarly, there have been problems of labor shortage and new challenges springing from the constantly changing business environment both at home and internationally. The most significant challenges can be identified as the increasing competition both on the domestic front especially from the neighboring Newly Industrialized Countries in Southeast Asia. This situation is aggravated by the *en-daka*, a Japanese term for the appreciation of the Yen currency. Despite these problems and challenges, these SMEs have continued to play an important role in the economy of Japan. Therefore, the next part of this paper would be dedicated to analyzing the performance of these businesses from an organizational and technology management perspective. It is this analysis which would later on be used in discussing implications for the development of manufacturing SMEs in Kenya.

#### **Technology Management and Business Organization amongst the Japanese Manufacturing SMEs.**

The role of technology in the manufacturing business sector needs no explanation since it is one of the basic and integral aspects of the production process in this business sector. Therefore the management of technology amongst Japanese manufacturing SMEs would be analyzed with reference to technology upgrading and innovation. After this, the organizational structure and characteristics of these

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6. White Papers of Japan, Small and Medium Enterprises, (1971-72) pp.137-138.

7. White Papers of Japan, Small and Medium Enterprises, (1978-79), p.119.

businesses would be analyzed. Certainly the organizational structure and characteristics of any business contributes to their performance. In analyzing the organizational aspects of these firms, the focus would be on the internal organizational characteristics as well as the organizations external to them but are related in terms of business assistance. The two issues to be discussed here are much related since the form an organizational structure takes basically is a function of several factors such as technology, goals and environmental circumstances.<sup>8</sup>

#### Technology Management

Basic to the entrepreneurial role is the ability to recognize and exploit opportunities. The task of the entrepreneur can be described as the relentless pursuit of opportunity. Opportunity is perceived here as the recognition of the desired future state involving growth or positive change, and the belief that achievement of that state is possible. One of the surest ways of seizing such opportunities is by keeping a head in technology through innovation. Innovations lead to new products, and it should be seen that the non-existence of such products constitutes an opportunity. Technology creates new opportunities while at the same time making obsolete the older ones. Innovations entirely depend on research and development, and the building of capability in terms of knowledge and skills resulting from the past practical work experiences.

Japanese manufacturing SMEs spend relatively large amounts of money on R&D even when compared to their American counterparts.<sup>9</sup> However, it is debatable whether the outcome of this kind of investment is equally impressive as the amounts involved. In terms of innovation, the US SMEs are still a head of their Japanese counterparts. This comparison should however be understood as a matter of relativity. Actually because of intense competition amongst the manufacturing SMEs, innovation is seen as one of the most secure means of beating competitors. Much of the R&D undertaken by small and medium firms is in collaboration with larger firms for whom they do subcontracting. There are also SMEs that undertake research activities independently, even though in this case these firms always cite financial difficulties as one of their major setbacks. The innovative activities are always supported by the Ministry of Trade and Industry's office for Venture Business

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8. Joan Woodward, *Industrial Organization: Theory and Practice*, Oxford University Press (1965), p.6

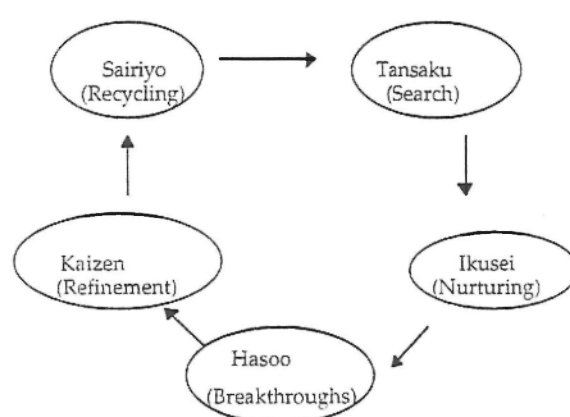
9. Daniel Okimoto and Gary R. Saxonhouse, "Technology and the Future of the Economy", in *The Political Economy of Japan* (edit.), Kozo Yamamura and Yasukichi Yasuba, Stanford University Press, California (1987), p.399.

Promotion and SMEs Agency. These two organizations devote attention to the identification and analysis of innovative small firms.<sup>10</sup>

At the firm level, innovation normally takes the form of continuous small incremental changes on existing technology. This is based on the Japanese concept of *kaizen* which literally means improvement. In this case, it means continuous process of making improvements. This method is also used by most of the large firms in Japan. The process of innovation starts with small group activities in which suggestions from workers is encouraged. At times, financial rewards is given for contribution of good ideas. The initial activities of the small groups is mainly focused on exhausting problem areas for improvement such as in the flow of work. The small improvements that result from the concerted efforts of ordinary workers and their group leaders can be perceived as a series of changes in the combination of human resources, information, and facilities. The integrated promotion of all these factors is key in the management of the small continuous innovations that eventually lead to organizational changes, product differentiation, new products and the development of new production facilities.<sup>11</sup>

For most of the SMEs, usually old technologies are improved on by fusing two or more old technologies. This process is known as *yugo-ka*, in the Japanese language. Literally, this word means fusion. Its advantages can be seen right away in the maximization of the use of the available resources instead of discarding them. This practice makes more economic sense in the light of the limited financial resources at the disposal of SMEs. Figure 1. is an illustration of the process of technology innovation.

Figure 1. Process of Technology Innovation



<sup>10</sup>. Ibid.p.402

<sup>11</sup> . Eiji Ogawa, Small Business Management Today, Asian productivity Organization (1994), pp.91-100.

One limitation on innovation is the small number of new entrants. Going by the Ministry of Trade and Industry's sample of venture business, out of 850 venture businesses, less than 4 per cent had existed for under 3 years. The Japanese labour market conditions also make it difficult for new ventures to hire experienced R&D personnel from the existing firms. Of the business ventures surveyed by the Ministry of Trade and Industry in 1984, 75 per cent of them identified the inability to hire experienced personnel as a critical problem both in the formative and early growth periods. Besides, R&D personnel salaries are quite high thus taking a large part of the initial costs.<sup>11</sup> The machine tool industry is the perfect example of small innovative firms that have risen to international prominence. Yamazaki machinery company which is Japan's largest and most technologically innovative machine firm came to prominence within a short time. In the mid 1980s, it could not be found among the top five machine tool manufacturers in Japan. The highly competitive nature of this industrial sector is also a contributing factor to the high rate of innovative activity.<sup>12</sup>

The role of the government in helping the manufacturing SMEs in upgrading their technologies also deserves attention. There are several public organizations supporting the activities of these businesses by providing a variety of services ranging from low interest financing for collective manufacturing, development of human resources especially the training of small business owners, industrial structural improvement, promotion of collective work, guidance to small business in sophisticated operations, relief and bankruptcy prevention measures. These public organizations can be found in all the local areas of the country, and the most significant aspect is the organizational structure and functions of these institutions. The local centers are linked to the national offices through a two-way information flow. This organizational arrangement has its strength in the fact that the local problems and issues can be addressed through this coordination and information flow. At the same time, new information can flow from the national office to the local areas. This process is enhanced by the standardization of the services and operations of the national organization.<sup>13</sup> The standardization of all the operations

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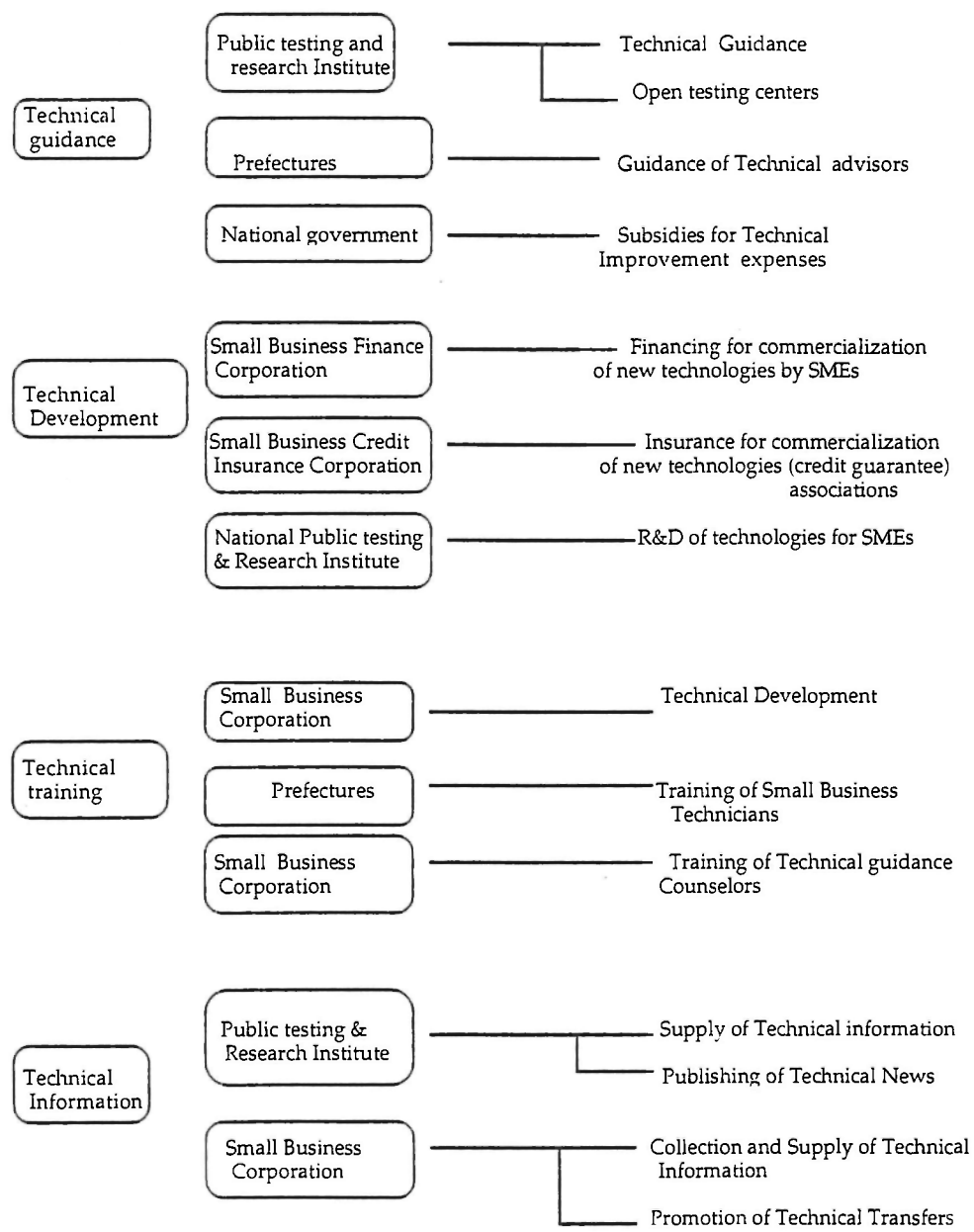
<sup>12</sup>. Sheridan M. Tatsuno, *Created In Japan, From Imitators to World Class Innovators*, Harper and Row Ltd., New York (1990), p.37

<sup>13</sup> . Ibid. p. 42

<sup>13</sup> . Philip Shapira, *Japan's Program of Regional Public Examination and Technology Centers for Upgrading SMEs*, A Research Paper No. 9019, Regional Research Institute, West Virginia University Morgantown, (Oct.1990), p.27.

of these organizations helps in averting unnecessary delays. Figure 2. in the next page gives an illustration of the extensive nature of assistance provided by these public organizations for the improvement of the technical level of SMEs

Figure. 2: Improvement of Technical Level of SMEs



Source: Now In Japan: Promotion of Small and Medium Enterprises in Japan, a publication of Japan External Trade Organization (1983), p. 10

### Business Conversion

An integral part of the *kaizen* approach to technological improvement is the continuous incremental improvements on products as well. The small changes are important in avoiding the risks and uncertainties of taking a leap into new technological areas or the manufacture of new products totally unrelated to the previous ones. Going into completely new areas involve recruiting new personnel, buying new machinery, obtaining a vast body of new information and creating new markets. All these can be too costly and the risk of failure is quite big. This process, which involves the effecting of small changes, allows most of the manufacturing SMEs to enter into new fields of business as a means of coping with changes in the international and domestic economy. In 1989, the percentage of manufacturing SMEs that had converted their lines of business (this statistically included diversification as part of business changeover) was about twice that of the large firms. This indicates the flexibility of SMEs to structural change. When an enterprise enters the manufacture of a new product and the volume of sales of the new product exceed 50 per cent of the total sales, then such an enterprise is said to have converted its line of business. On the other hand, when a new product is developed and the volume of sales is less than 50 per cent of the total sales, then the firm is said to have diversified its production process.<sup>14</sup>

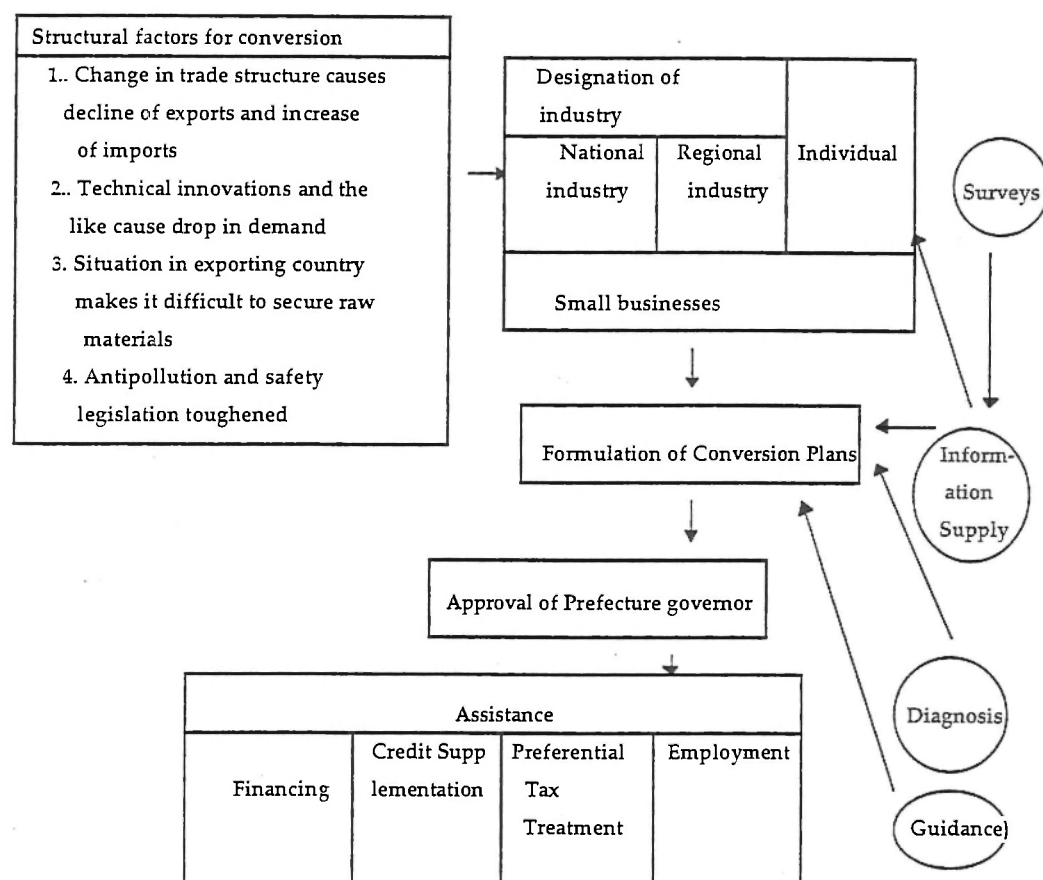
The government supports the efforts of SMEs interested in changing their line of business. Under the Law on Temporary Measures for Business Conversion of SMEs, assistance is given to enterprises faced with structural recession. Before assistance can be given, the restructuring plans must be approved by the government usually through the prefecture governor's office. The type of assistance offered range from financing at preferred interest rates, credit guarantee schemes and tax deferrals. In 1986, a survey done by SME Agency showed that 52 per cent of SMEs had the past experience with entry into new field. The mode of entry varied from business diversification, raising quality and adding value, developing new items and a change in business line. The common denominator in all these cases was that all these firms had placed an emphasis on the use of existing technology, sales channels and the available management resources. The essence of this is that business conversion requires adequate preparation well beforehand, hence the use of the existing

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<sup>14</sup> . White Paper on SMEs (1989), pp.54-55.

resources is the key to the success in this business strategy.<sup>15</sup> Figure 3. shows the stages involved in business conversion.

Figure 3. System of Business Conversion



Source: Now In Japan, Promotion of SMEs in Japan, JETRO, (1983), p. 14.

#### Steps In Business Conversion

First, a survey is carried out followed by information supply which leads to a possible diagnosis of the problem. After problem identification, it is then possible to provide guidance to the firms intending to pursue business conversion. A successful business changeover depends on several factors. Cited as the most important reasons in a 1977 survey on changeover in the SME manufacturing sector were; survey and information collection on business area intended, full preparations, raising funds, superiority of quality of new products and uniqueness of function, securing of employees (technicians), and cultivation of sales outlets which requires

<sup>15</sup> . White Paper of Japan (185-86), pp. 137-138.

doing a survey and information collection on prospects of order receipts and sales. Also given as important is joint activity with other enterprises to increase the resource base. Business changeover can be a very effective response to the changing business environment. It is notable that in 1979, 80 per cent of small manufacturers that practiced business changeover reported smooth sales and increase in profits.<sup>16</sup> Attempts at business conversion however, is not purely made of success stories. Several difficulties have been experienced such as lack of funds, personnel and management resources, difficulty in finding sales channels and difficulty if new technology totally unrelated to the existing one is used. In the light of these problems, several cases of business conversion have been in fields closely related to the previous business as typified by change from textile to garment and vice versa in the early 1970s. Such changeover to closely related areas of business has been a common trend in Japanese industrial history. The case of nail industry in Tsubame-Sanjo area in Niigata prefecture which successfully changed to kitchen and tableware manufacture exemplifies this trend.

The discussion of the approaches to technology management have been done in this section with several references to certain crucial functions related to technology being performed by the management within the SMEs or external assistance organizations. This points to the fact that technology management within these businesses cannot be discussed without analyzing the organizational framework within which technology is used. Therefore, it is imperative to discuss the organizational structure and characteristics of the Japanese manufacturing SMEs as one of the contributing factors to good performance. In looking at the organizational characteristics of these SMEs, it is useful to take a comprehensive approach which includes the internal organizational structure of these firms and their entire business environment which brings into focus the interfirm connections, and the external organizations that these businesses have to work in concert with.

#### **Enterprise Networking**

The main organizational characteristic of the Japanese SMEs is what can be termed as enterprise networking. Enterprise networking can be defined as the interrelation of firms in production with clear interdependence amongst these industries, and this occurs in such a way that the interdependence still allows for competition in the market. Industrial networking as a concept was first applied in the study of the *Keiretsu* (a group of Japanese companies tied together through reciprocal share-

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<sup>16</sup> . White Paper of Japan (1977-78), pp. 104-105.



holdings, credit relations, trading relations, and interlocking directorships).<sup>17</sup> Industrial networking takes two forms. First, is the vertical enterprise network which mainly involve large firms and the subcontracting SMEs. The second type of networking is of the horizontal type. The horizontal industrial network mainly comprises several small and medium enterprises sharing their knowledge about production and management technology. While analyzing the main strengths of the enterprise networking system, it is also important to discuss the framework within which this business practice takes place. This would help in facilitating a deeper understanding of this practice. Drawing upon the work of professor Tadao Kiyonari(1980), manufacturing SMEs may be classified into four categories by combining factors of markets, location and social division of labor ; (i) Regional industries (ii) Community-based industries (iii) Industries producing for large corporations and (iv) other types.<sup>17</sup> As well, the socio-cultural setting within which enterprise networking is conducted would be analyzed since this may be useful in giving a deeper insight into the workings of this business system.

#### I. Regional Industrial Clusters

Some of the SMEs have a long history of existence (Edo period before 1868, and Meiji Era 1868-1912), and they draw most of their resources including human expertise from the local areas. Usually these industries have regional specific advantages in terms of what they produce, which means that they sometimes serve other parts of Japan as well as exporting their products abroad. Their other key characteristic is belonging to same industrial sector and are concentrated in regional clusters. In the past, as the economy modernized, many of these industries were forced to change their products to keep up with the changing demand conditions.

The long period of existence of these industries in itself is a strength in the sense that a lot of technological experience and skills is acquired in the area of manufacture thus enhancing the social capability of these regional firms to absorb new technologies in related areas in case of change in products, and production

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<sup>17</sup> . Motoshige Ito, "Interfirm Relations and Long-Term Continuous Trading" in *Business Enterprise In Japan* (edit.) Ryutaro Komiya, MIT Press (1994), p. 117.

<sup>17</sup> . Tadao Kiyonari is cited in Mitsuru Yamazaki, *Japan's Community Based Industries: A Case Study of Small Industry*, Asian Productivity Organization, Tokyo (1980), p.2.

technology due to new market demands.<sup>18</sup> Technological accumulation can therefore be seen as one of the outstanding contributions of the regional-based industries. These industries are actually treasure-houses of technology and skills in their respective areas of operation. It is however useful not to make sweeping generalizations about the contribution of the regional-based industries which vary from very high-level techniques and skills to very low-level ones. It is still important to acknowledge that technology which by tradition has been accumulated in a production region is an asset that money cannot buy. The acquisition and mastery of the new technologies cannot be smooth if not totally impossible without such a historical background. Thus the contribution of the regional cluster industries to the technological progress of a larger number of SMEs is an integral part of the explanation of their vitality. In the clusters, the production takes the form of component processes and sub-processes each of which is performed by specialists. The production of a single item is therefore the work of many specialists, and the coordination and organization of the total production process becomes necessary. It is only in a few cases that it is possible to find integrated makers who perform all steps in the production process in their own plants. This system of production is however not unique to these businesses only, but is an integral part of the Japanese industrial organization of production. Industrial networking largely takes place within this division of labor system.

## II. Subcontracting System

Subcontracting relation is defined in the Japanese 1970 SME Subcontracting Business Promotion Law as "the production of intermediary processed goods such as parts and components." This system has had a long history in Japan, beginning with the "outputting system" used by merchants during the Meiji era (1868-1912). Under this system, a trader managed the flow of processing jobs given out to several highly competitive small enterprises. This past practice brings into mind the relationship of exploitation of the subcontractors by the core firms. Much positive change has occurred regarding the issue of exploitation. The relationship has evolved from the prewar one characterized by exploitation to a symbiotic one.<sup>19</sup> Actually by

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<sup>18</sup> .Technology and the Economy, The Key Relationships, OECD publication, Paris (1992), p.100.

<sup>19</sup> Ryoushin Minami, *The Economic Development of Japan*, Macmillan Press, England (1986), p. 153-154.

estimation, 65 per cent of SMEs are subcontractors.<sup>20</sup> It would be therefore important to analyze the contributions of this system of production to SMEs performance.

The SMEs with a reputation for skills and high technology receives several orders. Equally important is the strict observance of delivery-time and the ability to reduce the production costs. These requirements place very high efficiency demands on the subcontracting SMEs. These enterprises do specialize in the production of a few related items which allows for the concentration on research on improved production technology and the pursuit and maximization of their comparative advantage. In most cases these enterprises work in close co-operation with their main customers ( in this case larger or even sometimes other small enterprises). The close working relationship covers areas such as working together in design, quality and developing useful ties for technological improvements without large information costs. Through the subcontracting relationship, certain new technologies and management practices can flow down to the SMEs. This relationship so far has been one of the contributing factors to the reduction in the technological gap between the SMEs and the large firms. Subcontracting can therefore be seen as a useful channel for the flow of management and production technology from the large firms to the SMEs. For instance the use of the *kan-ban* system and quality-control circles is a perfect example of the diffusion of management technology from large firms to the SMEs.<sup>21</sup> It is notable that technical assistance takes place under the condition of long term continuity of business relationship. The long-term relationship is an indicator of a high degree of commitment evidenced by the fact that in a 1981 survey, the proportion of subcontractors that had changed their business partner was only 16 per cent. If anything, long-term relationship is a prerequisite for the advancement of loans of equipment, planning of production and investment in coordination with the larger firms.<sup>22</sup>

Even though the SMEs do get the above mentioned benefits in their subcontracting relationship with the larger firms, the power balance is always in favor of the larger firms. Due to their relatively vast resources, the large firms have a

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<sup>20</sup> . Takashi Yokokura, "Small and Medium Enterprises" in *Industrial Policy of Japan* (edit.) Ryutaro Komiya, Academic Press Inc. Tokyo (1988), p.524-526

<sup>21</sup> . *Kan-ban* system was originally developed by Toyota Automobile Industry. Under this system, low inventories are maintained through a process of supplying and or receiving the required parts and components in time. Usually the parts and components are kept in boxes with labels bearing the name of the parts, the customer and the date and time of supply or use.

<sup>22</sup> . Takahashi Yokokura (1988), p. 527.

stronger hand in the bargaining process. During the hard times, certain large firms make very harsh demands on the subcontractors, such as to further cut down prices. In the textile industry for example, the situation got worse to the point where after receiving several complaints, the Fair Trade Commission of Japan had to order textile contractors to stop forthwith the unfair cutbacks and arbitrary refusals of products ordered. In most cases, it is the lowest firm in the subcontracting hierarchy that bears the brunt more than the rest.<sup>23</sup> Despite these occasional problems, it is still fair to conclude that the subcontracting system does contribute positively to the vitality amongst the manufacturing SMEs. There is a built-in system of checks-and-balance in the business relations of firms in Japan which would help to highlight why the problems that sometimes occur in the subcontracting relationship never get out of proportion. The checks-and balance system can be understood in terms of the role the Japanese culture plays in business dealings.

#### The Japanese Culture and the Industrial Networking Process

The whole process of industrial networking is one of intense exchange relationship, therefore all the firms involved must be ready to offer something to the others. The interaction between firms is conducted through the intercourse of top management personnel who deal with each other within a cultural framework. Certain Japanese cultural values strongly influence the manner in which businessmen relate to each other. It is therefore necessary to analyze the importance of these values for the process of industrial networking.

First, it would be important to look at the concept of reciprocity and obligation in the Japanese culture. To understand reciprocity among the Japanese, one must of necessity try to grasp the meaning of the concept of *On* which is a relational concept combining benefit or benevolence given with a debt or obligation probably incurred earlier on. *On* is a social credit for the giver, while to the receiver it is a social debt. To restore a balance, reciprocity is required ( *On gaeshi* ). Reciprocity therefore literally means paying back of *On*. Because of the high value of reciprocity among the Japanese, a deep sense of gratitude interlocked with *On* has been inculcated as the foundation of the Japanese moral character. Also receiving *On* can

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<sup>23</sup> . Okumura Hiroshi, "Japan's Subcontractors, The Buck Stops Here" in *Inside the Japanese System* (edit.), Daniel I. Okimoto and T. Rohlen, Stanford Univ. press (1988), pp.85-86.

be considered as a burden (*giri*) that one prefers to unload as soon as possible, meaning that gratitude involves guilt feeling toward the giver.<sup>24</sup>

Usually gratitude is expressed verbally and by action. To refuse to repay, one risks being accused of being *On Shirazu* (unaware of *On* and therefore ungrateful). To be known as ungrateful spoils one's reputation which means losing face among others, more so the immediate group that one belongs to.<sup>25</sup> Losing face amongst one's group is something that the Japanese dread and this is illustrated in the usual Japanese expression in the case of a regretful situation - *Ana ga attara hairitai kimochi desu*. This statement literally means to feel like crawling into a hole because one feels ashamed of one's mistake. This expression is used to convey remorse for a mistake committed.<sup>26</sup>

Reciprocity and obligation are thus tied together in the interaction between individuals. This means that interdependence among individuals or groups is guided by the principle of need to show gratitude. Within this cultural framework, trust is the golden pivot round which relationships revolve. Because everybody is bound by the same cultural values, when they give away anything they do not fear the possibility of ungrateful behavior on the part of the receiver. The exemplification of the trust is the way Japanese firms conduct business and sign contracts with minimal if not complete exclusion of the use of lawyers. Usually such contracts are not very detailed and are expected to develop naturally through a long term relationship. The relationship that ensues after a contract is signed is regarded to be a complex one that cannot be completely covered in contracts. In practice, the enterprises operate in communities in which personal relations between businessmen is quite strong therefore the very fear of social sanctions make the decision makers for firms avoid anything that might cause them bad reputation and a possible isolation by the other firms. However, it is important to mention that apart from the cultural values, the economic conditions also contributed to the development and provision of an environment in which trust could be firmly rooted. In fact trust took root during the period of high economic growth because opportunities for future profit were more important and outweighed the possible momentary profit from betrayal.<sup>27</sup>

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<sup>24</sup> . Lebra Takie Sugiyama, *Japanese Patterns of Behaviour*, Univ. of Hawaii Press, Honolulu (1976), p.93.

<sup>25</sup> . Ibid. p.97

<sup>26</sup> . Hajime Takamizawa, "Key Business Expressions", *Yomiuri Shimbun*, Feb 11, 1995.

<sup>27</sup> . Motoshige Ito, "Interfirm Relations and Long-Term Continuous Trading", in *Business Enterprise in Japan* (edit.) Ryutaro Komiya, MITI Press (1994), p. 115.

A part from the cultural framework which facilitates the industrial network amongst these businesses, the presence and the trend toward the use of information technology is as well a plus for connecting various enterprises in different parts of the country. Therefore in the next section, the use of information technology and how it facilitates networking amongst the manufacturing SMEs would be analyzed as an integral part of the framework within which business is conducted. The importance of information technology to enterprise networking is that firms can be linked through the modern communication channels thus allowing the flow of large volumes of information. This supplements the human connections and can lead to new ones being created.<sup>25</sup>

#### Networking and the use of Information Technology

Compared to the large firms, SMEs seriously lag behind in the use of and investment in information technology. Most of the SMEs do not have adequate knowledge about information technology and its applications. This is mainly the result of lack of capable engineers and highly educated staff. Financial constraint is also a cause of the limitation of the use of information technology amongst several manufacturing SMEs. Still, compared to the developing countries, obviously there is a wider usage of information technology (all other references would be abbreviated as IT) amongst the Japanese SMEs. Increased use of IT would be a big boost to enterprise networking. The main efforts to increase the use of IT amongst the SMEs comes from the government channeled through public organizations in charge of giving assistance to these businesses.

The government policy which aims at increasing the use of IT amongst SMEs is a promising one. Through the Japan Small Business Corporation, the National Small Business Information Center was created in 1982 as a central organization which disseminates information to the Local Information Centers in the prefectures. These centers have a data base known as Small and Medium Enterprise Information Research System (SMIRS) which has all kinds of information relating to the operations of SMEs. Apart from SMIRS, there are other organizations which are concerned with the spread and use of information among the small and medium industries. For example the Planning Section of the Tokyo Metropolitan Labor

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<sup>25</sup> . New Human connections can be created for example when one finds out about a new customer or supplier through the information network system. Close interpersonal relations can be developed when business transactions take place.

Economic Office, Commerce and Industry Planning Department has SME information system data base, the so called "Mynet-Tokyo". This database has about 22,027 records on corporations, people, organizations, research reports, information about policy and consultation offices, and all sorts of statistical data relating to SMEs.<sup>29</sup> Also the SME Consultation Center has an E-mail system called the Small Enterprise Information System, referred to as "TORIDAS" meaning "retrieve" in Japanese. It provides E-mail system, a bulletin board system, facsimile transfer, electronic meeting system and a data base on SME related information. Even though the use of these services is still rather low, the trend towards the increasing use of IT would further facilitate networking that is already in place. Going by the survey done by the National Information Center in 1991, 28 per cent of SME manufacturers of production goods and 22 per cent of manufacturers of consumer goods had used the SMIRS. It is encouraging that the trend has been one of small improvements year after year. For instance, the number of consultations were 363,810 in 1985, 364,563 in 1987, and 368,058 in 1988.<sup>30</sup>

The significance of the trend toward the increasing use of IT lies in the strong backing it gives to the efforts in industrial networking. IT makes industrial networking much easier and faster. It is however, important to point out that all the contacts made through IT can only become useful when they are followed by the development of close interpersonal relations between individuals representing their firms. As the use of IT expands among the SMEs, it is expected that this would give more vitality to the operations of these industries.

The technological and organizational system of the Japanese SMEs is a major contributor to their dynamic performance. The approach to technology management of these businesses however as can be seen from the study, requires the fulfillment of certain conditions. This as well applies to the organizational forms that these businesses operate in. Some of the conditions can be regarded as purely unique to the Japanese environment and time period therefore cannot be duplicated elsewhere. Therefore, attempts at drawing lessons from this study require the awareness of the unique factors while recognizing those that can be used elsewhere if the necessary conditions are provided. From this perspective, it would be possible to write about the implications of the study of these businesses for the development of SMEs in Kenya.

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<sup>29</sup> . Osamu Sato, *Government Policy for SMEs in Japan: Supporting Informatization in Promotion of Information Technology in SMEs*, Asia Productivity Organization (1994), pp. 14-22.

<sup>30</sup> . Ibid. p.23.

Implications of the Technology Management and Organizational System of the Japanese SMEs for the development of SMEs in Kenya.

To begin with, several reasons exist as to why the development of SMEs would be extremely useful. The development of SMEs would help in the generation of employment and the utilization and mobilization of resources that would otherwise remain idle. For instance SMEs make possible the mobilization of family savings which may otherwise remain unutilized or channeled to unproductive activities and luxury spending. These industries are also quite useful in the training of entrepreneurs, since in entrepreneurship business exposure counts much. There is no better place for the birth of new small businesses than a region where some already exist.

Because little industrialization has taken place in Kenya, the condition of SMEs is such that there is the dominance of very low level technologies. In the actual sense technological capability is lacking in many businesses. Therefore there is an urgent need for the building of the social capacity of the SMEs to absorb new technologies. Since almost all the technology would be new and not developed within this sector, there is need for the upgrading of the skills of those working in this industries. In this respect, much can be learned from the role that the community or regional based industries have played in Japan. This requires the need for identifying potential production zones with special competitive advantages. It is these clusters that can act as technology treasure house as seen in the case of the Japanese regional based industries with a long history of operation. The identification of clusters can be extended to the informal industrial sector (micro industries) as well to nurture the technological capabilities. It may be easier to identify the clusters in the formal medium scale manufacturers as compared to these micro industries. Within the micro industries, certain clusters can be identified such as metal working in Kamukunji area of Nairobi and wood working in Kibuye area of Kisumu.<sup>31</sup> Amongst the medium scale manufacturing SMEs, cluster formation can be looked for and encouraged in sectors such as food processing, leather work, grain milling, blacksmithing, textiles and agricultural implements. Through the cluster formation technology accumulation can be achieved even though this would take some time, but

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<sup>31</sup> . Reference to these cluster in the formation process is made by Turnburn J, *Development and Promotion of Appropriate Tools and Implements for the Farming and Food Processing Through Local*



once the social capabilities to handle technology in certain sectors is built, this would be an asset for a long time to come.

Invariably, the clusters when fully developed would give a firm economic base to the various regions. Such a firm economic base helps in meeting the employment and income needs of the inhabitants of these areas. A firm economic base also makes relevance for further development of other SMEs which can be understood in the sense of a readily available market stemming from the incomes generated from the existence of the clusters. The further development of technology in the new industries within the clusters would have the advantage of a market pull. The clusters would also make sense for retaining of skills within these regions. In the Japanese case, if the regional industries did not exist, almost all the young people on completion of school would leave the local areas to seek work in other areas where jobs are relatively easily available. Even though several well educated young people, still leave for the bigger cities to seek work in bigger firms offering better working conditions and salaries, the situation would have been much worse if there was no industrial base formed by the regional cluster SMEs.

To fulfill the task of social capability building, the government through the SME development agencies would be instrumental in establishing public research institutions that allow the free flow of information to take place. This requires structuring the organization of these institutions in such a way that they are well spread in various parts of the country and even allowing a bottom-up information flow and decision making to avoid the creation of elite institutions with little reach to the local areas. At the same time the standardization of the operations of these institutions nationwide is key to the successful application for practical use in the firms. It is notable that whatever little industrial research has been done in the research centers in Kenya has not been linked to the production process. The research process loses its meaning, since it ends up as an exercise in futility.

Concerning technological improvements, much can be learned from the Japanese SMEs' *kaizen* approach. Traditionally, in Kenya new and sophisticated technology is impressive and may even be confused with big leaps in technological development which is considered by many as the mark of success. Contrarily, the *kaizen* approach may be highly beneficial in the sense that the cumulative impact of constant small incremental improvements can be so great as evidenced in the technological progress made by the Japanese SMEs. While it is cheaper to make technological improvements using this concept, it also allows for the maximum

utilization of the available scarce resources and facilities. The success of this approach however hinges on the constant upgrading of skills to enhance the formation of skilled labor. When kaizen is combined with business conversion method practiced by the Japanese SMEs, this could serve to lend more vitality to the SMEs in Kenya. Actually, business conversion as has been practiced amongst the Japanese SMEs can be regarded as a new concept for Kenya. It is a very useful concept especially in the light of the expected deepening and upgrading of the industrial sector in Kenya. Through the practice of business conversion, the Kenyan industrial planners and the entrepreneurs can learn to cope with changes in the industrial sector stemming from both domestic and even international conditions. As detailed in the Japanese practice of this method, adequate preparation beforehand is crucial to the success of this practice. Thorough surveys to create reliable information would be necessary since this is cited in the survey among the Japanese SMEs as important for the right kind of guidance to be given.

The technology management of the Japanese SMEs goes together with enterprise networking which therefore requires the analysis of implications of networking for the development of SMEs in Kenya. The main strength of the industrial network system lies in the general reduction in the transaction costs. Because the various firms pool their resources together, it becomes possible for them to reduce costs. Through this method, information can be acquired at relatively reduced costs both in terms of money and time. Industrial networking can also be a very effective means of achieving technological diffusion amongst various industries. This makes sense given the limited resources at the disposal of the Kenyan SMEs. Even though it would be difficult for Kenya to use information technology as in the case of Japan, still it would be important to create the awareness of the importance of networks as a means of getting information. In this case, social networks can be emphasized and used in combination with information provided by government agencies for SMEs.

The historical development of the sophisticated social division of labor in Japan could as well serve as a model for the development of informal business in various parts of the country into formal industry. For this to be fulfilled, there is need for an organizing agent to coordinate and supervise all the phases of production. To benefit from the subcontracting system which can be instrumental in the creation of backward linkages, governmental guidance is necessary. Even though linkage formation could take place without the government's direct intervention, this may

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to ILO, Geneva.

take unnecessarily longer time if left entirely to the market forces. The government's role can be in encouraging the competition amongst the medium enterprises to ready them to act as suppliers to the multinational companies. In turn, the smaller enterprises can be encouraged to fill the lower part of the social division of labor hierarchy. Efficiency is key to the sort of division of labor suggested here since the subcontracting system demands strict observation of production deadlines, cutting costs, and keeping high quality standards. As can be seen in the Japanese case, a vibrant industrial and economic growth is key to this process of division of labor by way of the several business openings that are created under such conditions. Note that during the hard times of economic recession, the small industries suffer most. There is also a general need to encourage Kenyan entrepreneurs to venture into manufacturing business other than the commercial sector. Since manufacturing requires practical skills, the encouragement of new SME start-ups in this sector could be done by encouraging the graduates of technical and engineering students to become entrepreneurs. This could be done without incurring new costs of training such as redesigning of the university curriculum to include business courses for engineering students. This could be easily done by allowing the cross registration of engineering students in the business courses. This would help in developing of both the engineering man and economic man in every graduate of the engineering schools. Such human resource is indispensable for the moulding of a sophisticated division of labor required by the subcontracting system. It is notable that currently many businesses prefer the vertical integration of almost all their activities due to the risks that abound in the business environment. This is why the argument for the encouragement of efficiency among the SMEs is tenable. It is only efficiency in their production methods that could allow them to participate in production with the larger enterprises. Even though the achievement of efficiency can be linked to certain economic conditions such as the availability of finances to purchase equipment and machinery, efficiency also stem from organizational aspects and business values that the businessmen opt for.

Even though there are several structural and socio-economic environmental differences between the Japanese SMEs and the Kenyan ones, still a lot can be learned from the Japanese practices in technology management and business organization. Some of these lessons can be difficult to apply with respect to resource constraints. On the other hand the application of certain practices requires much time to be fully developed as in the case of the subcontracting system. The Japanese technology management approach of *kaizen* would fit in well with the Kenyan situation since it emphasizes the maximization of the use of the existing resources.

Yet it also demands keenness on maintenance of the existing machines while there is a constant process of the upgrading of skills and knowledge to handle machines that one has been using for a long time. It is a capability-upgrading oriented system. It therefore requires the constant training and building of abilities which are required in its slow process of innovation.

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