

Flexible Specialisation in the Preferential Trade Area of Eastern and Southern Africa?

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Introduction

Most developing countries in general are faced with a multiplicity of problems. These include poor technological growth, low levels of industrial development, inappropriate institutions, deficits on balance of payments, falling commodity prices, increasing foreign debt, and high rates of population growth. These lead to poor performance in all economic sectors. In the past these countries alleviated their problems by external borrowing, but this assistance has rebounded in the form of growing debt which has outstripped their ability to repay. As a consequence external assistance has been cut back, exacerbating the difficulties which they face.

In this paper we would like to provide a brief overview of the problems facing the Preferential Trade Area of Eastern and Southern Africa (PTA) and to question whether they can be overcome through the use of the latest advances in technology, work practices and organisational structures. These involve the adoption of flexible orientations and new electronics-based automation technologies.

The following section outlines the background of the PTA. The next sections look at the concept of flexibility, the problems faced in its application in the PTA, and its prospects in the region.

Background

Geographically the PTA, as the name implies, lies in the eastern and southern part of Africa. It comprises 15 states which in 1984 developed a form of economic integration in a bid to solve some of their economic problems. These countries were Burundi, Comoros, Djibouti, Ethiopia, Kenya, Lesotho, Malawi, Mauritius, Rwanda, Somalia, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe.

The inherent problems facing the PTA countries are those that face the Least Developed Countries and can be grouped into technological and institutional factors. Technologically the PTA has a low level of industrialisation; institutionally it has a poorly developed physical and social infrastructure. The PTA also has high rates of population growth coupled with falling levels of GDP.

The outcome has been reliance on imported technology for use in all sectors including agriculture. To finance these imports, exports (mainly agricultural products) have been used as a source of finance. Because of declining commodity prices, the PTA has come to rely on foreign aid as a major source of financing domestic production. This led to a growth in debt. The outcome has been a cutting down on foreign aid, which crippled imports and affected domestic production. Capacity utilisation in existing industries in most PTA countries has been falling.

The move of these countries to form the PTA in 1984 was designed, among other things, to rectify this situation. The advantages would accrue from the larger territory, the larger population, pooled financial resources, the relaxation of trade barriers and the growth of competition and competitiveness in the region. These would arise from, and be accompanied by, institutional changes. Thus attempts have been made to formulate common policies with regard to agriculture, industry, physical and social infrastructure and common legal practices.

Flexibility and Automation

In this section we will briefly consider those elements of current industrial restructuring which have a potential impact on the PTA region.

One of the major currents towards increasing flexibility in production has been the success of Japan. It is therefore necessary to look briefly at the historical reasons which led to the development and success of the system. Way back in the late 19th century Japan had already adopted policies to stimulate growth of manufacturing industry. These policies included:

- a) a strong impetus from central government to promote the modernisation of the Japanese economy.
- b) Identification of education and training as key factors in the modernisation process.
- c) Intense efforts to import and adapt foreign technology.
- d) Close cooperation between government and large industrial concerns.

The Fordist system of mass production of homogenous commodities was adopted in Japan from the early 20th century, but because of the small and fragmented

market, Fordism did not fit in well. So in the 1950s and 1960s, the Japanese, using their organisational skill, developed a system which would cater for their market. More recently, the organisational nature of Japanese business has allowed the economy to quickly learn and use new technological developments which incorporated computer electronics in the production process.

These Japanese advances in organisational flexibility have been widely introduced in North America and Western Europe because of their advantages over their predecessor. The new system involves increases in the quality of products, reduces costs and produces a wider range of products.

Cost reduction has been effected through a number of measures which can be conveniently grouped into technological and organisational factors. Technologically, both machines and workers have been very highly developed and are highly productive. The use of electronics is applied in design and production. At the design level, new Computer Aided Design (CAD) had reduced the size of products without necessarily affecting quality. The reduction in size automatically reduces the material content, hence the material cost. At the production level new machines have been introduced. These include robots, automatically guided vehicles and manufacturing systems which perform several functions. Robotics has been applied. Workers are multiskilled, and undertake several functions, undergoing rigorous and regular training to catch up with any new developments in technology or organisation of industry.

Organisationally there have been changes in both machinery layout and labour responsibilities. First, cell-based production has reduced the distance travelled by a product from start to finish. Accompanying this is a reduction in the batch size. One advantage of this is the short lead-time used in the production process and the speed with which the buyer's changing tastes are met. Another advantage is the ease with which the batch can be quality controlled to even out defects. Second, workers have been organised in relation to their responsibilities. Multitasking and multiskilling are increasingly important. Their relationship with the management has changed: instead of receiving orders from the top they can also feed back suggestions to top management.

A wider range of products can also be made, given the level of technology in design and flexibility in production. Because of this a new relationship has developed in the market and between firms. Production is demand and quality oriented.

Proximity to the market, the whole organisational structure and technological competence has been accompanied by Just in Time (JIT) production. Amongst other things, JIT reduces the costs of

inventories, but it requires efficient reliable suppliers, an efficient and reliable infrastructure and close cooperation between the material supplier and producer.

Some Constraints on the Application of Flexible Specialisation in the PTA

As indicated earlier, Africa is facing a serious and growing economic crisis. The much vaunted export-orientated industrialisation (EOI) and the less fashionable, traditional import-substituting industrialisation (ISI) strategies have both failed. There is therefore a frantic search for solutions, for new ways of doing things.

While recognising that there is no simple or single solution to the economic crisis facing Africa, there is a growing awareness and realisation that new flexible technological innovations, coupled with organisational change and new work practices, can serve as a vehicle for accelerated economic growth and industrialisation. They may also be relatively low cost and be efficient in saving foreign exchange. These methods of work, based on information technology, are also seen as a way or bridging the wide technological gap between the developed world and the developing countries of Africa.

For the envisaged changes to succeed, it is necessary to have a favourable and conducive socio-economic environment at the macro as well as at the micro level. In this section we shall attempt to identify some of the possible constraints and bottlenecks to the introduction of these new currents of production, that is; new technologies and organisational innovation.

(a) The Constraint of Limited Financial Resources

African countries were drawn into the international division of labour essentially as producers of raw materials and consumers of imported manufactured goods from the Western industrialised countries.

Foreign exchange earnings from the export of primary commodities are small and highly vulnerable to market fluctuations. Falling commodity prices and steep rises in prices of manufactured goods and equipment, make it virtually impossible for firms in the PTA region to purchase new electronics-based technology, to finance R and D, to develop new products, and to purchase raw materials and intermediate products. All these adverse conditions create an environment that is not conducive to change. Moreover, small firms, which are the norm in most African and PTA countries, have inadequate scale and financial resources to keep abreast of new developments.

Innovation, we believe, may best be carried out within large diverse corporations and institutions which can cross-finance between their varied and profitable

activities. High technology firms and industries require increasingly capital intensive cost structures, which include R & D, expensive computer networks, flexible manufacturing systems, world wide organisation for marketing and customer support. For example, Japanese companies with intricate owner shareholders have a strong financial base and can therefore afford to spend intensively on research and development, even while producing poor profits.

(b) Constraints of Education, Training and Skills

Information technology, at the heart of which lies the microprocessor or computer, is by definition knowledge intensive. The introduction of new technologies and new work practices requires both a minimum number of well trained people (engineers, managers, accountants, computer specialists, production workers etc.) and a minimum degree of competence in their area of specialisation [Hoffman 1989]. Education and training are vital for understanding, operating, maintaining, and assimilating imported technology. They must be one of the top priorities for any long term strategy to bridge the technological gap.

As is known, in many — if not all — of the PTA countries, there is a dearth of the requisite managerial, technical and organisational skills needed for modern industry. Although a lot of investment has since been made in education, these education programmes are not geared towards the training of production engineers and skilled labour for industry. As Mytelka (1988) points out, few universities in sub-Saharan Africa offer majors in such fields as textile or petroleum engineering, and the training of skilled workers and line supervisors in post-primary vocational training schools is also deficient. The new demands for multiskilled workers must be seen in the context of these shortages in 'traditional skills'.

By contrast, immediately after the Second World War the Japanese developed a comprehensive and thorough system of education and training for the entire workforce. This was complemented by implementing a set of related social changes which broke down the barriers between blue collar and white collar workers [Freeman 1988].

(c) Constraints Related to the Transfer of Technology

In all African countries TNCs have shaped the patterns of production and consumption, the choice of products for export, determined the size of investments and, most important, have been the source of and vehicle for the transfer of technology. Since technology is embodied in imported capital goods and equipment, it was assumed that importing ready made machinery and capital goods is a form of technology transfer. Little attention was paid to the mastery of

this technology. In many cases the stimulus to assimilate was also frequently lacking. The kind of learning-by-doing that produces a steady improvement in productivity did not always occur automatically in the course of production.

There is therefore a need for the PTA countries to pursue a deliberate policy of assimilating and improving upon imported technology through what Christopher Freeman calls 'reverse engineering'. This involves tearing apart, studying and eventually trying to manufacture a product similar to that which is already available on the world market, but without direct foreign investment or transfer of blueprints for product and process design.

This Japanese approach to the import of technology may be compared and contrasted with methods used in developing countries. 'In many developing countries', states Freeman, 'the method of technology transfer was very often either through subsidiaries of multinationals or by import of turn-key plants designed and constructed by foreign contractors'. Neither of these methods is likely to result in an intense process of technology accumulation in the relatively passive recipient enterprise. It should also be borne in mind that since technology is the source of competitiveness and profitability for the TNCs, they have been reluctant to transfer to the developing countries R & D facilities and the latest technology.

(d) Market Related Constraints

A characteristic feature of the countries that are grouped in the PTA is the small size of the domestic market, due to the low purchasing power of the population and small population sizes, e.g. Comoros, Djibouti and Swaziland.

The small size of the market, amongst other things, would make these countries ideal for the introduction of flexible production. The dilemma is gaining product differentiation, while having to sacrifice the economic advantage of high volumes and long production runs associated with mass production. It should be noted that in all these countries, there is a great need and demand for basic goods and commodities as opposed to luxury goods. There is therefore a need for volume production for the mass market. Industries that serve a wide market, where benefits of scale can be reaped, fall into the three categories classified by Mytelka (1988) as:

- (i) Industries that meet basic domestic needs, for food, shelter, clothing or health care, as in the building materials, domestic food processing, and textile industries.
- (ii) Luxury mass consumption goods which provide an additional stimulus to production such as cigarettes and beer.
- (iii) Essential inputs of capital and intermediate

goods, to increase agricultural output and productivity, upon which the growth of the industrial sector depends. These include fertilisers and agricultural implements.

In the PTA countries, while product differentiation is undoubtedly important, it plays a secondary role to the availability at affordable prices of these basic consumer and capital goods. In addition, the three types of industry mentioned above were to a large extent able to use local raw materials and labour as inputs. They were therefore, to varying degrees, more likely to generate forward and backward linkages, to enhance skill formation and to contribute to domestic value added. The performance of these industries in all these countries of the sub-region has been lacklustre. Productivity and quality have fallen steadily, while the cost of production has gone up. Under these circumstances, it would appear that there is a need for a new configuration that would combine the advantages of FS with volume production — perhaps this might be termed flexible mass production.

Conclusions

As we have seen above, the prospects of increasing flexibility in the industrial sector in the PTA lie largely in the future, when markets will have grown, technology will have been developed and appropriate infrastructure will be available. All these will not be realised spontaneously, but will require conscious efforts by governments. Thus this section focuses on how governments in the PTA can create an appropriate climate for introducing more flexible and automated production.

Freeman has shown that the success of technological development in Japan hinged on the government's deliberate support. The Japanese government recognised that the private sector could not be left to manage on its own because there are certain areas where it cannot perform well without government support. This includes public goods and services such as social and industrial infrastructure, the control of environmental pollution, establishing harmonious relations with other countries and the optimal allocation of resources for a long term developmental perspective. The Japanese government refused to accept the conventional theory of comparative advantage, according to which Japan should have taken advantage of its abundant and low cost labour. Instead Japan, with state support, took a different and more technology-oriented route to industrialisation.

The Japanese government was able to succeed through implementing a number of measures. These included the working out of a well-researched and long term strategy of industrial development. This was

made in collaboration with both industry and the scientific and technological community. The second key element involved embarking on a strategy of reverse engineering on imported technology. This required studying, modifying and improving imported technology. In addition, the Japanese used the factory as a laboratory, involving closely the department of research and development in production engineering and process control. The third aspect of policy saw the development of a comprehensive and thorough system of education and training of the entire workforce. Fourthly, the Japanese government gave protection and financial support to domestic companies to enable them to compete favourably with foreign ones.

Because of a combination of long term forecasting and sound investment, the Japanese were able to foresee the limits of mass and flow production. In the 1970s they shifted emphasis to the knowledge-intensive industrial structures which now dominate in the 1980s. All these measures contribute to make Japan the formidable force it is today and a world leader in technology. Many of these policies were copied by the Asian NICs, especially South Korea.

The PTA could learn some lessons from the way Japan and the NICs were able to transform themselves into industrial giants in a relatively short space of time. The region does not have to slavishly follow the example of Japan, and it might not be entirely possible to do so, because of changed conditions and circumstances. In some areas it is possible to emulate Japan. For instance, the PTA in the 1980s is faced with a low level of industrialisation and an acute shortage of foreign exchange just as Japan was faced with in the mid-1940s. During that period, the Japanese government concentrated resources in key industries and sectors of the economy rather than spreading them widely.

There are a number of measures that the PTA could adopt, in order to create a favourable climate for the introduction and implementation of flexible production. First, the PTA should work out a long term policy and strategy for technological and industrial development. This should set out both the goals and the means for achieving these. It would look at the technological innovations and new work methods with a view to suggesting where and how these could be implemented. Secondly, the PTA should undertake measures aimed at strengthening indigenous technical capabilities, to enable reverse engineering to take place. Thirdly, as stated earlier, the PTA must have a sound education and training policy, which will have a bias towards science and technology, and also be geared towards industry. Finally, the PTA should assist local firms to compete on a much more favourable basis with foreign firms by providing financial, managerial, and technical assistance.