THE DEVELOPMENT OF RURAL MANUFACTURING INDUSTRY IN CENTRAL AFRICA, WITH SPECIAL REFERENCE TO METALWORKING.

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"The Development of Rural Manufacturing Industry in Central Africa with Special Reference to Metalworking".

In this thesis I argue that rural industry is a critical element in the development of poor African countries, and that its virtue has been recognised by a growing number of interventions in recent years. Particular benefits of rural industrialisation are the support of agriculture, improved availability of consumer items and repair services within the rural community, the generation of rural income and a contribution to the development of the national technology base. However, in spite of the attention this sector has received, there has so far been little evidence of rural industry thriving.

The general failure of rural industry to develop indicates that either it is inherently unviable in a modern context or that the interventions concerned with it have been recurrently faulty. I contend that, while the degree to which rural industry may thrive depends upon the level of formal industrial activity in the country, it is essentially viable but that where interventions have taken place they have usually been inappropriate.

The bulk of this thesis therefore examines what interventions would be appropriate to encourage this sector. I show that two conditions are essential. Firstly that interventions must take as their point of departure the existing context and practice of rural artisans, for example, training should take place within their normal working environment, depending only upon the resources to which they normally have access or to which they gain access by means of the training. Secondly that the target group for any intervention must have a significant degree of control over it.

Innovation is argued to be a key determinant of sustainability. The significance of confidence and its contribution to innovation are established, identifying the crucial nature of innovation itself within the artisanal context. Rural manufacturing industry is unlikely to thrive unless conditioning and circumstances encourage artisanal practitioners to innovate. I examine the factors that encourage or inhibit innovation, particularly attitudes towards existing practices and the perceptions of external agents.

As well as examining in depth specific factors such as innovation and the control of interventions, the thesis reviews all the resources required by rural industry in order to thrive and demonstrates the importance of a balance between them. However it is argued that skill development is the field in which external agencies can most usefully assist informal sector rural industry and that the results of interventions must be capable of autonomous propagation if they are to have any significance.

1: INDUSTRIAL DEVELOPMENT.

This chapter is structured in three sections. The first examines models of industrial development and discusses their relevance to the Central African context. Following upon the conclusions of the first section, the second explores the nature and significance of small-scale industrialisation, which the third section then relates to rural industrialisation.

THE NEED FOR INDUSTRIAL DEVELOPMENT.

This thesis is concerned with the process of a particular form of industrialisation. The first six segments of this chapter, up to and including "The Disproportionate Influence of the Modern Sector", examine the broader context of industrial development relating to Central Africa and the possible models for development.

The industrialisation of Third World countries is an essential step on the path towards improved standards of living in those countries, and towards a more equitable economic relationship between North and South, the industrial nations and the Third World.(Hojbak,1980,p144)

> "The picture that emerges from the analysis of the perspective of the African region by the year 2008 under the historical trend scenario is almost a nightmare. Poverty would reach unimaginable dimensions since rural incomes would become almost negligible relative to the cost of physical goods and services. The conditions in the urban centres would also worsen with more shanty towns, more congested roads, more beggars and more delinquents. The level of the unemployed searching desperately for the means to survive would imply increased crime rates and misery. Against such a background of misery and social injustice, the political situation would inevitably be difficult. The very consequence of extreme poverty would be social tensions and unrest which, in turn, would result in political instability. With the continuous and cumulative financial difficulties, governments would have little choice but to yield to the often unkind designs of international monopoly capital. As a result, the very notion of national sovereignty would be at stake."(UN Economic Commission for Africa,1983,pp93-4)

The colonial pattern of raw materials from a colony being exchanged for manufactured goods from the colonial power effectively endures, since the only exports possible for a country without a significant manufacturing industry are raw materials, principally agricultural and mineral. The foreign exchange earned by these 'cash crops' is necessary for the buying of manufactured and intermediate goods and technology of all kinds and, in some cases, food. The disparity in commercial value between raw materials and the processed end-products perpetuates a neo-colonialist relationship between economies which are industrialised and those which are not. In consequence of their great wealth the industrial countries largely control pricing structures and the technologies needed by the developing countries, and are therefore able to continue to maintain their privileged economic position.(Tanzania, 1969,p133)

Within developing countries the demands on the small amounts of existing foreign exchange for use on non-productive imports, such as armaments and consumer luxuries, further limits that which is available for investment. (Accepting the need for National Security, which may be exacerbated by the external manipulations of industrial nations.) The patterns of consumption are greatly influenced by the commercial marketing of imported manufactured products, whose sale primarily benefits the Northern manufacturer. A clear indication of the desperation of Zambia's foreign exchange situation was given in 1987 by the unpopular banning of the importation of carbonated drink concentrates such as Coca Cola; (North,1986,p52) this measure was not taken until after the imposition of a currency auction restricting the foreign exchange for the whole country to $4 million per week had failed to have the desired effect. The marketing strategies of the North constitute the export of consumer materialism, to the detriment of developing economies. These strategies extend beyond domestic items to create prestige and glamour for high-technology industrial hardware which the North wishes to export, regardless of the broader effects that may accompany its application in a less developed country. Even funds provided by the governments of industrial nations for development purposes are frequently robbed of much of their usefulness, if not given a negative value, by being 'tied' to the condition that they should be largely spent on equipment manufactured in the donor country; provision is generally not made for the subsequent support and imports that such industrial hardware is likely to require.(Singer,1977,p36)

If developing countries in the Third World are to find a solution to this neo-colonialist imbalance of trade and power, the development of their own processing and manufacturing capability in a way appropriate to their resources is an essential part of it. The export of value-added goods rather than raw materials enhances the direct income arising out of agricultural or natural resources. In addition indigenous industrial capacity permits the replacement of imports in general by generally cheaper local goods. This will bring about an improvement of living standards and a greater availability of productive hardware. However, where the continuing importation of capital and intermediate goods is needed in order to support the industrial capacity the benefits will be eroded. In theory, if the industrialization of a developing economy helps to control the requirement for foreign exchange, as well as directly earning some, the pressure to generate foreign exchange by the cultivation

of cash crops should be reduced. This in turn should permit the development of agriculture in ways more likely to benefit the population directly. However, the direct and hidden costs of inappropriate industrialisation can be such that the process is counterproductive, leading to a greater dependence and economic imbalance. 'Development' of this kind is negative, magnifying existing economic difficulties and introducing new problems, particularly social ones. The composition and nature of industrialisation within a developing country should therefore be carefully considered, in order to maximise the beneficial economic and social effects while minimising the extent to which further problems are created or existing ones perpetuated.

> "The inherited colonial structure cannot be eliminated without an industrial strategy which aims at self-reliance instead of reinforcing the foreign ties, which would repeat present exploitations" (Party directive, Tanzania, 1973, 'Agize Juu ya Viwanda Vidgogo Vidogo Nchini', in Berg,1978,p50)

MODELS OF ECONOMIC DEVELOPMENT.

While an agricultural subsistence economy might be considered as an option for some African countries it would provide little scope for improvement, particularly since the resources available per capita are now significantly less than they were when subsistence was previously the norm, in pre-colonial times. The ecological deterioration and the continuing population growth militate heavily against subsistence representing a viable choice of economic strategy. In addition, in most cases, the comparative poverty of a subsistence economy is unlikely to be attractive to the aquired materialist tastes of the ruling elite. Since some form of industrialisation or foreign exchange generation is necessary if development is to take place, subsistence cannot be considered as a strategy for development.

It is inevitable that developing economies will to some extent contain disparate elements which have been established under different regimes or during different policy periods. Even where one specific strategy has been pursued for an extended period the economy may include apparently anachronistic elements as a result of particular circumstances or pressures. However, most economic development strategies conform to one of the five models below.

The Primary Production Model. Economies developed according to the industrialised nations' concept of 'free trade', where the theory of Comparative Advantage dictates a concentration upon primary production, may be regarded as a variant of the Colonial model. (The nature of modern technology has largely negated the other comparative advantage of poor countries, namely cheap unskilled labour.) This strategy is export orientated, with some value-added as processing capacity increases. However, processing systems will generally be capital-intensive, depending upon imported technology and technical skills. The comparative advantage of primary production capacity falls as the values of the products decline; in some cases tropical agricultural products now compete with the subsidised equivalents grown in industrialised countries. A developing economy pursuing this model is dependent upon the generation of foreign exchange through the export of primary products to finance all its domestic requirements for manufactured goods. The economic dominance of the industrial nations dictates the values of primary products, the low price elasticity of which offers poor protection when the world economy is unstable.(Tanzania,1969,p133) The industrialisation of agriculture which is usually a component of this model aggravates rural unemployment and urban migration, without offering significant industrial employment alternatives.

The Import Replication Model. Industrial development based on import substitution is concentrated upon the domestic production of industrially manufactured goods in preference to their importation. Although some foreign exchange is saved and some jobs are created, the necessary capital equipment must be purchased abroad and will normally require a continual supply of imported intermediate goods and technical support. Import replication of this kind does allow for some export of the products concerned, but this will be in direct competition with industrialised nations using the same technology more efficiently, or using even more advanced methods.

These kinds of Import-Substitution Industrialisation enterprises force domestic capital to compete on unfavourable terms to produce goods similar, but invariably inferior, to those of the multinational corporation. It does not foster outward orientated production in Africa comparable to that which Frobel *et al.* see in South-east Asia as a source of manufactured goods for the world market. Rather as Langdon and Mytelka suggest, while Africa *is* incorporated into the world economy it is in a subsiduary manner generating few internal linkages or no significant growth of local entrepreneurs via the need for subcontracting."(Higgott,1986)

Import replication involves the use of inappropriate production technologies designed for quite different circumstances, and fosters unequal income distribution, relying upon the 'trickle down' effect for general income improvement. Since exports achieved by this form of industrialisation are unlikely to generate an adequate supply of foreign exchange, additional exports such as cash crops will also be required. While import substitution is a means of industrial development, it is unlikely to contribute significantly to national economic development, since it is a compromise position.(Langdon, 1986,p181)

The Industrial Exports Model. The development of export-orientated manufacturing involves the importation of modern capital intensive technologies and the intermediate goods and technical expertise to service them.(Langdon,1986,pp181-211) The disadvantages are similar to those encountered in an import replication strategy, and include the massive debt required to finance the necessary capital investment and the consequent vulnerability to global economic fluctuations. The inherent inequality of income distribution creates a dualistic economy, where little 'trickle down' to the rural poor will occur. Whatever the virtues of this model, the circumstances which permitted the Newly Industrialising Countries to successfully undertake industrialisation in the recent past no longer exist. In 'The Political Economy of African Debt: The case of Zaire', Thomas Callaghy makes it clear that

> "Very few African countries are likely to succeed in exporting themselves out of debt, or even into stable and productive debt, much less into a higher level of development. Under current world conditions, the replication of NIC export-oriented development strategies is in serious doubt in much of the Third World; it certainly is for most of Africa."(Callaghy,1986,p342)

The Heavy Industry Model. The socialist model of initially developing heavy industry at the expense of agriculture and consumer goods cannot be considered to be viable in the context of Africa, though the Chinese variant, of 'walking on two legs', where heavy industrial development is undertaken parallel to agricultural development, may be regarded as slightly more relevant in a rurally-based society. Both strategies require an existing technical skill base, capital and a large captive domestic capital goods market, which are not available within Africa. Such a development strategy also requires social and economic disciplines that are inconsistent with African cultural traditions.

The Small-Scale Industrial Model. Broadly-based low-level industrialisation based upon existing craft industries avoids the need for foreign capital and, by replacing imports rather than replicating them, reduces the foreign exchange requirement. Replacement involves the manufacture of goods which perform the same function as those previously imported, but without attempting to reproduce the same quality or designs, for which modern industrial equipment would be required. The small scale of the industrial units involved limits the degree to which income is concentrated within classes or geographical areas. The use of available levels of technology and capital permit industrial propagation on a scale impossible where high levels of skill and capital are necessary. Small-scale industrialisation forms a part of general small-scale development, particularly agricultural. There is a minimal dichotomy between agricultural and industrial development, and far more linkages exist between the various economic and social sectors. Vulnerability to external economic fluctuations is minimised, as is the degree to which foreign exchange requirements dominate the national development strategy. It is this model of industrialisation which this thesis explores.

THE MODERN AND INFORMAL SECTORS.

Of the models identified above, Import Replication, Industrial Exports and Heavy Industry are dependent upon high levels of capital in order to finance modern manufacturing technologies, and therefore depend primarily upon a trading relationship with the industrialised nations as the means of obtaining it. While the neo-colonialist Primary Production model does not concentrate upon manufacturing industry, modern industrial technology and expertise are likely to be used for the in-country processing of the primary goods to a level where they are acceptable in western markets; this must be financed by capital obtained from abroad. All of these models involve the acquisition of modern technology and its concomitant back-up from the industrialised nations, defining them as 'modern' industrialisation strategies. By contrast the Small-Scale industrialisation model avoids primary dependence upon modern technology, thus minimising the requirement for foreign capital and expertise. The small scale of industrial units allows them to exist outside formally organised systems, thus requiring fewer unproductive national bureaucratic structures, though in turn they are less likely to contribute to the formal

tax system. In contrast to the 'modern' sector, therefore, small-scale industrialisation can be categorised as 'informal'.

While a developing country may conform to a specific economic model, there is usually a mix of modern and informal sector industry within it. They are not entirely mutually exclusive, but a dominant modern sector militates heavily against a succesfully co-existing informal sector. The initial strategic decision for a developing country is therefore whether the main thrust of industrial development should be modern or informal or, in the case of Primary Production, whether there should be significant industrialisation at all.

During the nineteen-sixties and -seventies modern industrial development predominated, to the considerable detriment of the existing informal sectors in the countries concerned. In many cases traditional technology bases were severely damaged, if not destroyed, by this development strategy, their significance tending to be ignored or dismissed. This thesis develops the arguments in favour of the growth of the informal sector, in particular the development of small-scale industries in rural areas. It identifies the significance of particular factors and the way in which their existence might be usefully exploited. The timeliness of a strategic re-direction is emphasised by the variety of agencies now recognising the significance and appropriateness of small-scale development; in Britain these include the Intermediate Technology Development Group, Voluntary Service Overseas and Oxfam. While industrialisation is only a single component in development it is a productive source of economic growth which enables further expansion in other sectors of the economy. In addition to the wealth-generating capacity of industry the social role it plays through the creation of employment and the manner in which it does so are of great importance. Although agriculture is of fundamental economic significance in central African countries it requires a compatible industrial infrastructure to support it. (The form and efficacy of industrial development therefore affect the well-being of the entire population of a developing country, and are a determinant of its social development.)

The arguments concerning industrial development strategies presuppose a genuine desire for development on the part of the state. This does not always exist. In "The Political Economy of Debt: The Case of Zaire", Thomas Callaghy illustrates the conditions in which the interests of the

ruling class conflict with the necessity of general economic development. In this example the ruler's need for cash with which to retain loyalties involves corruption on an institutionalised basis, to such an extent that external development funds and the earnings of state industries are diverted, the international banking and aid communities being successfully manipulated in order that their support should continue.

> "The Zairian financial system is the weakest point of the regime; in fact, 'system' is too strong a word because Zairian finances have very little order and clarity, even approximate. 'Systematic disorder' is more the norm. Zaire is a wealthy country, one of the most well-endowed in Africa, but it is now on the verge of financial collapse - an increasingly common condition for African regimes.(Callaghy,1986,p314)

The self-interest of the Mobutu regime precludes the economic development of the country, by failing to provide the sustained political will and by systematically removing the financial means by which it might be accomplished. Callaghy quotes a leading Zairian analyst, Nzongola-Ntalajaa, who states that Zaire is

> "a neo-colonial state whose ruling class helps *to block economic growth and development* as well as the normal functioning of the state apparatus by depriving the state of those essential means and capabilities with which it may improve the living conditions of the population as a whole." (emphasis added).(Callaghy,1986,p331)

In a context such as this, a discussion of the potential of different industrialisation strategies to bring about economic development becomes irrelevant, since none of them would be allowed to serve this purpose. In these circumstances the only industrial form whose growth is likely to encourage economic development, particularly in rural areas and for the lower levels of society, is small-scale. Not only is the development of small-scale industry possible where the establishment of larger structures is not, but the very informality of the enterprises provides some protection against state pillage. In addition to the value of small-scale industrialisation as a development strategy, its potential as a means of self-help for the rural victims of a disinterested regime is of very great significance in Africa.

CAPITAL INTENSITY AND FOREIGN EXCHANGE REQUIREMENTS.

The most significant difference between the 'modern' and 'informal' sectors is the availability and use of capital. Private capital is scarce in less developed countries, and where it does exist is unlikely to be invested in manufacturing industry. The finance necessary for the establishment of 'modern' industry is most likely to come from abroad, through multi-national companies or development loans, which perpetuates economic dependency upon capital-rich countries. In the case of multi-national investment, control of the industry does not reside with the host country and most of the enterprise profit will return abroad.(Berg,1978,p5) Shifting world markets and changing factors of production also make the length of time for which a particular multi-national investment will remain in a particular country increasingly uncertain.

> "Post-independence industrialism in Africa has predominantly been a child of the multinational corporation; most of this has mirrored production in the industrial mother countries inasmuch as it has been expensive, capital intensive, only tangentially relevant to general African needs and available almost exclusively to the few. As Langdon and Mytelka evocatively suggest, production ranges from: 'Coca-Cola for the satisfaction of thirst to Mercedes cars for the satisfaction of transport needs'.(Higgott,1986)

Benefits to the local working population are likely to be limited, since the capital-intensive nature of modern industry severely limits the levels of labour required. In addition, few local workers will have the necessary skills for the operation of the plant, so employment opportunities are largely restricted to unskilled and semi-skilled positions, the technical posts being primarily ex-patriate, which allows little upgrading of the local workforce.(Freeman,1982) By contrast, small industries require less capital investment per person employed, and frequently less capital per unit of output, as discussed later. Low capitalization results in lower levels of technology but permits far greater indigenous control and retention of profits.

> "In a (World Bank) survey of four countries, large scale enterprises had between 3.9 times (Mexico) and 8.8 times (India) as much capital in fixed assets per job than did small scale. In some branches, the discrepancy can be considerable. In India, small scale textile firms had $1631 of capital per employee against $18 130 per employee for large, while in iron and steel the ratio was $2522 to $39 917. In other words, for the same investment, small enterprises create many times more jobs. Moreover, small scale enterprises tend to employ more unskilled workers - two thirds of their labour force, against half for large firms - hence

providing more work for the urban poor, who have few or no educational qualifications."(Harrison,1979)

The industrialization of an economy should become largely self-generating. In the case of modern sector industry each enterprise must be painstakingly set up, most frequently as a cooperation between the state and outside agencies, commercial or statal. The level of capital required, the technological resources involved and the sheer monopolistic scale of the operation often effectively preclude subsequent duplication of the enterprise within a small economy. Indeed the establishment of a modern industrial enterprise may cause the closure of a substantial number of existing small enterprises, which is unlikely to be compensated for by the creation of any sub-contracted business due to the enormous disparity in technology and scale.(Meyer,1979,p3) Small businesses, on the other hand, using technology corresponding to the level already existing within the country and requiring capital that is within the scope of local entrepreneurs, can be duplicated within the limitations of market requirements and raw material availability. The potential for duplication is a highly significant factor in the choice of industrial development strategies.

The servicing of debts arising out of the acquisition of foreign capital requires foreign exchange. Moreover, modern industries require continuing foreign exchange for technical support, spare parts and, in many cases, intermediate goods necessary for the manufacturing process. All foreign exchange must be generated within the country concerned, which in the case of developing countries usually means the sale of cash crops or other raw material resources such as timber or minerals. The price differential between the exports and the imports increases the domestic production necessary; the pressure on agriculture towards cash crop and large-scale production, rather than towards the meeting of domestic needs, in order to earn foreign exchange is continual and increases as national indebtedness and foreign exchange needs grow.(Pilger,1986,p348) An industrialisation policy with a built-in and continuing requirement for foreign exchange that exceeds the value of industrial exports must therefore be seen as negative in broad development terms, with the possible exception of enterprises producing industrial goods such as engineering consumables which will facilitate the development of small industries. Betz' observation in the early 1980's is even more pertinent today, indeed the last decade has brought a dramatic fall in the availability of capital for industrial investment in developing countries.

> "The financial condition of many third world countries is now critical in the extreme. Debt service payments to both private and public lenders are being met with the utmost difficulty, often requiring rescheduling to avoid the most serious economic consequences. The fact that much of the capital strain is the result of the use of high capital technology in the development schemes of the sixties and seventies should be obvious to all." (Betz, 1984, p1x)

While small industrial enterprises require some access to foreign exchange in order for them to obtain equipment and consumables not manufactured within the country, the scale of their requirements per unit of output is considerably lower than that of the modern sector. (Harrison, 1979) The growth of the small and informal sector will normally provide for many of the requirements of the sector, so that as it grows its foreign exchange requirement will diminish proportionately. Because of foreign exchange restrictions the availability of production consumables which have been manufactured within the country can be very beneficial to other manufacturing activities. For example, small welding and fabrication workshops are more viable in Zaire than in Zambia due to the domestic production of welding rods in Zaire and the lack of it in Zambia. The problems of foreign exchange and the purchase of industrial (and domestic) consumer items are considerably complicated for the majority of central and southern African countries by their proximity to South Africa, the dominating economic and industrial power in the region; commercial and industrial dependency by a country upon a regime to whose policies it is most strongly opposed creates considerable complications, and increases the desirability of maximisimg industrial self-reliance.

INFRASTRUCTURAL REQUIREMENTS AND ECONOMIC DUALISM.

The levels of mechanization and automation in modern industry require raw material and intermediate goods for use in the production process to be highly standardized. Where such inputs are not manufactured within the country there is a continuing foreign exchange requirement, in the event of a shortage of which the production of the factory is likely to be affected or even temporarily suspended. The higher the technology, the less flexibility there is likely to be in the manufacturing process. The corollary to this is that the lower the technology that is used the greater is the variation of inputs which can be made use of. While small

industries suffer from a lack of access to imported raw materials, they are in a much better position to exploit whatever materials are available at any particular time. The smaller the enterprise, and the more craft-based it is, the truer this becomes. The adaptability of craft-based production, particularly in metalworking, allows the direct exploitation of scrap, thus lowering material costs both to the business and to the nation without the need for preliminary large-scale industrial re-cycling. While time and production are frequently lost through the search for materials this principally concerns labour, as opposed to the interest costs on capital-intensive machinery. In the more established small metal-working workshops the search for scrap material generates additional employment, for example the employment of two young boys as scrap collectors by the fabrication business of Mr Siziba in the new industrial estate off Mumbwa Road, Lusaka, Zambia. The use of scrap materials does permit entrepreneurs with very little working capital to nonetheless set up business, but this very ease of access to particular trades may create problems. In Kinshasa, Zaire, the spread of the sand-casting of aluminium in informal sector workshops in order to produce primarily domestic items has resulted in a situation where such workshops are sometimes only able to operate for as little as two days per week due to the heavy competition for the available aluminium scrap. The same is true of sheet metal working in Harare, Zimbabwe.

In order to support modern industrial developments an efficient compatible infrastructure is needed.(Müller,1980,pp27-37) This means that in addition to the capital required for the factory itself money must also be found with which to build roads, buildings and other facilities, to supply power and water, and to buy and maintain the necessary haulage equipment. The concentration of infrastructure to serve one particular site inevitably diminishes the infrastructural development possible elsewhere in the country.(Berg,1978) While small industry also benefits from all the infrastructural support it can get it is generally geographically dispersed and shares the same needs as agriculture and the population in general, primarily for running water, basic electrical power and a transport system. This means that infrastructural development from which it benefits is not to the detriment of the community, but rather to general advantage.(Müller,1980,p148) Müller argues forcefully that large-scale modern cash-crop agriculture has concentrated requirements similar to those of modern manufacturing industry, and that these are generally incompatible with the needs of small farms and therefore of rural small industry. Not

only does the dominating influence of large enterprise attract a disproportionate share of the capital available for infrastructural development, but the subsequent need to justify the initial expense requires its fullest exploitation. This involves encouraging the establishment of additional foreign-capitalised modern industry on the basis of the available infrastructure, which in turn further increases the domination by the modern sector and the negative effect upon the informal sector. This snowball effect of modern industrialisation is likely to drain resources away from other areas of development, which leads to two distinct levels of economy within the one country.

> "This implies a dualistic development of the economy. On the one hand a modern high technology sector which exports part of its production, on the other hand a low-technology, informal and small-scale industrial sector, working mainly for the domestic market. However, the promotion of world trade enhances only the growth of this modern industrial sector, which often remains an isolated sector without linkages with the other sectors of the economy. This modern sector is also so small that it will never be able to solve the urban employment problem." (Van Dijk, 1982, p56)

THE DISPROPORTIONATE INFLUENCE OF THE MODERN SECTOR.

The magnetic effect of the modern sector extends to the recruitment of personnel by creaming off the best and most skilled people, who represent the greatest educational investment by the nation. A shortage of skilled workers affects all levels of employment; training is poor, so initial skill levels are generally limited. The scarcity of skilled workers is particularly serious in the managerial grades; even where people have had the relevant training it tends to be primarily theoretical and desk rather than bench-based. The general preference for prestigeous white collar office jobs discourages those who are eligible for them from considering the informal sector, where direct involvement in the manufacturing process is almost unavoidable. An inability to accept delegated authority renders a noticeable proportion of trained managers considerably less effective than they might otherwise be; this is often exacerbated by tribal and extended-family demands which can seriously inhibit a manager's freedom to operate strictly according to the best interests of the business. Since the larger a business is the more specialised management it requires, this general lack of managerial capability is a shortcoming

which has serious effects on structured enterprises in the modern sector, in spite of their ability to attract the best of what there is available.

While good management is essential for small workshops, there are nonetheless fewer complexities involved, which therefore require a lower level of skill. In a small workshop the functions of the owner, manager and principal possessor of skill and technical knowledge are generally combined in one person. The informal sector is able to train its own managers at minimal expense by means of on-the-job experience.

The centralisation of production in geographical terms due to the concentration of infrastructure and political interest increases the degree of dualistic economic development, since modern sector industrial regions may achieve a prosperity denied to other areas, at the expense of those areas. Disproportionate economic influence tends to generate disproportionate political influence, encouraging the perpetuation of the favouring of the modern sector in industrialisation policies. Moreover association with the prestige attached to large projects and their tangible signs of modernity is seductive to politicians whose status will thus be augmented. The growth of small industries, particularly informal ones, does not rate very highly as a tangible memorial, nor serve to impress materialistic peers. Where graft is involved the potential that lies in major capital projects is vast compared to the minimal scope within the promotion of small industries. Even where there is no graft the potential tax revenue from large industry may be greater than that which can be gathered from a large unregulated informal sector. This represents a temptation to the state to encourage the former. The potential for control can be a significant factor affecting a government's choice of industrial strategies.

IMPORT SUBSTITUTION: REPLICATION OR REPLACEMENT.

In this second section of the chapter, up to and including The Developmental Significance of the Informal Sector, the merits of small-scale industrialisation are compared with the effects of large-scale modern industrialisation. The relationship of technology choice to scale is explored and small-scale is defined. Since in the African context small-scale enterprise is normally informal, particularly in the rural environment, the contribution to development of the informal sector is discussed.

Using standard industrially-produced inputs for the most part, Third World modern sector manufacturing industry can in theory produce high quality goods, similar to those produced in any country with equivalent technology and input quality. The low cost of overheads, the favourable terms of operation generally offered by the host state and, in some cases, the lack of stringent industrial and environmental regulations, create potentially competitive export opportunities for the industry, a proportion of the profits of which will remain in the host country. However, the nature of the modern sector means that while the goods would be manufactured domestically, substantial production related imports would still be required, making heavy demands upon foreign exchange resources. In addition, the exports of such industry are in competition with those of the industrialised countries, which are in a better position to update their technology and thus to retain a comparative advantage. In fact very few Less Developed Countries have achieved a significant level of exports of modern manufactured goods; import substitution would seem a more attainable immediate objective if the development of modern industry is desired.

African small-scale industry, particularly the informal sector, has very little export potential (with the exception of handicrafts), its products being generally of a low quality, sometimes abysmally so, and lacking in market appeal. Even where product quality is adequate, small enterprises are unlikely to be equipped to organise exports or to handle the attendant bureaucratic exercises. However, although little foreign exchange is earned through informal sector exports, very little is required either, and a great deal may be saved by means of the reduction of the volume of importation. The production of the informal sector is almost exclusively

concerned with import replacement, the provision of goods for the domestic market. The low level of quality is a disadvantage where competition with imports is necessary, since consumer tastes normally favour the better finish of the modern sector product, resulting in a market price difference of as much as 100% between imports and informal sector products. In many cases poor quality and the lack of an acceptable finish excludes the informal sector product from the formal wholesale distribution and retail network, confining sales to local public markets and direct sales, which consequently limits the enterprise's potential for expansion. Nevertheless, a sustained effort to develop the quality and capacity of the small-scale manufacturing sector can swiftly narrow the difference in quality between the imported or substituted goods and those made locally using minimal imported inputs. In this way small-scale manufacturing of import replacements offers a serious alternative to substitution or importation, and has the additional merit of developing the national technology base and locally-owned industrialisation.

The limited benefits from the existence of a modern sector manufacturing import substitutes are heavily offset by the consequent supression of import replacement activity. Writing specifically about the local manufacture of consumer goods to foreign designs and quality using modern production technology, Berg observes that

> "During the first ten years of independence, Tanzania replaced some imported consumer articles with goods which were made locally. Imported machinery and imported intermediate products continued to flow into the country and so, therefore, did imported technical expertise. It is now widely recognised that substitution does not constitute an adequate industrial policy. Local labour and local natural resources remain largely untapped. The new industries do not create local skills and research facilities (national technological potential). The development of local technology remains in abeyance."(Berg,1978,p50)

Although the product quality of the informal sector is frequently poor, the dispersal of the production both within urban areas and rurally gives the sector considerable contact with its consumers, allowing for direct feedback and the precise tailoring of products. While appearance is of great importance for domestic goods, it is less significant in the selling of agricultural equipment, for example, where a local producer, who may also be a farmer, is able to produce precisely what local conditions require and has direct knowledge of local tastes and needs. The small output and flexible production capacity of craft-based industry put it in a far better position to produce locally appropriate equipment than a

remote urban-based mass production unit.(Muller,1980,p127) Although the informal sector suffers from the ability of the modern sector to dominate the market it does have virtues in the context of certain applications, particularly where Northern notions of planned obsolescence have influenced the fundamental quality of a product. A farmer-blacksmith knows the qualities necessary for a machete or a hoe, and values one which will last; machetes produced from automobile leaf-spring by village blacksmiths in Manie, Bandundu region, Zaire, are far more resilient than the mass-produced Chani-Metal equivalent from Kinshasa. Berg relates a similar example in Tanzania.(Berg,1978,p22) However, as long as informal sector production has to compete with modern sector goods, whether imported or domestically produced, their market position will always be dramatically inferior in terms of access, and, unless dramatic changes occur in the finish of their output, of consumer attraction.

> "The products of small enterprises tend to originate from indigenous craft traditions, and they are also more likely to satisfy the needs of poor people than are the products of large enterprises and foreign technology. In many developing countries there is a severe shortage of large numbers of commodities; it is more equitable if scarce promotion resources are used to assist enterprises which make things that poor people buy. Investigations into the demand for soap in Bangladesh, shoes in Ghana, furniture in Kenya and bicycles in Malaysia (Baron and van Ginneken, 1982, pp 685-686) suggested that there is a tendency for local products, produced in small units using labour intensive equipment to be more appropriate for the needs of poorer people. ..... Farmers also are often ill-served by the products of large industry; the simple tools and equipment that are manufactured by local small factories are more within the reach and more suited to the scale of the holdings and technical ability of the typical farmer.
>
> Because the profits of small enterprises are not dependent on long production runs they can manufacture smaller quantities of products which have a regional or even a more local market; this means that the peculiar needs of farmers in certain areas, or of minority tribal or other groups, can be economically served."
>
> (Harper,1984,p12)

CENTRALISED PRODUCTION AND THE ECONOMY OF SCALE.

Efficient centralised production depends to a considerable extent upon an effective and economical distribution system, at least regional but preferably national and international as well. In any economy, developed or undeveloped, an adequate national transport system is an enormous consumer of capital, and requires very considerable technical resources to

service it. In developing countries the shortage of capital makes the acquisition and maintenance of transport a major problem, particularly since the system must substantially be paid for with foreign exchange. Given the absence of a reasonable system of distribution in central Africa the centralised production approach is unlikely to meet the needs of consumers in rural areas. In the same way there are problems of distribution for any rurally-based producers operating on a large scale.

Although the dominant commercial markets are urban and the distribution problems are such as to discourage trade in the rural areas, the failure to supply the rural communities with products which they require has far greater repercussions than ungratified material appetites. Agricultural development requires tools, equipment and consumables which, apart from aid projects, must come through commercial channels. If these channels fail to maintain a satisfactory and reliable supply, the essential development of agriculture is handicapped, and with it food supply and national development. For the small scale agricultural producer equipment and consumables must be available locally, without incurring excessive transport costs. If centralised industry, where it exists, or imported goods cannot meet the needs of the peasant farmer because of the lack of an adequate distribution system, then the development of a local system of supply becomes a priority. Goods produced locally by small workshops within the rural areas have less distribution problems, since they are made at or near the point of sale, and minimise the need for middlemen, thus lessening the profits which will be taken between manufacturer and consumer.

One of the principal arguments in favour of large-scale industrial development is the economy of scale. Lower production costs through modern equipment and better raw material prices, high levels of output and the power to influence the market are fundamentals of western large-scale industrialisation, permitting modern industry to dominate any small competition. However, such advantages do largely depend upon context, and can be considerably lessened if conditions are inappropriate.

> "Large-scale factories in some developing countries achieve a much lower level of labour productivity and capital productivity (which is more important) than do identical plants in the long-industrialised countries. The relevance or importance of these factors obviously varies from country to country. An assessment needs to be made by those who frame policy. Economies of scale are not just the product of technical coefficients. They cannot be

realised unless the co-operating economic and social factors are favourable."(Marsden,1970)

The high output of modern industry is seen as one of its principal virtues and, in the case of manufacturing for domestic consumption, appears the most logical solution to large consumer demands, if the social arguments in favour of small-scale industry are disregarded. However, the profitability of output relates to the quantity produced per unit of input. The material costs of the same product produced in the two sectors will be similar, even including the advantages of bulk-buying by the modern sector. The two principal input variables are therefore capital and labour. Northern capital-intensive production gives high output per worker, but low employment, however the high technology is assumed to justify itself mainly by high output per unit of capital. In reality these advantages, as with those of scale, depend upon full exploitation of the technology and capital investment. This involves working to maximum capacity a large part of the time, a condition rarely achieved by large Third World industries. Despite its notional advantages, large-scale manufacture in poor countries does not in practice achieve economies of scale in capital productivity.

"More unexpectedly, small firms achieved a higher return on capital. The same four country (including India, Mexico & Columbia) survey showed that small firms produced between 80 and 300 per cent more output per unit of fixed capital than large firms. Large firms usually achieve a higher productivity *per worker* - but not always. In Indian sawmills and car repair, the value added per employee is actually higher in small than large firms."(Harrison,1979)

EMPLOYMENT.

The principal resource of developing countries is labour. In many cases there are few other resources, and those which do exist are primarily natural or agricultural. In a situation of minimal resources it is logical that any development strategy should concentrate on exploiting those which do exist; in the case of poor countries, therefore, on people. An industrialisation strategy must therefore be labour intensive, not only to exploit the principal resource but also in order to spread any income that can be created as widely as possible and to involve as large a proportion of the population as possible in the process of development. The most

logical path to industrialisation thus also offers some amelioration of the most pressing economic and social problem, unemployment. The hope that large modern sector industry would create mass employment was either the product of an extraordinary naïveté, of Northern cynicism, or a combination of the two. Writing in about 1964 (but published in 1974) Patrick Van Rensburg, the originator of the 'brigades' system of self-financing vocational training in Botswana, already clearly saw the fallacy of modern sector industrialisation, a strategy which was to continue for over ten years in many countries, and still occurs today:

> "At the moment there are some 50 000 people in paid employment in the modern sector. After public and private investment of about R180 000 000 (mining development and infrastructure), the most optimistic estimates are that 70 000 people may be absorbed by 1975. The total potential resident labour force will probably exceed 300 000. This, of course, includes women, whom some planners and statisticians may discount. That would be to ignore the enormous potential contribution of women to production and development. The employment capacity of the modern sector would have to grow at 10% a year for another 10 years to achieve an employment figure of 170 000 out of 450 000 willing workers in 1985. Something like R500 000 000 would be needed in investment. Can such a growth rate of employment capacity be maintained for so long? Experience in some other emerging countries suggests that the modernised economy can absorb an additional 0.5% or 1% or 1.5% of the labour force each year, while the labour force itself grows at 3% or more each year."(Van Rensburg,1974,p68)

This equation is general to most of the Third World, and makes a nonsense of modern sector industrialisation as a strategy to reduce unemployment. Fourteen years later the same point was being made in India's Sixth Five Year Plan:

> "In 1978, out of a total labour force of 265 million, unemployment and underemployment amounted to the equivalent of 20.6 million full-time unemployed. Every year six million new workers are entering the labour market. The task ahead then is to create 50 million new jobs by 1983. There is no hope, the plan states, of large scale industry absorbing more than a tiny fraction of the total. Organised factories employed only 4.8 million people in 1971 - only 22 per cent of the total in manufacturing and repair. Employment in the modern sector tends to grow much more slowly than investment or output from the sector: between 1961 and 1976, investment rose by 139 per cent and output by 161 per cent, but employment grew by only 71 per cent. Large scale industry, in other words, was getting more capital intensive all the time."(Harrison,1979)

In spite of the disadvantages of the informal sector and the neglect it has consistently suffered, it nonetheless constitutes a remarkably established basis for industrialisation.

"The craft sector and small firms are very important in terms of employment in both towns and country areas, and they are equally important when it comes to the total production of manufactures and added value. The data now available suggests that this sector represents 70-96 per cent of the labour force and more than a third of the added value in the manufacturing industry. In Jamaica for example, 27 per cent of jobs in manufacturing are accounted for by individual craftsmen and small firms, which create 25 per cent of the value added. In Somalia, the figures are 50 per cent and 40 per cent respectively, in Ghana 87 and 39 per cent, in Sierra Leone 96 and 44 per cent."(Traoré,1981)

In India handicrafts, including gems, are the most valuable single export, representing in 1983/84 a 16.2% share, as opposed to 8.9% for cotton, 7% for engineering, and 12.3% for crude oil, the largest other categories. In addition to handicrafts there are other craft-based categories, such as leather and leather goods (3.5%) and the cotton manufactures already mentioned, of which a significant proportion are produced by craft means. All these categories had increased their share of export value, by up to 36.4% (Handicrafts), except engineering which had decreased by 12.5%.(Lloyds Bank Group,1985,p17) In 1977 the Indian Government proposed to remove all official credit from the modern sector in order to reserve it for use by the small-scale and village industries.(Harrison,1979)

"Of the total extra jobs, India plans to create around 23 million in agriculture through expanded irrigation facilities; 17 million in services including labour intensive construction of infrastructure (roads etc); and 9.4 million in manufacturing. Of the latter, no less than 6.8 million would be in small scale and village industries.

India's small scale enterprise sector was already booming. In 1977, the average firm employed seven workers, with a capital of around $10000. In the five years from 1972, the number of small firms nearly doubled, from 140 000 to 269 000, while the value of their production trebled. In 1976, though they represented only one tenth of the capital investment in industry, they provided two fifths of the jobs and two fifths of the production: in other words, for one unit of scarce capital they created six times as many jobs and six times as much output as large scale units."
(Harrison,1979)

In economies where there is a lack of capital and of employment for large numbers of people, small-scale industrialisation addresses both problems far more effectively than the large-scale modern formal sector. It is not the size of the individual enterprise which is ultimately economically significant, but the extent of the activity as a whole and the number of people involved in it.

SCALE AND TECHNOLOGY CHOICE.

Particular terms and descriptions sometimes carry implications of a more specific nature than was originally intended. The realisation that the 'industrialisation' of developing countries was an essential part of the development process resulted in attempts to implant modern industry into many developing countries during the nineteen-sixties and -seventies. There appeared to be little examination of what 'industrialisation' should mean within the context of less developed countries, and an automatic assumption that what was good for 'us' would be best for 'them', that a direct technological jump was not only practical but would benefit the entire developing economy without producing significant negative side-effects. While many of those closely involved in the development process did not share this view, the governmental donors and recipients of developmental funds were committed to it, not least for reasons of prestige and a belief in the magic of the economic order which was promised by the possession of modern technology. For recipient nations the aquisition of modern industrial capacity also appeared to represent the most direct route to joining the 'modern' nations, since the lack of it was the most obvious difference between the two estates.

The comparative size of the units making up the modern and informal sectors and the considerable apparent difference between their production capacities appeared to indicate that modern industry was the only viable means of achieving the level of industrial production to which developing countries aspired. Large-scale industry is also the form of industrialistaion which appears to be most amenable to the control of governments.

> "Government policy usually favours large firms, giving them cheap credit (hence encouraging them to be capital intensive), access to foreign exchange and import licences (hence encouraging capital imports) and protecting their often uneconomical production with tarriff walls ranging up to several hundred per cent. By contrast, small firms are discriminated against. They find it difficult to get official credit. An International Labour Office survey in Africa found that only four per cent of unorganised sector enterprises in Kumasi (Ghana) has official credit, and only two per cent in Freetown (Sierra Leone). Small firms have no political pull and cannot get hold of foreign exchange or import licences. In most cases they are located in slum or squatter areas and may be without water and power and sometimes even a roof over their heads. Some governments and municipal authorities, using inappropriate western regulations, actively harass them, demolishing their premises, demanding licences they cannot afford

and documentation they have not the education to prepare."
(Harrison,1979)

Modern technology is typified by large production units of considerable automation and sophistication. In contrast, much of existing manufacturing capacity within developing countries was, and remains, small-scale and primarily craft-based. Most small-scale business activity, including manufacturing, is carried on outside the formal structures of the national economy and consequently does not present a cohesive image as a suitable vehicle for industrial development in the Northern sense. The fact that the informal manufacturing sector is of considerable economic significance in the industrialised countries themselves, for example in the Italian automotive industry, has only recently been recognised.

While there are certain processes for which modern large-scale technology is indispensable, such as the refinement of mineral oil, there are many which lend themselves to a lesser scale and others that can, with less satisfactory results, nonetheless be undertaken outside modern industry. The term 'Appropriate Technology' has acquired an implication of intermediate and small scale technology, but was originally intended to stress appropriateness as opposed to describing any particular level or type of technology. A consideration of the advantages and disadvantages of different technology levels and systems allows the most beneficial technology mix to be arrived at, providing for an integrated industrial development involving various scales of operation and levels of technology, the balance between which may change and adjust as the new industrial economy evolves.

The criteria applied in the judgement of what constitutes an appropriate industrial technology and scale will obviously affect the choice of industrial strategy. The orientation of those controlling the choice is fundamental. If their priority is economic development as measured by Gross National Product, regardless of the social consequences or divisions it may create or reinforce, their preference is likely to be for the modern sector since it has until recently been axiomatic that modern industry makes the most productive use of the limiting factors of production. If they are primarily concerned with social development and perceive industrialisation and economic advance as being the servants of this purpose they are more likely to consider the advantages of small-scale industrial development.

"Technology never comes alone; it is packaged as part of a social organisation designed to produce goods. It may seem obvious that technology is part of institutions and, as institutions are tied up with national politics, the choice of technology is always determined by the character of the political system. The beginning of industrial growth, as we know it today, was undertaken by the colonial governments, so the colonial industrial package included multinational capital. Since independence it is the design of the industrial package that has altered, rather than the package itself. Most independent national governments have retained close ties with western capital so that multinational and conglomerate commercial and industrial capital still dominates most third world industrialisation. Consequently, the predominant choice of knowledge, technique and organisation has been determined by these forces."(Berg,1978,p6)

DEFINITION OF 'SMALL-SCALE'.

Terms such as 'informal sector *industry*' tend to give an impression of some establishment and size, even though smaller than the large-scale or modern sector. While 'small' in the Northern industrialised context can refer to factories employing a few hundred people, the scale in developing countries is considerably more limited. The size of an enterprise can be measured in various ways, including the number of people employed, the value of capital equipment and property, the turnover, profit or output. No single factor can be taken as a simple standard since, for example, one enterprise may employ large numbers of people but little capital equipment to achieve a turnover similar to another which employs few people but considerable capital. 'Large' and 'small' are notional terms, better defined by the nature of the management of the enterprise than by quantity measurement.

"…….an enterprise ceases to be 'small' when management becomes necessary as a separate full-time activity in addition to carpentry, selling or whatever else is the function of the business."(Harper,1984,p15)

According to this definition of smallness, the owner or manager's primary capability lies in the execution of the task by which the enterprise earns its income, and that skill continues to be exercised in addition to any managerial role. In a survey of small metalworking establishments in Britain, where the measure of smallness was that the proprietor was, at least occasionally, involved in the production process, very few businesses involved more than ten people. When this figure is exceeded, in this

particular context, the management function generally becomes full-time.(Poston,1985) In this way there appears to be a maximum number of workers who are likely to be employed by a manufacturer still directly engaged in a particular activity, according to the specific economic context. However, the number of employees is not an accurate definition of the scale of an enterprise. Variations of activity, location or economic environment cause the number of workers likely to be involved in a 'small' business to vary. The constant of the 'dirty-handed owner' is probably the most reliable indicator of smallness across the spectrum of workshops, whether in Britain or the Third World, and has particular usefulness since as well as defining scale it also describes the primary orientation of the owner or supervisor.

Staley and Morse divide businesses between craft industry, employing a maximum of ten people, modern small scale industry employing between ten and ninety-nine people, and medium and large scale industry employing more than one hundred per factory.(Staley and Morse,1965) These definitions correspond with the definition of small (craft-based) as being without seperate management or as having 'dirty-handed' management, and confirm that anything of greater size in a developing country is likely to be 'modern'.

While the term 'informal' does not directly define the size of an enterprise it is generally likely to be within the 'dirty-handed' definition of 'small', since growth to the industrialised notion of 'small' would make it highly significant and visible within an African country, and would militate against it remaining 'informal'. In addition, the need for standardised inputs in large quantities and for more efficient capital equipment commensurate with larger size will require 'formal' status if they are to be accessible within a context of foreign exchange restrictions.

An illustration of the kind of scale involved in the informal sector in Central Africa is provided by one particular aluminium foundry, a grandiose but accurate term, which produces spoons. It consists of two young men and two boys, a charcoal fire in an old buried truck wheel-hub, a home-made bellows fan driven by hand using an adapted scrap bicycle wheel to gear it up, a steel pot as the crucible, one ladle and a single cast iron mould which produces two spoons at a time. Consumables are charcoal and aluminium scrap. The mould, imported from Europe, was

provided by Oxfam. The workshop is in the open air in Limité, an unserviced suburb of Kinshasa, its only structure a screen of palm branches. Rivals in other suburbs have the advantage of electricity, when it works, and produce cast aluminium cooking pots by sand-casting. One such foundry in Massina, again in the open air, employs about five people using the same type of truck wheel hub crucible but with an electric powered fan, the electricity being delivered by bare wires hanging out of a house-wall on one side of the workshop area. Casting equipment consists of one shovel, two wooden frames, a file and the sand that constitutes the floor of the area. By normal classification these suburbs are slums, but the energy and the industrial activity evident in these orderly and suprisingly clean residential areas deny the use of the term.

THE DEVELOPMENTAL SIGNIFICANCE OF THE INFORMAL SECTOR.

Small industry, particularly in the informal sector, constitutes a part of society, part of its fabric and even its identity. The employment it creates assists social stability and raises the standard of living for many for whom the modern sector can offer nothing. Women, the very poor and the uneducated are more likely to gain some income benefit, directly or indirectly, from thriving enterprises within the community. Money earned locally is largely spent locally, and the profits of small businesses tend to remain within the community; they are certainly not exported to the owners of foreign capital.(Seie,1980) Small industry is locally capitalised, mobilising savings and other retained capital which would otherwise lie idle, be consumed or be invested in land. The existence of the extended family system in most Third World countries greatly assists this, since the pockets of all the family will be scoured for capital, not just those of the entrepreneur. However, it is also true that the demands of the extended family can greatly hinder capital accumulation; in addition there are advantages and disadvantages to the use of family labour, which can be exploited but may also exploit the business.

The small workshop, whether rural or urban, has the important effect of raising local morale, since it is largely a self-help mechanism. If the dominant atmosphere is of constructive energy, of developing one's own means of economic survival, it becomes a normal thing to do and a matter

for general respect and encouragement. The growth of small enterprise helps to persuade the population that the way to improved conditions is through their own efforts. External factors generally only affect the fortunes of a local small enterprise negatively; at best there may be no negative effect resulting from external factors.

In a situation of high unemployment the only resources available to the poor are their strength, intelligence and resourcefulness. The only way in which the majority can survive is to exploit these resources on their own account as small-scale entrepreneurs. While many of the resulting enterprises will be of a trading nature, many others will be small workshops involved in manufacturing and repairing. It can be argued that manufacturing workshops are the more important economically, since they involve a maximum of value-added, and therefore a maximum economic gain for the community. Within the African context it is reasonable to include the repair workshops as sharing this significance, since in many cases they are reviving machinery, in particular vehicles, which are in such a state as to have little residual value without the value-added of the repair work, which may almost constitute re-making.

In the informal sector all employees are closely involved with the manufacturing process. Most training is by apprenticeship, usually informal, and serves to develop the local technical ability. As small enterprises develop, the skills which they encompass increase; though individually small-scale, this training develops the technical base of the nation. The modern sector employs fewer people, a smaller proportion of unskilled labour, and the technical skills in which its employees are trained are often only marginally relevant outside the modern sector. With the inability of the modern sector to duplicate itself the technical training it provides contributes virtually nothing to national technical growth. Without training relevant to duplicating industry, no autonomous or broad-based industrialisation is possible.

The virtues of small-scale industrialisation have recently become increasingly significant. Global economic variations such as the recession of the late 70's, the American budget deficit(Pilger,1986,p340) and the sudden stock market depression of 1987 have a far more immediate impact upon large scale industry financed with borrowed capital or owned by multi-national companies than on small scale locally-based industries. (VanDijk,1982,p66) The problems of Third World debt repayments have reached

such proportions that at times the whole international banking system has appeared to be under threat of collapse. In many instances the decline in the values of natural resources and cash crops have largely undermined developing economies, for example in the cases of oil in Mexico and Nigeria and cocoa in Ghana. In Zambia the prolongued depression in the price of copper, which suffered an *annual* average fall in nominal price of 18.7 per cent for the years 1970 - 1980,(Ravenhill,1986,p4) has meant continuing borrowing in addition to existing debts, in the full knowledge that the copper which accounts for 95% of current foreign exchange earnings will be effectively exhausted in about 20 years time.(Oliver,1986) (Although the price has risen slightly again since, the economic ground lost because of its long depression cannot be recovered.) As the disadvantaged trading partner in the global economy the South cannot develop itself economically to a significant extent if it continues to attempt to do so on the North's terms. Capital-intensive industry is the North's system, dominated by the possession of capital which is totally under its control. Past attempts to introduce large scale industrialisation have made the process even harder for the South, by saddling it with virtually unredeemable debts the partial repayment of which force it further into the neo-colonialist relationship. Industrial independence, including the ability to process natural resources and crops, is the most promising path to African economic development. The only way in which industrialisation can be developed without incurring dependence is through small scale units.

RURAL INDUSTRIALISATION, IN RELATION TO URBAN MIGRATION.

In this third and final section of the chapter the arguments in favour of small scale industrialisation are looked at in relation to the process of urbanisation, agriculture, rural income generation and the special implications for national policies. The conclusion of this chapter is that in rural development small-scale industrialisation has a significant role to play which can only be brought about by means of small-scale development initiatives widely applied.

Images of poverty in the Third world are frequently urban, since the dramatic impact of large numbers of people in extreme conditions is more obvious than images of what appear to be isolated rural occurences. Massive urban migration has created desperate conditions, but it is significant that for many people the urban existence is the lesser of two evils. The provision of employment is desperately needed in both urban and rural areas; the case for rural industrialisation does not deny the importance of developing the informal sector in the towns and cities, rather it seeks to assist in the creation of conditions in the countryside which will obviate the need for massive urban migration. If the development of agriculture and rural industry are to be successful the fullest involvement of the people and a favourable political environment are essential.(Berg,1978,pg) General national development is dependant upon social change; while informal sector industrialisation, rural or urban, has a significant contribution to make to development, it is not a panacea but a single factor.

> "The manifold problems arising from rapid urbanisation also suggest that more attention needs to be paid to rural opportunities. All the theories of rural/urban migration agree that rural/urban opportunities (or lack of them) play a significant role in influencing the movement to the towns. None the less, the rural aspects of appropriate technology may have been overemphasized. Urban poverty and lack of productive opportunities is also widespread." (Stewart,1977)

Urban/Rural population, 1985 (millions):

	Urban	Rural	
China & India	415	1390	
Other Low Income	127	507	(35 countries)
Lower Middle Income	243	432	(36 countries)
Total:	785	2329	(World Bank,1987)

Rural poverty promotes urban migration. Agricultural development alone is not sufficient to counter this,(Berg,1978,p6) since expanding populations and the exhaustion of some soils result in a limit to the land available to individuals. This shortage of viable agricultural land is exacerbated in some locations by the exploitation of large areas of land for commercial cash crop cultivation, often by foreign capital, and by other concentrations of agricultural property in the hands of a small percentage of the population. If there is insufficient land, or the land is not sufficiently productive to support the community, many of its members are forced to leave. Those leaving are most likely to be the young and the best educated; their future return to peasant agriculture is unlikely, which may eventually lead to an abandonment of village existence as the older generations die out. (Van Rensburg,1974,p39)

> "It is usually cheaper to generate rural than urban livelihoods, and economically more productive (Lipton, 1977). Whether people are treated as an end in themselves or as an economic resource, the pointers are in the same direction; towards priority for more and better rural livelihoods to support larger populations and to provide rural solutions to urban problems."(Chambers,1983,p169)

If the necessity for a modest income could be satisfied in the rural areas the pressure to leave home and community for the uncertainty of the cities would be greatly reduced. In addition to improved agricultural earnings population-retaining income must also be generated by other means. While the potential of local small workshop production for earning income from sources outside the community must not be exaggerated, coupled with the recycling of money originally generated by agriculture within the community it can provide for a significantly larger population living on a given amount of land than if all goods and services are purchased from external sources.(Macpherson,1978,p1) In addition business activity increases, developing local managerial abilities and preventing the appropriation of entrepreneurial roles by outsiders in an exploitative manner; in this way the training of local labour extends beyond artisanal skills.(Bodgaert,1983) The retention of skills within the village is fundamental to rural industrialisation, wherever the training was given. It is rather suprising to find, in a 1980 UNIDO monograph "Appropriate Technology for Light Industries and Rural Workshops", the following statement:

> "the rural workshops should continuously train the village labour force so that it may supply the large and organized engineering and metalworking industry"(UNIDO,1980,p81)

This assumption that rural surpluses shall be primarily applied to the financing and training of urban industrial expansion has been dangerously pervasive throughout this century. The UNIDO monograph arose out of two meetings, one technical/official, the other ministerial, in India in 1978. Considering the title this statement can only be interpreted as an illustration of the degree to which the modern sector dominates the perception of many in official positions, relegating rural industry to a perpetually subservient and sacrificial position. In contrast to this statement, every effort should be made to encourage those with skills to exercise them in rural areas, in the face of the powerful pressures towards urban migration.

> "The population (of Tanzania) in 1974 remains over 90% rural and almost all of the economically active are engaged in smallholder farming. The population and the labour force are growing at nearly three per cent per annum. Non-agricultural wage employment has increased significantly, at an annual rate of 6.1% in the past three years. However, the actual number of non-farm wage earners (officially 292,220 in 1971 and unnofficially 350,000 in 1974) is still less than 10% of the economically active population, and the number of people engaged primarily in farming will continue to grow in absolute numbers for decades to come.(Tanzania,1972) Even if non-farm wage employment continues to grow at the high rate of 6% per year, the agricultural population will still increase by over 2% per year through the 1970's and by over 1% per year through the rest of this century. In consequence, apart from any socialist bent, a development strategy that emphasizes the creation of opportunities for broad participation in economic growth must be heavily orientated toward rural, and especially agricultural, development."(Wall,1975,p8)

AGRICULTURAL DEVELOPMENT THE PRIORITY.

The development of agriculture is the highest priority. With food production per capita falling steadily throughout the last decade, food provision has now become the most serious issue facing government in much of Africa. The lack of success of extensive agriculture as a domestic food production strategy has led to the encouragement of intensive agriculture. The fundamental role of all rural industrialisation is to support or at least complement the development of agriculture. The requirements of intensive agriculture can be met most appropriately by local manufacturers; increases in agricultural productivity and incomes will provide the stimulus for further associated development, encouraging the development of rural industrialisation.(Traore,1981) Rural

industrialisation must not compete for resources with agricultural development, since this would be counter-productive.(Berg,1978,p10)

That rural industries should be compatible with agriculture does not require that they be confined to agricultural products and requirements, since there is a very extensive need for basic domestic consumer goods within rural areas, the meeting of which contributes to the raising of living standards.(Berg,1978,p12)

> "But while rural development must feed on and supply agriculture, it cannot be limited to agriculture if it is to be successful. Hence, the Plan (Kenya's Four Year Development Plan, 1979-83) will provide incentives for the dispersion of industry, and rural non-farm activities in the informal sector will be accorded high priority. Such activities are even now an important source of rural employment and income, with about 43 per cent of smallholder income being generated in this way."
>
> (Republic of Kenya Development Plan, 1979-83)

The simple dispersion of industry suggested in this policy statement carries the inherent danger of the inappropriate transplantation of industries, regardless of the context in which they need to be located and the requirements and vulnerabilities of the recipient context.

> "Many small rural industry programmes fail to integrate into the rural conditions. There are many examples of rural small industry projects, for which the raw material comes from elsewhere, and which are producing goods that are of little use in the village and will have to be marketed elsewhere. Such types of small industry obviously become very vulnerable in a village economy because of their dependence on outside markets and supply. The new rural industry should naturally relate completely to the setting, try to satisfy the needs of the village to start with and, if possible, use the raw materials which are locally available. The first production priorities are agricultural tools, buildings and installations.
>
> (Berg,1978,p8)

Agricultural and rural industrial development are interdependent, and should be pursued simultaneously. Rural small workshops can support the development of agriculture, while agriculture and the income it generates provides a market for the output of the rural industry.(Van Rensburg, 1974,p73)

As workshops develop and flourish, the gradual increase in rural production capability produces a corresponding development of local technology and skill levels, allowing the exploitation of increased local prosperity by means of further agricultural development involving more advanced technologies. The spending of this income within the community,

rather than outside it, encourages a cycle of prosperity growth and local development, and strengthens the extended family and other social systems and cultural traditions that are perceived as valuable in their own right.(Harper,1984,p11)

The less leakage of income to external suppliers, the greater the population that can be supported. Global economic patterns are reproduced between urban and rural areas within developing countries. The imbalance between the values of agricultural and manufactured goods ensures that the suppliers of agricultural and other raw materials remain economically disadvantaged, and are therefore in a weak position when buying manufactured items from the economically more powerful. It therefore follows that the more the dependence upon outside sources for manufactured products can be minimised, the less effect the inequality of exchange will have.(Berg, 1978,p9)

INCOME GENERATION.

As well as providing a livelihood for those in rural areas who have no land, small workshop production can be a means of income augmentation for those who do. Such activities take place particularly during the dry season, when there is little agricultural work to be done except where irrigation is used. While some modern rural artisans do exist solely on their workshop income, this is not usually the case; 'traditional' artisans are almost invariably subsistence farmers in addition to their workshop activities, though the brunt of agricultural work is normally born by their wives. In Mpika, Zambia, the blacksmith, potter, wood turner and mechanic-welder all cultivate crops as part of their living during the rainy season. Even if the potential income reached a point where they were losing money by continuing to farm rather than spending all their time in their workshops, it is unlikely that the majority would do the latter, since the pattern and traditions of their lives are essentially agricultural. This is probably partly a result of the narrow economic safety margins available to them, which preclude the taking of risks, including putting all one's eggs in one basket. Continuing domestic production of the food required by the family goes a long way towards ensuring its availability, or is at least psychologically reassuring. The traditional male role as

the hunter is now largely obsolete, due to the lack of game, which encourages the development of alternative sources of income.

In the rural context the development of the skill/technology base feeds upon itself, since the stronger the resource is the greater are the possibilities for its further development. Since agricultural prosperity is an essential component of national development and prosperity, the support and enlargement of the rural technology base is most important, particularly if an artificial and unsustainable rural-urban balance is to be avoided.

The inability of agriculture to support the population due to the degradation of the land, the growth of the population and the requirements of industrial agriculture increases the necessity of generating non-agricultural income. While the supply of agriculture-related goods is the priority, this market is insufficient for the level of income-generation which is required. The local manufacture of domestic goods gives considerable opportunity for small enterprises and can therefore make a valuable contribution to both income-generation and the community's standard of living, both of which support population retention. (A major source of rural non-agricultural income is crop processing, which falls outside the category of manufacturing being considered here, but those involved in it stand to benefit particularly from the improved access to productive equipment brought about by the development of rural manufacturing.) The unsatisfactory urban situation of the majority of those who have migrated from villages is nonetheless the lesser of two evils; the improvement of the quality of life in the villages decreases the pressure to migrate. Although the primary reasons for migration vary, the pressure on the available land being a common cause, access to domestic consumer goods can significantly affect the perceived standard of living, and thus the desire to migrate. While the taste for consumer goods is most frequently and most appetisingly met by urban or foreign manufacturers, such externally-produced goods are a drain on the very limited agriculture-derived income, whereas locally produced goods retain the income within the community, and should therefore be encouraged wherever they can compete.

THE ORIENTATION OF INDUSTRIALISATION POLICIES.

Any development plan which leaves out significant portions of the community on the rationale that they will catch up later is most unlikely to succeed. The idea of income derived from high-tech development 'trickling down' is fallacious in a situation where the dominant mass of the population have little to offer those who have benefited directly, and therefore nothing with which to stimulate the trickle. In countries where little or no industrial development has taken place spontaneously any externally originating large-scale industrial development has had minimal beneficial effect on the majority of the people; the effects have usually been negative. Since the majority of the population in developing countries are rural poor national development must include small-scale, grass-roots development taking the technological and social status quo as its point of departure. Even the introduction of intermediate technology generally represents a sudden technological development, and requires capital levels that place it beyond the means of those most in need of independent incomes. High technology developments, resulting in the introduction of isolated pockets of industrial wealth, have dramatically upset the social equilibrium, as well as the economic and ecological ones. While the successful development of a country from the bottom upwards is also likely to disturb any existing equilibrium quite drastically it will do so in a more equitable and gradual manner.

"Categorization of countries according to encouragement/importance given to rural industries:

I. *No specific encouragement to small rural industries*	II. *Described as important. Some encouragement but no specific policies stated*	III. *Encourage rural industries but not much attention to technology development and dissemination*	IV. *Encourage rural industries. Programmes include development and dissemination of ATs*
Cuba	Algeria	Afghanistan	Bangladesh
Iran	Ecuador	Barbados	Botswana
Oman	Liberia	Burma	Brazil
Saudi Arabia	Malawi	Cameroon	China (mainland)
Yemen Arab Republic	Malaysia	Mauritius	The Gambia
	Mexico	Somalia	Ghana
	Philippines	Sudan	India
	Senegal		Indonesia
	Seychelles		Ivory Coast
	Syria		Jamaica
	Thailand		Kenya
			Korea (Republic of)
			Nigeria
			Pakistan
			Papua New Guinea
			Taiwan
			Tanzania
			Zambia

(Sinha,1983)

Even where official policy is claimed to encourage rural industrialisation according to the categorisation in this table, comparatively little has been achieved in relation to the scale of the problem. In most cases formal large-scale industrialisation remains the principal goal, with small-scale industrialisation seen as a palliative rather than as a major strategy in its own right.

To describe small-scale development strategies, including rural industrialisation, as 'life-belt economics' is entirely reasonable. If the function of a life-belt is to keep the person afloat until the next stage of rescue commences, this is as necessary economically as it is physically. However, if the individual lifebelts are gathered they can become a raft of considerably greater capacity. The needs in developing countries are immense and urgent. Any measure taken must provide an immediate improvement for those it is supposed to help, but must also contribute to long term development.

In subsequent chapters it will be argued that the actions, and preferably the decisions, which promote economic development must come from within the community concerned if they are to be successful, whether or not some external assistance is made use of. In order to succeed such actions must be modest in immediate scale but as wide as possible in their application.

> ".....there seems only one cause behind all forms of social misery: *bigness*. Oversimplified as this may seem, we shall find the idea more easily acceptable if we consider that bigness, or oversize, is really much more than a social problem. It appears to be the one and only problem permeating all creation. Wherever something is wrong, something is too big."(Kohr,1980)

2: RURAL INDUSTRIALISATION.

In this chapter rural industrialisation, the way towards it and the constraints upon it are examined. The differences between the nature and performance of traditional and modern activities are also explored.

IDENTIFYING A STRATEGY FOR SMALL-SCALE INDUSTRIALISATION.

Strategies for rural industrialisation must take into consideration a wide range of factors. The delicacy of the rural economic, social and environmental ecology demands that careful attention is given to the complete context, however apparently insignificant certain aspects of it may be. The identification and analysis of relevant factors by outsiders with a perspective far removed from the empirical understanding of the village people concerned is fraught with risk to the subjects and to the developmental goal. The minimising of such risk must be a primary concern; to do so requires the maximum possible respect for existing local skills, knowledge and perceptions. The principle of working *outwards* from the rural status quo is fundamental, since working inwards constitutes the imposition of alien assumptions, with the inevitable concomitant unforeseen negative effects.

If rural industrialisation is to be affected from within it is essential that the base from which it is to be developed is well understood, since this indicates the direction, speed and manner of development which are practicable. An examination of existing technical skills and perceptions and the manner in which these are acquired and transmitted is necessary, in order that the means to augment them and improve their communication may be identified. In considering the development of the means of transmission of technical knowledge, the introduction of contributions by external agents should at all times be minimised, since any system of technical extension dependent upon external action is limited in its scope and potential. This is not to deny the value of well-focussed appropriate external contributions at particular points in time, but the development of effective actions originating internally must always be the priority. 'Ascending Technical Development', ('bottom-up'), can only succeed if propagation becomes autonomous, the generation of impetus and the growth of capability being brought about by the action of the rural industrialists, the artisans, themselves. Since successful propagation is fundamental to extensive rural industrialisation, an understanding of existing structures and capabilities is necessary, in order that these may be capitalised upon and adapted and developed to meet the needs of the proposed expansion of the artisans' activities.

For autonomous propagation to be possible, the constituent knowledge must be 'owned' by the artisans involved. Since additional technical knowledge

is necessary for development, the volume of it, in particular the quantitative ratio of new and old knowledge, and the manner in which it is introduced are highly significant. A massive introduction of technical knowledge devalues inherited wisdom and the value of ownership of it, while the imposition of alien structures denies the value of the existing social patterns. For this reason the purpose of any external input must be clearly defined, the input only occurring when existing alternatives are manifestly inadequate for the required technical development. Existing technology and structures need to be examined regarding their adequacy in relation to each other and the purposes for which they are required, in order that changes will only be introduced where they are most urgently required. The recognition and rejection of gratuitous 'improvements', conforming to the perceptions of outsiders, is necessary if the existing base is to be consolidated rather than wasted.

In identifying the factors which inhibit rural industrialisation, in order to propose the means of amelioration, the significance of infrastructure and the desirability and manner of its development must be considered. Muller contends that infrastructure is the single most crucial factor restraining rural industrialisation, but also argues that the real need is for the development of an infrastructure suitable to subsistence agriculture which will, incidentally, serve the needs of artisans (blacksmiths in the case of his study). He postulates further that rural industry, in the case of blacksmithing, is sufficiently developed to meet the needs of subsistence agriculture as it is currently practised.(Muller,1980) While infrastructural restraints are highly significant their removal is not the panacea which Muller suggests. The extent of the restraint and the degree to which it needs to be adressed must therefore be examined.

If development is to be appropriate to its context, and is to be primarily effected by existing practitioners, the ability to develop and adapt apposite techniques and structures is necessary. In order to establish the potential for rural industrialisation it is therefore necessary to examine the extent of the indigenous ability to design and innovate, and the relationship between innovation and the society in which it occurs. If significant contemporary innovative capability is not in evidence the possibility and suitability of the introduction of relevant assistance from external sources needs to be examined, as does the premise that local design skills are necessarily the most appropriate.

While considerable work has been done regarding industrialisation strategies, some of it according significance to the informal sector, the paucity of recorded data regarding indigenous small rural industries and the lack of formal structures make strategic generalisations difficult to prove. In order to identify a strategy for small-scale rural industrialisation using indigenous structures the approach to this research has been largely empirical, particularly involving work with the blacksmiths of the village of Manie in Bandundu, Zaire. Where village industry has been considered in the past the emphasis has generally been on the establishment of new artisans, products of Northern-style technical training and thus primarily urban-orientated. While this approach has some relevance, it depends primarily upon the assumption that there are few traditional craftsmen remaining (Miller 1980 p6), and a failure to perceive their relevance where they do still exist. In many areas there remain traditional artisans who constitute the most viable potential basis for rural industrialisation; one of the principal barriers to their exploitation is ignorance of their significance on the part of urban-orientated outsiders, which is exacerbated by the considerable difficulties involved in working with such dispersed and unstructured groups.

IN-HOUSE SHORTCOMINGS RESTRAINING INFORMAL INDUSTRIALISATION.

In the majority of cases the proprietor and manager of a small workshop is primarily an artisan. He may have had some formal training, minimal in quality if not in time, or may have trained by 'apprenticeship', working in the workshop of someone else who is also likely to have had minimal training. The skill and technique basis of a small workshop is therefore unlikely to be broad or of a high quality. In the case of traditional indigenous craftsmen the skill level may be quite high by virtue of a genuine apprenticeship, usually within the extended family, but the technical scope is likely to be narrow.

While the owner's technical capability may be sufficient to successfully carry out the production work, he is most unlikely to have ever had any training in management, book-keeping or business strategies. Since administrative and managerial skills are essential if a small business is to thrive, their absence means that the majority of small workshops struggle on from hand to mouth, always risking collapse. In the case of

one trained production engineer who runs a small metal fabrication workshop in Lusaka, Zambia, it became clear to an agency of the Development Bank that he was unaware of the difference between cashflow and profit, with the result that his profitability was marginal and his loan repayments were unreliable. Similarly, small businesses frequently approach this agency for loans for equipment which will allow them to diversify, in the mistaken belief that diversification is automatically the most profitable path.(Schirra,1986) In the case of most rural artisans in sub-Saharan Africa costings normally relate to time and materials only; the inclusion of profit and depreciation is not understood.

Given the technical and managerial limitations of workshop proprietors, and also of their employees, the habit of research and of sharing information within their peer group would make up for some of these deficiencies. Information is very hard to come by, and even where an advisory agency exists to provide it its expertise may be limited. Metalworking businesses who have asked for technical assistance have found that the theoretically trained young engineers who are sent to help them lack the practical knowledge which is essential in relation to a small workshop.(Mulenga,1986) Business and financial advice appears to be more available than technical advice, which could be due partly to the perceptions of priority of the agencies involved, partly to the ease of duplication and publishing of such information, and partly to the comparative difficulty of training competent technical extension workers. However, knowledge and information are not shared among workshops, indeed they are normally carefully guarded. Even where an agency is offering assistance in this area the take-up is slow, since the idea of freely available information is alien. Traditionally an artisan's 'wisdom' is a precious thing, the birthright of his sons; if other children are allowed to know the secrets his sons will eventually be robbed of their inheritance, since their earnings will be lessened through competition. In the case of blacksmithing there are also traditional religious powers inherent in the activity, which encourage a further restriction. Such a tradition serves very well when the craftsman inherits the complete knowledge from his father, which is possible within the very limited requirements of traditional agriculture and village life. If, however, the inherited knowledge is incomplete, the second generation will lack some of the information and capability necessary to function satisfactorily within their working context. As the context within which the artisan functions changes and develops some old skills will become obsolete and disappear,

such as smelting ore for blacksmiths, but new skills and technologies must be acquired in turn if the trade in question is to remain relevant. The reluctance of many traditional indigenous craftsmen to change and adapt their ancestors' practices severely limits their usefulness in a developing environment. Where craftsmen are willing to adapt and develop their capabilities the only way in which such knowledge can reach the majority of small workshops is through a peer group grapevine; if this does not exist, as is the case in Zambia, for example, each workshop remains isolated and entirely reliant upon its own efforts for any development.

If techniques and designs relevant to contextural changes are to be developed an indigenous design capability is necessary. While some work is being done in institutes worldwide on devising more appropriate technologies, and some of these may reach the field, in the vast majority of cases there remains a need for adaptation to local conditions. Local practitioners are best suited to this role, since they are intimately familiar with local requirements and conditions. In many cases appropriate technologies to meet the local needs have not been developed elsewhere, or if they have been are unlikely to have been transmitted to rural practitioners. In the case of artisans this applies equally to product designs appropriate to changing local requirements and to technologies and techniques appropriate to their own manufacturing process. While indigenous design and innovative capacity does reveal itself among traditional artisans, its application and development are restricted by societal and physical factors. This restriction is a fundamental restraint upon the potential development of indigenous rural industry. Urban-oriented artisans whose technical training was institution-based are less restricted in this way, but their usefulness is correspondingly minimised by a lack of craftsmanship.

A small workshop in a developed country would normally have two choices when faced with the need for a process which it could not currently carry out in-house. The first is to acquire the necessary skills and equipment; access to these in Africa is generally problematic. The alternative is to forego the aquisition of the process and subcontract the work to another workshop which, while it may involve a cash outlay, conserves the workshop's inevitably limited capital resources and allows them to be concentrated more productively.

In Zambia and Zaire very little subcontracting between small workshops is to be found. Some subcontracting by big workshops to small ones does exist, but the subcontracting of work by small to large in order to obtain a component or a service which the small is unequipped to produce or undertake is rare. The result is that each workshop makes its own products in their entirety, even where it lacks the equipment and/or the expertise to do so adequately. Resources committed to extending their capability in order to do this are often inadequate to finance the extension, and drain capital from elsewhere in the business.

The reasons given for the lack of subcontracting are doubts regarding delivery, quality and the honesty of the contractor. In the face of these a small workshop proprietor may often feel safer producing all components in-house, however great the strain of doing so may be. In one case in Zambia a workshop was producing a component in-house for about 200 kwacha which could have been purchased from another manufacturer, at a better quality, for 20 kwacha.(Siziba,1986)

RESOURCE DEFICIENCIES WHICH RESTRAIN INFORMAL INDUSTRIALISATION.

Four major resources are identified by artisans as being in short supply; credit, materials, transport and machinery.

The lack of colateral and the disinterest of banks in rural manufacturing enterprises is a major obstacle for artisanal entrepreneurs seeking credit, though growing recognition of the problem has finally lead to attempts to address it realistically by some agencies. Besides the basic problem of obtaining the necessary finance for equipment, loans are very expensive. For example, in 1986 a small (under £300) loan from Small-Scale Enterprise Promotions Ltd (SEP) of the Development Bank of Zambia to a small workshop had to be be repaid within six months at 24% interest; even this rate of interest was less than commercial ones. At this time SEP made only 25 investment loans per year, which gives some indication of the difficulty small businesses face when seeking loans. Most capital equipment must be purchased abroad with foreign exchange, if it can be obtained; the rate of inflation in many developing countries means that almost as soon as an adequate amount of money has been collected in local currency it becomes inadequate in terms of foreign exchange. The problem

of devaluing currencies plagues development agencies as well as entrepreneurs.(Schirra,1986)

Consumables are a continuous problem, particularly in countries with severe foreign exchange restrictions. In 1986 in Zambia, for example, foreign exchange was sold to commerce through a government auction system. The bulk of the US$4 million per week was taken by larger companies who were prepared to pay very high rates and to put up with the punishing conditions attached to the bidding and purchase. The small workshop could not compete in this market at all, and therefore had to rely on locally available materials and consumables.(Lotzen,1986) If consumables are in short supply in the whole country, access to them in the rural areas is liable to pose enormous problems. One rural cooperative workshop which was visited in 1986 in Mpika, Zambia, was down to its last polished and almost toothless hacksaw blade, and had no other means of cutting metal. The foreign exchange situation in Zambia has subsequently worsened.

Raw materials are a problem mentioned by almost all small-scale manufacturers, particularly in the rural areas. The majority of small workshops, particularly those working in metal, exploit recycled material wherever possible, which adds to their economic virtue. New metal stock is very difficult to come by; product lines are hard to standardise if the design must be altered for each individual item in order to accomodate the nature of the currently available material. Every aluminium foundry visited on one journey in Zambia and Zaire pointed out that its production was limited by the availability of scrap. The only hardened and special steels available to the small workshop are those found in vehicles; the most favoured parts are leaf springs, then torsion bars. In many rural blacksmith's workshops the client must supply the steel from which the tool will be made, the problems of supply being too great for the smith to deal with himself. Little use appears to be made of coil springs and valves, though both would be ideal for certain purposes. Timber is becoming increasingly expensive as deforestation advances, accelerated by the export of charcoal from forests to cities. Much of the carpentry in Mbuji-Mayi, Zaire, for example, is carried out with a plastic-laminated chipboard ('Multiplex') manufactured in Kinshasa from timber cut elsewhere in the country.(Tchimbangila,1986) Transport in Zaire is unreliable and expensive, which affects the supply of raw materials and therefore the fortunes of small workshops dependent upon new raw materials.

Material supply problems for small rural workshops whose raw materials are heavy are severely aggravated by transport difficulties. A smith from Manie, near Vanga, in Zaire, when offered a large quantity of material could only accept one piece of truck chassis about one metre long, since this was the maximum he could carry the 20 or so kilometers back to his village; this would be sufficient for perhaps two days work. In this case he had also carried six heavy forged shovel blades the same distance in order to sell them. (However, he was nonetheless enthusiastic about the supply, which constituted a considerable improvement upon his normal situation. A commercial source of supply from this point, Lusekele, has now been established for the use of the local smiths, as a result of this research.) A great deal of the artisans' time can be wasted in unskilled ancillary tasks, restricting the time and energy available for production. The result of these factors is that materials delivered to and products collected from small workshops in remote villages are frequently sold and bought at exploitative prices by the merchants concerned, where such merchants exist. A reed basket made in Manie and sold there earns its maker 30 zaires; the same basket sold in Kinshasa is worth 250 zaires.

In many cases the owners of workshops do hear of new technologies, and can recognise their possible relevance. Where in an industrial country this might lead to contact with a manufacturer of the relevant equipment, who would also supply any necessary information and back-up as part of the package, in a developing country there is unlikely to be such a resource available. In the absence of off-the-shelf technology and equipment each workshop must construct the equipment or process itself either by 're-inventing the wheel' or, on the rare occasions that it can be obtained, from locally available information. Some simple workshop equipment is made locally within the informal sector, particularly in urban areas, but is limited and frequently of poor quality, such as the entirely home-made fixed-amperage arc welders made in Massina, Kinshasa, Zaire. These are made from scrap copper wire covered with brown paper, which is varnished before the wire is wrapped around home-made steel plates; the unit is used in open-air workshops without any casing, being stood on pieces of wood, unswitched electrical connections being made by hand-twisting the wires to the mains supply. Even where the equipment can be purchased, though even a lathe may be hand-made, the manner of using it must be developed in-house. The time required for such inefficient and generally low-level process and equipment development is likely to constitute a major drain on the energies and time of an innovative

workshop. In the case of a workshop which is not capable of developing its own tools the prognosis is inevitably fairly static.

Even in cases where the capital with which to purchase equipment is available, the knowledge with which to analyse which process should be purchased and to identify the appropriate machine is generally absent. In developed countries such decisions are made with the assistance of the technical press, equipment salesmen and peer group, or consultants. In the case of a developing African country there is unlikely to be access to relevant technical publications, equipment salesmen are not sufficiently common, if they exist at all, to make a rational overview possible, and there is little or no communication with peer group. In many cases the result is likely to be scarce resources spent on inappropriate equipment, to the detriment of the business.

DISADVANTAGEOUS LEGISLATION.

General economic factors affect all businesses, but small workshops have limited resources and safety margins and are therefore more vulnerable to negative effects. In the same way, legislative measures designed to assist or protect another part of the economy may have unforeseen results for the informal sector, which does not have the 'muscle' to promote its own favourable legislation. In order to promote agricultural development the government of Zambia removed all import duty on agricultural equipment in the nineteen-eighties, while continuing a 30% tax on imports of steel. As a result of this imported equipment, particularly from Zimbabwe, became far cheaper than the domestic product, the materials in Zambia sometimes costing as much as the imported finished item. The damage caused to the domestic implement manufacturing industry by this measure was enormous.(Jonsson,1986) An environment protective and encouraging towards small workshops in particular and small enterprises in general is only likely to arise when such an approach becomes the basis of a national development policy. Where small enterprise is regarded as being of minor economic significance it will always suffer from legislation and economic measures enacted with the modern sector in mind, these frequently being inappropriate to its needs and wellbeing.

The detrimental effect of the development of infrastructure inappropriate to the requirements of the informal sector has already been discussed, earlier in this chapter. In an economy where foreign capital investment is encouraged the informal sector is also liable to be disadvantaged by competition from the resulting import-substitution products and by the domination of modern-sector bias of such policies.

GENERAL PROBLEMS NOT PECULIAR TO AFRICA.

Since the management function of a small workshop is normally carried out by the principal artisan, salesman, accountant, designer and book-keeper, it is normal for such a person to be over-extended in all of these capacities and perpetually short of the time in which to organise the various functions properly. The choice generally lies between limiting commitments and activities to a manageable level, and thus apparently limiting growth potential, or of going all out for growth at the expense of efficient organisation. The logical solution, of organising properly in order to be able to increase production, presupposes it being possible to make the time available to do so. As a workshop grows this situation worsens until the point at which the proprietor can leave the bench and become a full-time manager, though by this time the acquired bad habits are likely to be ineradicable.

Almost invariably the owner of a small workshop is primarily an artisan, albeit ambitious, not a manager, so management will always be the weak point of small workshops. Given that this is so, business planning and an understanding of the means by which profitability can be achieved are often lacking. In many cases small workshops operate on the principle of reluctance to turn away any work, and of expanding their capability as broadly as possible in order to be able handle it. The result is workshops with only a few employees which, for example, work both wood and metal or which over-extend their capital resources on a wide range of equipment.(Malama,1986) While this potentially allows them to produce capital equipment for other enterprises to commission, the management, design and labour costs involved in such one-off production are prohibitive, to the extent that in many cases the true cost is more than a local clientele can afford to pay, and the output is therefore priced at a level that represents a loss to its maker.(Ngulube,1986) The understanding of such

equations is frequently absent in skill-based small workshops anywhere in the world, but is particularly unusual in Africa. The most viable path for small workshops is the production of a limited number of designs which have a limited number of techniques or processes in common, thus making most use of available capital, equipment and skills while also being able to avoid dependence upon a single product or market.(Schirre,1986) Since product repetition limits the variety and level of skill necessary in manufacture the skills of the owner are likely to be liberated from the shop floor sooner, and can then be exploited both in product development and in better organisation and management.

RURAL INDUSTRIAL VIABILITY.

Due to unstable local conditions and the rapidly varying effects of international trade concerning the Third World, central African rural industry exists in a context of continual change. Few factors are constant, even within the general field of rural industry where the sources of skills, stages of evolution, orientations and purposes differ widely.

Rural industrialisation almost invariably means small informal workshops, a large proportion of which do not provide the sole occupation of their workers. While some categories of workshop can be established elision is normal and distinctions are generally blurred. While a cash economy is more and more dominant, there is still considerable trade by barter in rural areas, although, for example, this is illegal in Zaire.(Selig,1987) Among such non-cash transactions there may also be social obligations operating to the direct economic disadvantage of the artisan, which being a significant component of the social structure are therefore nonetheless worth maintaining.(Mbwa,1988) Within the group culture of a village profit is not the only motivating force; social relationships and dynamics also have a strong effect. The majority of the rural population continue to be involved in agriculture, most of their subsistence requirements being locally produced. However, the demands of the cash economy continually increase the need for either cash-crop production or the generation of non-agricultural income.

The viability of rural industries generally reflects the economic level of the community within which they exist; it is therefore frequently difficult

to establish the underlying potential of an industry (or of a single workshop or artisan). The decline of an industry may occur because of strangulation through inadequate infrastructure, because of official repression,(Miller,1980) or because it is genuinely obsolete. Therefore a change in the conditions of production, such as infrastructural development, favourable government policy or complementary development, may dramatically alter the prognosis for such an industry. For example an unpublished paper relating to a Rural Mechanisation pilot project in the Central Province of Zambia states that

> "From a tour that was undertaken by Mr Mukutu to Refunsa and Chungwe, visiting craftsmen, one point that emerged was that the prospects for village metalworking are very limited unless there are working oxen. Once there are working oxen in the area the prospects expand enormously."(Zambia,1978)

There is a tendency to regard traditional industries as obsolete by definition, and to concentrate development initiatives upon 'new' industries. Not only is this to disregard a valuable resource, but the expensive replacement of it is likely to become necessary, even though the context, and therefore the problems, will remain essentially the same. The stability, demise or expansion of a rural industry should not be regarded as an isolated phenomenon, nor should its worth be judged solely upon its current performance. Newly introduced rural industries, such as motor mechanics and welding, have a greater potential economic viability than their traditional counterparts because they deal directly with the mechanical representations of the cash economy and of the more industrialised urban centres. However, rather than benefitting the local economy they may constitute part of the threat to it, by sustaining an import-export economy rather than supporting autarkic development.

While rural development is not concerned only with agriculture, farming is the major economic activity in any rural area and is therefore the activity that should be developed initially, particularly since the commodities produced by it are fundamental to survival. Since agriculture is the dominant rural economic activity it is also the principal market available to any small workshop which is set up, until such time as a broadening local economy creates other markets.

For the support of agriculture, the first industrial requirements are wood and metal workshops capable of limited production of tools and equipment, and of their repair. Once the wood and metal workshops have been

established, exploiting the agricultural economy to finance their existence, they are then available for the manufacture of other, non-agricultural, products. Their principal role should be that of producing and repairing capital goods, goods to be used in the production of commodities and the execution of services. The wood and metal workshops' capabilities constitute a basic resource for the equipping of all kinds of local enterprise; their existence is vital to rural industrialisation and economic expansion.

INDUSTRIAL ORIGINS: TRADITIONAL OR IMPLANTED.

Rural manufacturing industries are artisan-based. The knowledge of the artisans is likely to derive from either Northern or traditional sources.

Artisans trained in the urban modern sector or through organised technical training schemes may acquire an extensive technical repertoire, but, due to the dichotomy between their training and the rural society in which they exist, may be regarded as implanted. Included in this category are the subsequent apprentices of the original implanted trainees.

Traditional artisans regard their knowledge as inherited wisdom, an integral part of their lives and their place in society. This is particularly true of blacksmithing, which still retains some of its traditional religious significance in many places.

The general difference in the quality of output between 'traditional' and 'implanted' artisans appears to have a philosphical basis, since the actions of the implanted artisan have no connection to the rest of his life other than the provision of money, while the knowledge of the traditional artisan is regarded as wisdom, has come from his fathers and is to be protected. Skills and understandings aquired by such a route carry with them a sense of quality. Where technical capability has been taught to a group of trainees with a very limited goal in mind, generally the production of a restricted range of products which have no personal connection to the maker, the accent has been on economy of training, on making a machine of the trainee in order that the limited task can be performed. This is the normal Northern approach to training, but in most examples seen in central Africa even this training has been abbreviated as

far as it is possible to do so, principally in the interests of economy. While limited goal training may satisfy the immediate apparent need for which the artisan is being schooled, in the long run neither the community nor the trainee is being done any favours, since the paucity of the experience fails to equip the artisan with the ability to adapt to future requirements, to take a pride in his capacity and therefore exercise a sense of quality. In essence, Northern training has been passing on the Northern industrial disease of disinterest and depersonalisation to the new generations of African artisans, providing poor material from which a general technological base must be built.

Besides the alien nature of much of the implanted training, it frequently involves the use of modern equipment, as at the Institut Technique Professionel in Kikwit, Zaïre, which apart from requiring very substantial capital also demands the use of electricity. Even in Kikwit, a substantial town, electricity supplies are very uncertain, there being normally none during the day and frequently none at night either, while in rural areas they simply do not exist. Thus any implanted artisan whose training involves the use of such equipment must remain in an urban environment, or re-learn his trade. Since the latter is unlikely, implanted training schemes are of little relevance to rural industrialisation, except where the training has been specifically tailored to rural needs and limitations. Although there have been some successes in the centralised training of rural craftsmen, as at the Selima Trade School in Malawi, there is also evidence that the subsequently implanted artisans do not always adapt very well to their rural practice, not least because they are often located in communities remote from their own extended family. In addition, even where technical training is appropriate to rural practice, and is carried out in the rural environment, the context of the training remains Northern, in terms of substantial purpose-built workshops and imported industrially-produced tools. While the individuals trained in this environment may be able to adapt to less pretentious village facilities they have nonetheless received the suggestion that a 'proper' workshop requires capital intensive structures which are inappropriate to village establishment, and unnecessary in relation to the initial products of such workshops. Ox-traction equipment can be built in conventional local workshops, with locally made tools. Where, as in the case of the Oxfam-funded projects in the Kasai, Zaire, sets of blacksmithing equipment were imported from England,(Crighton,1986) the implication is that duplication is not possible without similar expensive imports. By contrast, the two books by Aaron

Moore containing instructions for making a total of nineteen wood-working tools are expressly designed for duplication and are appropriate for use in rural or urban environments, provided the carpenter using them can read English and simple drawings.(Moore,1986/87)

If the function of a rural primary workshop is to further the development of other local enterprise, including agriculture, by means of the provision of capital goods and repair services, the establishment of the means to do so must be a high priority. A sophisticated workshop with a skilled staff capable of dealing with all eventualities may appear to be the resource required, but is totally unrealistic in a developing country with minimal funds available, even if the necessary skills already existed.

> "The idea has to be accepted that each of the 6000 villages in Tanzania eventually will need a metal workshop (blacksmith, mechanic) and a woodworking workshop (carpenter) if agricultural mechanisation and better animal husbandry is to find a secure and broad base" (Kienbaum in Müller,1980)

While such a conclusion is logical, the means by which the goal is achieved, and the cost of doing so, is crucial to the reality of the proposal, as Müller illustrates.

> "However, although the (Kienbaum) report recommends that these workshops should employ existing craftsmen, it also estimates that *each* pair of workshops should be provided with tools, equipment and working capital worth 120,000 T.shs (15,000 US Dollars), i.e., 72,000 T.shs for the blacksmith workshop and 48,000 T.shs for the carpenter workshop, and each should receive extension service and advice costing a similar amount of money.
>
> These sums of money are extraordinarily high. In case this implied standard of workshops should be accepted and introduced as the general conception of a village workshop for all the 6000 villages mentioned, it would be detrimental to the whole idea. It would cost about 14 mill. T.shs (or almost 1% of the current total development budget for the whole country) to establish just 60 pairs of workshops *per year*, and it would take 100 years to "cover" the country (assuming that the number of villages remains constant)." (Müller,1980)

If it is accepted that the development of rural economic activities of all kinds depends upon the existence of primary workshops, yet that the cost of such workshops is prohibitive, the equation necessary for rural development would appear to be insoluble. However, the conventional Northern concept of a workshop, upon which Kienbaum's estimates of cost appear to be based, bears little relation to the rural African norm which must form the foundation of local primary workshops.

If the number of primary workshops is to be sufficient to have a significant effect, such workshops must be established independently, from local resources, since the scale of the problem is beyond centralised funding. Since the cost of conventional (generally imported) tools and equipment severely limits the range of facilities which any workshop can hope to achieve, alternative means of aquiring equipment and of carrying out technical processes must be found. The development of a workshop's capability to supply itself with tools and technical capability is fundamental to its ability to develop with minimal external support.

The traditional artisan, besides the philosophical virtues of his training, is already located in a social and economic structure of which he is an integral part, and to which his training is directly related. Since it is this very social and economic micro-system which, among many others, requires development, the most logical vehicle for rural industrialisation is the traditional artisan. This is not to suggest that such artisans are perfectly equipped to play the desired rôle, but if mechanisms can be contrived to augment their wisdom in ways relevant to concurrent developments, particularly in agriculture, success is far more likely than by means of implanted artisans, since the traditionals have already demonstrated their motivation and staying power, and their ability to operate under existing limitations.

This research has therefore concentrated upon the potential of traditional artisans, especially blacksmiths, by means of empirical work with the blacksmiths of Manie, a village in the Zone de Bulungu, Région de Bandundu, in Zaire, in particular. The intention was not only to study their relevance to contemporary development, but also to ascertain their attitude towards participation and to identify the means by which their contribution could be maximised. Possible means for the development of this industry include external inputs of information, internal re-structuring, infrastructural development and the expansion of their market. While appropriate external inputs may be made on an individual basis, this will have an insignificant impact regarding the industrialisation of a wider rural area. Particular attention has therefore been given to the manner in which inputs were made, and the way in which a process of autonomous propagation of technical information might be established.

3: RURAL WORKSHOPS.

In this chapter the viability of Urban and Rural informal manufacturing are compared and the contribution of the rural informal sector and the difficulties inherent in its development are identified. Particular attention is given to the significance of innovation and the constraints upon its practice, which leads to a close examination of the nature and role of Design and Analytical Decision Making in the context of the small workshop.

COMPARATIVE VIABILITY OF URBAN AND RURAL INFORMAL MANUFACTURING.

"Their production processes are characterized by a low capital-labour ratio. For our economy where capital is scarce and labour abundant this fact is an important consideration. Secondly, small-scale production is often the only means of meeting demand when the size of the market for any given item is small. This is particularly the case for relatively isolated markets in small towns and rural areas. These enterprises can, therefore, play a useful role in programmes of industrial decentralization. Thirdly, they help in the tapping of resources such as entrepreneurship, capital, and raw materials which otherwise would remain unused. They generally mobilize family or community savings which might have remained idle or been spent on unproductive activities."
(Kenya,1979)

The commonest and most severe constraint upon small-scale manufacturing activity is a shortage of inputs. In the case of metalworkers, working largely with scrap, the principal source is urban-based industry and consumers. The consequent shortage of scrap in rural areas means that many blacksmiths are dependent upon their customers to supply the material with which they work, which results in a far lower return than if they had direct access to the metal themselves. In the case of the Manie blacksmiths, when clients provide the material the products made from it are shared equally between smith and client, resulting in 40% lower earnings than if the smith's own material is used. By contrast urban metalworkers have access to a comparatively reliable supply of metal from scrap vehicles and other recycled sources. The density of the urban environment makes it economical for them to search out metal directly themselves, or to take advantage of the scrap dealers who can exist due to the level of activity possible. If there is any new metal stock available for purchase the urban manufacturer is in a good location to get it; where material supplies are restricted they are unlikely to be available to the rural artisan. For example, tinsmiths in urban Zimbabwe have normally been able to use new metal sheet, imported from South Africa by the formal sector, while rural tinsmiths are almost exclusively restricted to recycled sheets of frequently inappropriate gauge. Further differences in the availability of tools and the quality of peer group practice result in the lower quality rural practitioners being largely dependent upon repair work, while their urban counterparts concentrate upon new products, for which they receive a better return.(Cromwell,1989) In addition to raw materials urban artisans also have better access to other processed inputs, particularly consumables such as nails, sand paper, hacksaw blades and tools in general.

The means of production available to small scale manufacturers are also considerably affected by location. Access to electricity is most unusual in rural areas, whereas it is becoming increasingly common in urban centres, even if it is not always reliable. The availability of electricity, a reasonably cheap and versatile source of power, can dramatically change the quality of finish, the processes and the speed of production possible. The presence of other related expertise also means that some repair of such capital equipment is possible. In metalworking access to welding capacity, or the lack of it, affects the product range that is possible, and can also give significant price advantages to the products concerned. In addition to this, there is considerable consumer preference for goods considered to be made by "modern" means. However, there are also negative effects, since mechanised processes often require less skill of the artisan and therefore, particularly in the case of welding, allow poor quality goods a cosmetic attraction. While in many places this has resulted in the blacksmiths losing the hoe as a product to a combination of industrial and welded urban manufactures, it is interesting to note that in rural Zimbabwe at least some farmers prefer the blacksmith-made hoe for its durability, in spite of slightly higher cost. The alteration of industrially produced hoes is a further service which the smiths provide.(Cromwell,1989).

All manufacturing activity is dependent upon the market for its products. While some rural manufacturers have specific advantages such as a direct relationship with rural customers and a personal understanding of their requirements, the scale of the market and its spending power are of major significance. An urban market with comparatively strong spending power is able to buy a very diverse range of products in considerable quantities throughout the year, creating many opportunities for the urban artisan. By contrast in rural areas spending power is very limited, cash being very scarce except for a brief post-harvest period, if the harvest has been adequate. The low spending power severely limits the range of products which can be sold, while the lower density of the population restricts the size of the individual artisan's market.

The majority of rural artisanal manufacture and repair is combined with subsistence farming, allowing access to cash for external purchases and such formal sector costs as school fees and taxes. Even where an artisan has access to credit, permitting capital expansion and increased productivity, assuming raw material availability, the local rural market is

unlikely to be able to support those additional costs. By contrast, urban artisans are normally in a far better position to expand their production since their greater market is more likely to be able to provide the revenue for this. In addition the possibilities for access to credit are likely to be better in an urban environment. Where the transport infrastructure is good the position of rural artisans is further eroded by competition from urban manufactures.

Where the development of small enterprise is being contemplated by an external agent the possibilities are likely to be far more measurable and on a considerably larger scale in the urban environment than the rural one. The convenience of working in a more accessible area and the far lower cost of advisory inputs are also attractions. Urban enterprises are more likely to benefit from, and thus repay loans for, improvements in capital equipment, a consistently favoured technological solution to enterprise development. In addition, the apparent returns from the amount of effort required for rural enterprise development seem very limited due to the part-time commitment of the majority of practitioners, compared to the full-time professional involvement of the urban entrepreneur, which is perceived as more valuable and laudable by the majority of external agents to whom full-time specialised professional activity is the norm. Subsistence farmers who do a little manufacturing on the side are generally not perceived as making a significant contribution to rural development, and are considered to be unrewarding as a subject for input in terms of measurable results. The majority of loans to small businesses from such agencies as SEDOM in Malawi or SIDO in Zambia go to urban or peri-urban enterprises; extensive rural credit support is only likely to arise where that is the specific focus of the agency involved.

In this context, where most of the production and marketing conditions favour the urban manufacturer, it is to be expected that initiatives to develop urban small manufacturing enterprise have been far more successful than those aimed at the rural equivalent. The most notable example of urban small scale enterprise development is the growth of manufacturing activity at Suame Magazine, Ghana, which was imaginatively supported by the Technology Consultancy Centre, Kumasi. (Smillie 1986) The magazine has now become the centre of the vehicle repair trade in Ghana, as well as encompassing a range of other manufacturing and repair activities, particularly in metal; several thousand people are currently employed. Aluminium casting has already been referred to earlier, and is an example

of an activity which has spread widely in a number of urban centres in Africa, but which is dependent upon a raw material, scrap aluminium, which is almost exclusively found in the urban context. Some work has been done to assist and develop the activity, for example by Oxfam in Kinshasa, but, like any commercially viable low capital cost activity in an urban environment, it has tended to spread of its own accord. Such casting, while it can be carried out entirely manually, is greatly assisted by electricity being available to power a rotary fan. Not only is the urban commercial environment more appropriate for such activities than that in rural areas, but the lack of agricultural oportunities means that people are entirely dependent upon direct income generation. Since unemployment is seriously high and rising in most African countries the attraction of informal sector activity is considerable in urban areas. The potential for a fruitful relationship between an urban entrepreneur and a development agency is reasonably good, where continuity is comparatively easy to achieve and constraints are limited to those affecting the whole economy rather than being exacerbated by geographical location and market limitations. The input made by the Development Technology Unit of Warwick University to Mr Siziba's metal fabrication business in Lusaka assisted considerably in his ability to develop products, the business being further enabled by a substantial loan from the Small Scale Enterprise Promotion section of the Development Bank of Zambia. It is in fact significant that the problems occurring within Mr Siziba's business centred around the multiplicity of choices open to him and his reluctance to concentrate more profitably upon a limited number of product lines, instead of diffusing his energies and capital by custom-building a wide range of products. His business clearly demonstrates that, with the right inputs, skills and support profitable small scale businesses are entirely feasible in urban and peri-urban areas.

Examples of successful small-scale enterprise arising from external interventions in rural areas of Africa are much harder to find. The extreme difficulty continually encountered in material supply, the limitations of the market and what it will support, the predominantly part-time nature of artisanal activity and the frequently misplaced expectations of external agents' interventions make success unusual. If an agency attempts to develop a rural manufacturing enterprise along conventional lines, which are essentially urban, they are unlikely to be successful. It is no accident that by far the largest proportion of rural business loans provided in Zambia, for example, is to finance hammer mills

with which the staple food is processed.(Schirra,1986) Milling is one of the few rural services which are not seasonal and which it is economically viable for the whole community to use. The conditions of rural manufacturing differ significantly from the urban equivalent, and this must be recognised if the intervention is to be effective and sustainable. The author of a detailed and careful survey of non-agricultural enterprise in the Communal lands in Zimbabwe(Helmsing 1987) went to considerable pains to quantify the value of rural blacksmiths work and their activity, and came to the conclusion that the smiths were making a loss. This conclusion was arrived at by allocating a value to the smiths' time, and costing their work accordingly. To apply such measures, and to draw conclusions from the results, is to ignore the special context of the activity, the reasons for undertaking it and the results desired by the practitioner. A subsistence farmer who also makes some forged items for his own use and for sale is on the edge of the cash economy. His principal needs are catered for by the family's farming activities, which do not have a direct cash value since the products are largely required for domestic consumption, only surplus being convertible to cash. Yet cash is required for agricultural inputs and domestic requirements such as school fees, certain foodstuffs and consumer items, and, being difficult to acquire within the local rural economy, has a value above the exchange value of equivalent agricultural produce. For example, an axe and a chicken may have the same value, but the smith would sooner be paid in cash than with the chicken, since the need he is trying to meet is for cash. In many cases the farmer will only make sufficient products to meet his cash requirement, 'other' than responding to the demands of his immediate customers. This is because even if the cash takes longer to earn than the equivalent in local goods it is justifiable and useful to do so in order to obtain access to the external inputs required for agriculture and the home. Beyond that point the benefit of working at "a 'loss" diminishes, so extensive production becomes less worthwhile. Helmsing suggests that the agricultural activities subsidise the artisanal production, but the reverse is true; the artisanal activities are undertaken at a lower apparent return in order to supply the necessary external inputs for the agriculture, which require cash.(Crowell,1989)

The result of such measurement, which does not recognise the motivation and true value of an activity to the practitioner, is that either the subjects will not be regarded as suitable for assistance or that the assistance given will be misconceived, usually attempting to change the

activity into one more recognisably urban, where Northern-influenced expectations are more likely to be met. However, the results are more frequently an apparent disinterest and a failure to capitalise upon the inputs made, leading to the assumption that the failure is the fault of the artisan rather than the input. A blacksmithing project carried out in Malawi attempted to raise considerably the technical level of rural blacksmithing, involving a significant increase in capital levels required. The majority of part-time smiths failed to respond, probably because the changes introduced to the activity were too extreme to be undertaken at one step, and because the motivation to extend their activities was not matched by sufficient need, as described above for the Zimbabwean smiths. (ITDG,1989)

Rural small-scale enterpise development is not inherently unviable. To draw such a conclusion from conventional business measurement leads to the conclusion that the practitioner does not know what he or she is doing. The extent of the knowledge of farmers and indigenous rural practitioners of various kinds is now widely recognised as highly pertinent and very well-tuned to local conditions. The viability of an activity can only be gauged if its full context is understood, just as the limits of the extent to which it is viable may only be judged if the need it is intended to meet is acknowledged. The fundamental purpose of traditional rural manufacturing activity is to support subsistence agriculture and, as part of that, the domestic existence of the farmers. The development of rural manufacturing will therefore only succeed where this purpose is recognised and reinforced. This means that inputs which concern themselves with the income of the practitioner rather than the perceived needs of the community and the practitioner are inherently unviable.

THE SIGNIFICANCE OF INNOVATION.

The context within which a rural workshop in Africa operates is subject to continual change, often extremely rapid. Traditional practices such as blacksmithing can easily become marginalised by the incursion of industrially produced goods or welded artifacts from urban areas, where access to scrap steel is far easier. Conversely the decline of a national economy usually has an extreme effect upon formal sector industry and the urban artisans' advantages are diminished by declines in the transport infrastructure. Since the economies of the majority of African countries are under pressure the comparative advantages of the rural artisans are often no longer diminishing, while their function within their communities increases in significance once more.

Fluctuations in the market position of the rural artisans make the ability to respond to changes in demand for different products an essential capability. Market opportunities are generally very limited, making access to those which do exist very important. The small number of alternative products which can be made result from a combination of the very limited seasonal purchasing capacity of rural communities, the degree of penetration from formal and urban manufacturers and the level of competition they offer in terms of price and quality, and the severe technical and infrastructural restrictions within which rural artisans work.

While the artisans' ability to make products wherever an opportunity exists is important to his or her own survival, it is even more important to the community within which they work, since an opportunity for the artisan means a need unsatisfactorily or un-filled for the local consumers. This particularly relates to the need for repair services, which are rarely if ever met by remote manufacturers. Repair services do not, however, constitute by themselves a sufficient market opportunity for an artisan since they are almost invariably less profitable than manufacturing, normally requiring more input for less return. The exceptions to this are specific repair activities relating to items of great strategic value such as bicycles.

In order to be able to take advantage of varying market opportunities and to survive variations in available resources the ability to make the best possible use of raw materials and tools is of fundamental importance. If

an artisan is unable to innovate then the workshop's capability remains static, relating to a particular set of inputs and market demands. Since the context is far from static such an artisan is very vulnerable, and becomes increasingly unable to maintain the service which the community either does require at the present time, or may need in the future. The ability to find ways to circumvent the lack of particular equipment or materials and to maximise the usefulness of those which do exist is an ability of fundamental significance to the rural manufacturer and repairer.

In Developed countries an artisan has access to many sources of information concerning sources of materials and means of production, in a context of plentiful supply. In Africa an artisan is faced with a general unavailability of inputs and an almost total absence of information relating to the ways in which change can be accomodated or taken advantage of. With rare exceptions technical and design development must be originated by the practitioner. Though there is some potential for the sharing of knowledge between practitioners the tradition of the protection of knowledge as a valuable commodity militates against it in many areas, in addition to which almost all artisans are in the same position, their knowledge relating to existing practices, usually coming from a traditional base. In this way there is very limited possibility of an established practitioner being able to get assistance in developing adaptations or innovations from a more capable peer.

In the majority of rural workshops in Africa production is not systematic. While the limited number of products could be considered as lines, goods are normally made on an individual basis. Exceptions to this are unusual and quite dramatic, as at Phalula in Malawi where a group of smiths who mainly make axes produce them in batches, maximising the use of time and fuel. By contrast the majority of smiths, including those at Manie, make one axe at a time, from start to finish, even if there are several to be made. Whenever a new product or a variation is required, design input is required. The general use of scrap material by blacksmiths also demands a capacity to vary even a standard product slightly according to the form of the raw material. Repairs consistently make demands on the design capability of the artisan, since breakage may occur in many different ways. Even where an article regularly breaks in a similar way the ability to recognise and adapt to variations is necessary, for example in the repairing of large enamel bowls with rusted out bottoms, in Zaïre. The ability to solve problems and to innovate within existing parameters is an

essential part of the activity, even when additional adaptation and innovation are not necessitated by changing external factors.

The level of innovation of which a rural workshop is capable varies greatly throughout Africa, depending upon the culture of the society, the education and training systems through which the practitioner has learned both technical and intellectual habits, the extent of their confidence in their skills, and the time available to them to do the experimentation necessary for innovation. Attitudes to risk-taking are also of fundamental significance, the more marginal the economy of the community the greater the caution regarding risk will usually be.

Innovation involves the taking of risks, since the outcome of a particular innovative course of action is invariably uncertain. In order to be willing to take risks and to be able to deal with the consequences of failure, the artisan must have a reasonable level of professional confidence.

To experiment in order to find possible ways of doing things and to test the application of such ideas, it is necessary to have time available to do so. Such 'Industrial Leisure' can only be created by the generation of a surplus income which allows for the not immediately productive use of time and materials for experimentation. Before innovation can become a regular feature of an artisan's activity the point where such a surplus can be created must be reached and an awareness of the need to re-invest it in the activity must exist.

Working with the smiths of Kanie in 1987 their attitude to undertaking innovation was specifically explored. Because the entire craft had been learned from their elders and was seen as coming from their ancestors, it was not based upon analysis and experiment. For those who had had primary education this attitude had been further inhibited by a system of learning by rote which leaves little to the initiative of the individual. In addition to these factors the group culture is heavily prejudiced against individual advantage, so experiment in order to gain individual or clique advantage is not acceptable to the larger group. The principal smith, Waka Ngai, is believed to have been poisoned by others of his clan early in 1989 because he was not felt to be sharing enough of the economic benefits which they believed him to have gained through working with the foreign blacksmith(Collis 1989). Even in less extreme cases the

accumulation of surplus as capital or even working capital is extremely difficult, since any cash or kind would immediately be annexed by other members of the extended family. An example of this was when one smith, Ada, had no money with which to buy the steel that he needed and which was on offer in the village because all the cash he possessed had been used by his family to purchase a child's dress the previous day.

In order to test the smiths' ability to design in response to demand a very simple problem, the design of a cracker for oil-palm nuts, was presented to them, causing considerable unease. One group of younger smiths did attempt to produce a solution, but were totally unable to test it because of a lack of steel with which to experiment. It was the firm opinion of the smiths in general that any available material from which commercial products could be realised should be absolutely reserved for that purpose. The young smiths had no leeway in the matter, making any product development even more difficult for them.

The use of time for innovation constituted a major risk, since they barely survive on their output. The time taken to work with the researcher was a major investment and was carefully limited in order to minimise the cost to the smiths. The work done was almost exclusively on items which they saw knowledge of as an urgent need and which they had directly requested, so the connection between cost and benefit was immediate and obvious in their minds. Even so, there were comparatively few smiths who could afford to participate for all the sessions, though the pressure to do so grew as the recognition of the potential benefits increased.

It is difficult to know precisely why the confidence to experiment was lacking, since the lack of opportunity effectively prevents any practice of doing so, complicating the other factors involved. What was clear was that any significant advance in the development of products was made quite remote because of a lack of confidence and the consequent reluctance to take risks with scarce resources. It should be stressed that this does not negate the work which was done with these smiths, since the most urgent need was to consolidate their activities in order that the subsistence farming community should retain access to their services. The priority identified by them was the making of tools for their own use, which served this purpose.

SUSTAINABILITY AND GROWTH.

The interests of the African communities in which small-scale manufacturing enterprises exist generally require that they be sustained for the sake of the services they supply. This should be a primary concern of any external agent working in this field. Where existing enterprises are concerned it will initially frequently be a question of consolidation rather than development. However, the person with the greatest interest in the sustainability of the enterprise is the entrepreneur, so client-orientation on the part of external agents will prioritise this fundamental goal. Any failure to protect the sustainability risks the demise of the enterprise, losing the income for those working in it and the benefits of its services for the local community, and so defeating the purposes of the external agent. The greatest threat to sustainability when external agents intervene is the introduction of artificial solutions to persistent problems which the practitioner will be unable to sustain following the departure of the external agent's influence. The use of the agent's transport or agent-influenced market links are frequent examples of this.

The principal factors customarily considered to affect the initial viability of small workshops are the availability of:

Investment capital
Working capital
Accessible markets
Appropriate infrastructure
Raw materials
Tools, equipment & consumables
Management and technical skills
Suitable products or services
Motivation

In Africa the level of available resources necessary for the establishment of a small workshop vary widely, as do the quality and scale of the commercial competition. In the most extreme case the possession of simple skills may constitute the vital resource, for example where capital equipment is a pair of pliers and raw material is some scrap wire for the production of toys for a market devoid of them. Even at this level all factors can be quantified, since they must be present in some form for the

enterprise to exist. While the minute scale of the factors might be considered to lessen the importance of each element, the problems are equally great for the artisan at every level, since the scale of operation constitutes a reflection of the available resources.

The relative importance of the different factors is variable as a workshop can be operated on a minimal availability of one or more resources if these are compensated for by a strength in others. For example, poor infrastructure is less relevant if an adequate market is available locally, if tools and consumables are home-made, and if raw materials are either home produced or easily available. In this context capital requirement is also minimal compared to the need for skill, as is management expertise.

Just as all the factors listed above affect the fundamental existence of a small workshop, so the resources they require must be appropriately augmented if the workshop is to grow. As the scale of the workshop develops, the balance between the various factors increases in importance, very quickly passing the point where a strength in one area can compensate sufficiently for a weakness in another. At any stage in development inadequacy in the resources with which to deal with any one factor might be identified as the principal impediment, but it is essential to recognise that all factors must be responded to to the appropriate degree at all stages of the workshop's evolution. While the proportional relationship may vary, for example an ample availability of investment capital and the corresponding equipment may bring about a lessening of the skill requirement, each factor continues to be an essential requirement for the workshop's development.

A workshop can be established on the basis of the resources required to deal with the factors listed above alone, and may indeed be able to develop to a certain extent without the contribution of any other resource provided the existing ones are adequately augmented. If, however, development is to proceed at a reasonable pace and progress to a significant extent four further essential requirements arise. These are:

Skill acquisition
Information availability
Analytical Decision Making
Design

It would be wrong to suppose that these resources would not make valuable contributions to the enterprise from the very first but in many cases a workshop will be producing traditional or standard products or services using traditional or standard resources and practices for which minimal innovation is required.

For the development of a small workshop an expansion of capability is essential, whether in management, technology, or product development. The knowledge necessary for this expansion can either be original or received.

Subjects upon which a small workshop may require information include:

Obtaining finance
Regulations and laws

Markets
Product patterns

Material technology
Material sources
Technology
Technology sources and choice

Subjects upon which a small workshop may require instructional material include:

Management
Book keeping
Marketing
Techniques and skill development

The availability of information and instructional material allows capability to increase without recourse to costly empirical development, although selection decisions are still essential. If information on all the areas that concern the workshop is not available universal improvisation becomes unavoidable, which in many cases leads to less than satisfactory solutions, since they will always be 'first stage' rather than a development of the accumulated wisdom of others.

While capital, equipment and raw materials are areas in which there are frequently crucial difficulties, the majority of information will probably come originally from a source external to the locality, since technological and business levels are likely to be generally low, making useful peer group assistance minimal. In addition to this, the traditions of keeping 'wisdom' within the family militates against a mutually supportive attitude to the sharing of information among peers. Many small workshops in Africa identify a lack of information as a considerable constraint. The information and instructional material which they believe they require relates to methods of technical improvisation, techniques, product design, finance or marketing. It is also frequently true that they even lack information regarding resources available within their own locality, such as technical services which could be provided for them by other small workshops or formal agencies.(Sizibe,1986)

The acquisition of information in any society is time-consuming and expensive, the results depending to a considerable extent upon the initial level of knowledge possessed by the seeker. In the African small workshop context the seeker is therefore normally the most skilled and knowledgeable person in the workshop, who will normally be the owner and also the key worker. Given the paucity of information resources, the uncertain gain which results from a certain loss of output is a doubtful incentive to the commitment of time and money. Since small workshops frequently operate on narrow subsistence margins, where the shortage of cash correspondingly increases the significance of the time that any task requires, a spontaneous seeking out of information is likely to be an exercise which it is only very rarely possible to carry out. Once a workshop has grown to the point where the owner is no longer required to be continually working at the bench, but is largely concerned with management functions, some of his/her liberated time can be dedicated to the gathering of information which would advance the workshop, indeed this may be regarded as part of the function of a manager. However, at this stage the workshop would pass beyond the definition of 'small' being used here, which is that full-time management is not required, the owner still being 'dirty-handed'.

The smaller the workshop is the more vital is the need for information and instructional material, but the harder it is to aquire it. In rural areas the isolation of workshops considerably exacerbates the problem.

THE PROCESS OF INNOVATION.

The exploitation of received information and its adaptation and development in ways appropriate to a particular application involve Analytical Decision Making (ADM) and Design.

The term Analytical Decision Making is used in this thesis to define the organisation and exploitation of all the relevant factors to the greatest advantage, in order to obtain the best production most economically, achieving the maximum efficiency and profit.

Victor Papanek states that "Design is the conscious effort to impose meaningful order".(Papanek 1972) The universality of this heroic description may be valid, but it lacks the precision necessary if the contribution of design to broader activities is to be examined. Papanek's subsequent affirmation that "The mode of action by which a design fulfills its purpose is its function"(Papanek 1972) does declare that function is a fundamental purpose of any design, function being "the work a thing is designed to do"(Fowler 1969), but the statement that a design does what it is supposed to do when it does the work that it is designed to do cannot be regarded as a useful definition of 'design'.

Common usage of the word 'design' puts much emphasis on representation rather than innovation, for example the Pocket Oxford Dictionary definitions of 'design' are:

> "To formulate the plan of (picture, building, book etc) in the mind or on paper etc as a pattern"

> "A mental plan, outline or sketch or groundwork or pattern for a work of different scale or material or elaboration".

A 'designer' is described as:

> "A person who draws designs for manufacturers".

If these definitions are compared with the same dictionary's entry for 'function', above, there appears to be a discrepancy, since the use of the word 'designed' in the definition of 'function' does suggest an element of

intellectual intention which is absent in the representational definitions of 'design'.

In order to describe the creative aspect of design more precisely than Papanek, without abandoning the possibility of its broad application, it is necessary to construct a definition which includes the intellectual and inventive elements, identifying the difference between the design activity and the application of existing solutions.

The definition I propose is that design consists of the origination of a solution in response to the logical analysis of a problem.

Design can be said to occur when an original solution to an identified problem is arrived at, whether the origination lies in the invention of component responses or in the manner in which responses, invented or existing, are assembled.

The understanding inherent in the capacity to design may also be employed when decisions requiring no origination are being made. While not design, such an activity exploits the same analytical approach, but terminates before invention becomes necessary.

For example, if a technology is transferred there is an Analytical Decision involved, a decision made using an understanding of design, but nonetheless a choice from existing options, not an origination. The making of a choice regarding the appropriateness of a technology requires the same analysis of the factors involved in its deployment as would be necessary were the technology being originally designed, but the results of the analysis are applied to known options rather than being the stimulus for the invention of responses to the questions raised. Only if existing technologies were rejected in their current form in favour of an origination would Design become apposite.

Where a technology is transferred and adapted both Analytical Decision Making and Design are involved, since Analytical Decision Making will have been employed in the initial selection of the technology appropriate for transfer, while Design is required for its adaptation to a form suitable for the use to which it will be put.

ADM can directly affect:

- Resource management
- Management
- Marketing
- Products
- Material choice
- Technology choice
- Technology development
- Techniques

Design can affect:

- Product development
- Product presentation
- Material exploitation
- Technology development and exploitation
- Technique development and exploitation

Just as product or process innovation is the result of the design process, so it may occasionally be possible to regard the organisation and management of a workshop as being a product of the design process, as opposed to ADM, if it has departed or developed from standard practice as represented locally or in the practitioner's training.

Above all, design is the tool for the origination of solutions, particularly in the technical and product sphere. The less technical information is available and the more scarce technological resources are, the more important the design capability of the workshop becomes, since improvisation, innovation and invention often offer the only alternatives in the absence of conventional commercial resources.

The design capability of the majority of small workshops in Africa tends to be largely consumed in finding ways to circumvent the lack of resources in order to maintain a viable status quo, rather than in the furtherance of the development of the business. While Design is not an exhaustable commodity, the thinking, experimentation and development involved do cost a considerable amount in terms of both time and money. In an enterprise where subsistence is the primary aim profits are low; if the innovation necessary in order to maintain the status quo consumes all of any income

surplus to survival requirements the financing of design activity for the workshop's development is impossible.

The same severe limitations of available research resources, time and money, discourage the aquisition of the knowledge necessary for the introduction of innovations, regardless of whether they are original (design) or aquired (information).

If a workshop's design and research capability is exhausted by the fight to continue the basic activity at a viable level, the means by which the further development of small workshops might be encouraged should be examined in this light.

Since the cost of design activity is high, particularly in terms of the time of the most capable members of the small workshop, it is a highly significant investment which should be employed with appropriate care. The decision to develop a particular process, piece of equipment or product should only be taken after a careful examination of the potential yield in terms of profit and production. Additional profit may come from increased product quality or liberated skilled time, rather than from increased production alone.

Since design is a creative activity, many small workshop practitioners find considerable pleasure in it, with the result that it may be indulged in beyond the allocatable resources of the workshop. Over-indulgence in design may take the form of putting more design time into a product than is justified by the price which a client will pay, or in the development of non-viable products or processes. Non-viability may be inherent in a product or process, or may arise out of other workshop limitations such as a shortage of manpower with which to exploit the result of the design work, or the inability to market the product of it.

Where a workshop is concerned with the manufacture of individual products according to customers' specifications, there is likely to be a high design content in each product. In a developing country, particularly in a rural environment, customers are unlikely to realise sufficient earning potential from the workshop's product to enable them to pay an appropriate price for it, given the cost of the design input and the length of time required for the building of what is frequently, in effect, a prototype. It is therefore

extremely difficult for a design-based workshop in a developing country to be commercially viable over a period of time.

Since all design costs must eventually be borne either by the purchasers of the product or service provided by the workshop, or by the workshop itself, the more clients who share the cost of each design input the more likely the workshop is to receive a realistic payment for it. If the cost of design is adequately reimbursed the workshop is more likely to be viable and is in a better position to develop, since further design work can then be financed. If design work is not a viable activity the development of the workshop will be severely hampered, since all such input will have to be funded by other income. In an environment where design is not viable it is unlikely that there will be sufficient profit generated elsewhere in the business to finance it adequately. Therefore within a poor community design activity and the consequent workshop development are severely handicapped, which in turn denies the community the improvement of a resource desirable for its own development.

It should be emphasised that design effort on the part of a small workshop constitutes a long-term investment, particularly in the case of capital equipment. The work is not directly paid for, as in the workshop's normal activities, but will be paid for gradually out of increased production or better prices resulting from better quality. While design costs are a factor in the prices of industrially produced capital equipment, they are shared by the complete production run of the designed object, and are therefore far less per item. In the case of a small workshop the design work normally results in a single piece of capital equipment for the workshop's own use, rendering the equipment very expensive in real terms.

In addition, when a workshop buys an industrially manufactured piece of equipment there can be reasonable confidence in its effectiveness, whereas a home-designed item carries a far greater risk of failure, having been designed by a non-specialist with little time for research and development. A piece of equipment produced in-house therefore represents a very considerable investment with a greater risk of loss. However, such equipment is more readily adapted, improved and repaired as may become necessary, since its local origins allow for local solutions. An industrially produced item, if it is obtainable, is likely to be expensive in cash terms, particularly if it has been imported, and carries the severe

risk of being disabled through a lack of spare parts or adequate maintenance and repair facilities.

A high proportion of small workshops in Africa use at least one item of non-traditional home-made capital equipment, including:

Wood lathes
Arc welders
Saw tables
Cut-off saws
Sheet metal shears
Sheet metal folders
Chain making jigs
Vibrating tables
Tile grinders
Moulds for casting concrete
Forges and fans
Grinding wheels

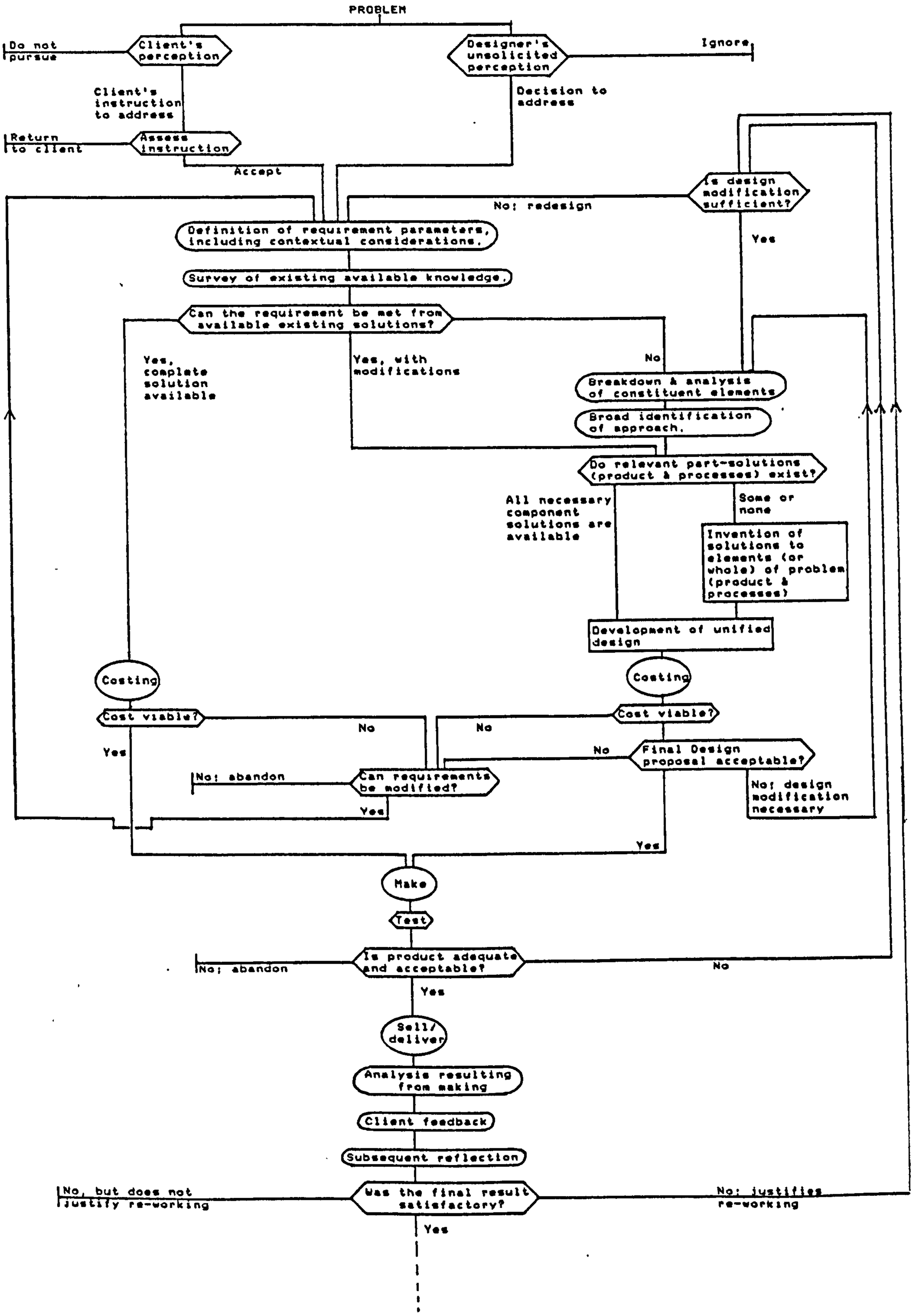
In certain cases the need to provide the means of production from within the workshop's own resources constitutes a major diversification. The remarkable versatility of the designer in one carpentry workshop in Mbuji Mayi, Zaire, is illustrated by the variety of equipment he has produced:

Wood lathe
Saw tables
Vibrating table
Tile grinder
Various moulds for concrete
Forge and fan
Joint cutter saw and jig
Grinding wheel

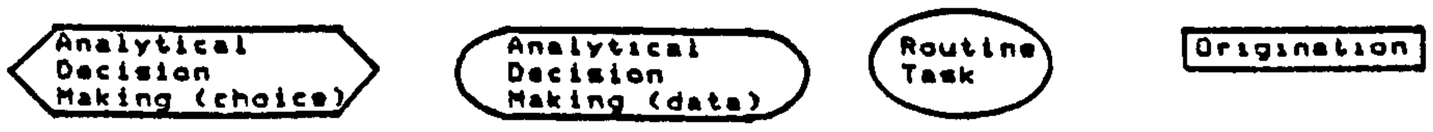
In this case the workshop has spent capital on metalworking tools in order to be able to build the wood and cement working equipment. More seriously, the inventive talent of one of the co-owners has been largely consumed by the production of fundamental equipment, which was illustrated by this capable designer requesting that designs for furniture should be sent to him.

This designer is not willing to capitalise upon his engineering capability by producing and selling the equipment he has already designed for his own purposes, on the grounds that his business is carpentry. This reluctance partly stems from a tradition which discourages the sharing of wisdom; he has no desire to see his competitors prosper. The fact that there are many carpenters in the town competing for a limited market with considerable raw material problems, while no-one is producing the capital equipment that is desperately needed does not appear to register as significant. His workshop is increasingly in difficulties, and appears likely to cease trading.

The design process in small workshops:



Symbols:



FORM OF DESIGN INPUT REQUIRED BY PRIMARY AND SECONDARY WORKSHOPS.

Whatever the developmental context of a small workshop and whatever the level of sophistication it achieves, there will always be a design requirement. The consumption of design input by a workshop is likely to increase as the workshop grows, and the nature of the input is also likely to change. Initially the requirement will be for solutions to problems arising out of a shortage of resources with which to make and repair conventional products previously designed elsewhere. As the workshop grows and its resources increase the emphasis is likely to change to product design, with less time required for the development of the means of production by design and innovation, particularly if the workshop is a specialist one.

An absolute categorization of primary and secondary workshops is obviously unrealistic, since many workshops will play a dual role or evolve from one category to the other. However, even where both functions are carried out in the same workshop the differing design requirements will generally apply to each activity.

A primary workshop is design intensive. Flexibility, being able to originate or develop, produce and repair a wide variety of products for different activities, requires seperate design input for almost every job, with the full range of decisions regarding function, form, construction, materials and processes being taken each time. In addition, although process development and innovation to redress workshop deficiencies are required in both primary and secondary workshops, there will be far more of this necessary in a primary workshop because of the variety of tasks it will undertake; in a secondary workshop, once the product range and the means of manufacture or repair are established, the need for everyday design input is minimised, as the output and the activity become increasingly standardised.

A secondary workshop is production intensive. Although continual shop-floor problem solving is not required in secondary workshops concerned with the production of standardised goods, more specialised long-term input is required for product design and development, and for the development of processes appropriate to the production of those products. Cosmetic design input is also required for consumer products, whereas the

capital goods of the primary workshop will largely succeed or fail on function and price alone at this level of market.

As a result of the wide variety of products and repairs of which a primary workshop must be capable, little standardisation or specialism is possible. All tools and capital equipment must have the widest possible application; high-cost tools must be continually employed in order to justify themselves, so a specialist tool can only be justified by a specialist output. In the context of a rural African small workshop *any* tool may be regarded as being high-cost, and therefore must be broadly useful in a primary workshop situation.

Just as each tool or item of equipment must be as broadly applicable as possible in order that the capital involved can best be exploited, so the workers in a primary workshop must be able to cope with all the design and production problems which they meet. Design must take place at a shop-floor level, and each worker must be capable of the necessary decision-making. While some decisions can be centrally taken by the owner or manager, the degree to which input is necessary makes the capability a general requirement. The scarcity of such workers reinforces the case for a seperation of roles between primary and secondary workshops, so that primary workshops with skilled designer-workers do not waste this resource on standardised production tasks.

Since tasks are individualized, most design input is job-specific, and must therefore be undertaken by the worker carrying out the task; there is therefore little external design input possible regarding shop floor activity in primary workshops. In the same way the potential for input in terms of designs of tools and equipment for the workshop's own use is limited, since the manufacture of items such as a metal-bending machine(ITDG 1972) represents a considerable investment to the workshop for a tool which, although applicable to many products, is still comparatively specialist in function, and would therefore only rarely be undertaken even where the workshop is aware of the design.

While extension services which are sufficiently local to be able to give relevant design advice on specific problems would be a desirable resource for the workshop, the cost would be enormous. Since design input is a continuous requirement, reliance cannot be placed on any outside agency to provide it; the capability must reside in the workshop. It is also

arguable that the valuable resource of capable workers should be applied directly, running their own workshops, rather than being employed as advisors for an expensive extension service of questionable overall effectiveness.

The principal external design contribution which can be made to primary workshops is through the provision of appropriate designs for capital goods which the workshop may be required to make for local use by various types of secondary enterprises. An example of this approach in the UK, in the context of consumer goods (decorative ironwork), is the CoSIRA pattern book for blacksmiths(CoSIRA), a book of varied designs for use by blacksmiths which has been very widely used in the past, often directly as a pattern book for customers to select from, though its use is now diminishing as its decorative designs become increasingly dated. The work of the Intermediate Technology Development Group with ApT (Appropriate Technology Design and Development) in producing detailed manuals for the production of items of metalworking and other equipment(ITDG 1972) is a good example of this approach, which could be usefully employed for a far wider range of capital products. Dissemination of the design material, and the best form for such material, remains a problem. The publication of seperate booklets for each item of equipment may keep the individual cost down, but it makes the acquisition by each small workshop of a design reference library extremely difficult and very unlikely. Past attempts at bringing a number of designs together have been unsatisfactory in various ways, most commonly in the professionalism and clarity of their presentation(Macpherson 1975).

One of the best known (VITA 1975) suffers from being so eclectic as to be of little use to any particular workshop, and is reputed to include designs which have never been properly tested. An additional problem which requires consideration is that published manuals, of a type standard in the North, require literacy and the ability to read engineering drawings, which immediately restricts the number of workshops in which they can be used.

A suitable design resource, with sufficient range to make a significant contribution to small workshops, might be a series of publications containing design and build instructions for a variety of associated equipment, grouped according to either manufacture or use criteria. Since equipment is likely to be developed and tested on a piecemeal basis a

system of individual publication as well as in compendium form may be the ideal, allowing specific designs to be obtained singly. If the compendium was in the form of a binder system the individual manuals could form the basis of the compendium, with later designs added as they became available.

If any external design input is to be made to rural workshops, it must be of the highest quality, well tested for shortcomings. This is particularly true in the case of designs of capital equipment for manufacture by primary workshops, since the number of copies produced will seriously magnify any design weaknesses. The dissemination of good design lessens the risk of dangerous or inadequate equipment being produced by less able local designer-producers, but by the same token it places a great onus on the external agency to do the job properly. Failure to do so, besides harming the vulnerable immediate recipient, tarnishes the reputation of the system and therefore limits its future effectiveness. The significance of the location of design and innovation activities is discussed elsewhere in the thesis.

> "The demand for threshers has led village blacksmiths and small town artisans in India's wheat bowl to produce their own backyard varieties, which find a ready market. These substandard machines are responsible for 50% of all thresher accidents, according to a study by Haryana Agricultural University."(Rao 1983)

As secondary workshops are concerned with repetitive output of whatever the product (or service) might be, there is considerable scope for external design input, since standardized production maximises the exploitation of the input, which therefore justifies the effort of making the input.

Design related to the means of production can affect the whole output of the secondary workshop concerned, and can also be duplicated for use in any similar workshop. Where this involves capital equipment dissemination might be via the equipment fabrication manuals referred to above; such equipment would constitute design input to the secondary workshop by means of the primary.

In the same way that designs for capital equipment can be widely disseminated for use in primary workshops, so designs and manufacturing instructions for consumer items may also be assembled and published in groups according to manufacturing resource criteria.

For secondary workshops the value of jigs and similar aids to production is considerable, since as well as speeding up production they generally improve quality standards and the level of workmanship possible from a given level of skill. The greater the proportion of workers who are eligible for employment, the quicker the benefits of improvements in the local economy can reach all parts of the community. While there is a need to develop skills within the community, the de-skilling of tasks through the application of design accelerates the development process and minimizes problems due to a lack of skilled workers, as well as lowering the threshold above which on-the-job training can commence. Jigs usually relate to specific products, and so could form part of the manufacturing instructions accompanying product designs.

If appropriate product designs and manufacturing instructions, including jigs, are being assembled and disseminated, the next logical step for the external application of design is to construct complete packages of product designs grouped according to the processes required for their production, together with designs and fabrication instructions for the capital equipment involved. Since manufacturing skills are not the only ingredient required for the success of a small workshop, some instructional material concerning entrepreneurial aspects of the business could also be incorporated. Since each package would be product and market specific the entrepreneurial material could be as precisely designed as the technology, including subjective costings to make it as brief and as relevant as possible. Requiring careful field testing to avoid any risk of economic or other damage to the recipient entrepreneurs or communities, such packages could be widely duplicated within a given context, fully justifying the level of effort taken to design them in the first place. However, any package would certainly require adaptation for use in different localities or contexts.

> "The entrepreneur 'in a vacuum' who is 'given' a ready made project by a small enterprise promotion agency, and does not have his own idea, must learn the technology if he is to have any hope of successfully converting the abstract project into a viable business; a skilled craftsman must similarly acquire some simple management skill before he can start and run his own business, but both technical and management skills can be aquired in many ways other than through training."(Harper 1984)

In the case of any technology which a development agency considers to be potentially appropriate within a developing country, whether the technology is innovative or suitable for transfer, it must first be carefully tested

and applied individually, in order to be certain that the assumption of appropriateness is correct. Apart from the considerable inherent risks in employing technologies in a different context on a large scale without due preliminary research, there is, happily, not often going to be the opportunity to do so

Since introduced technologies must be tested, and also demonstrated to the recipient countries and communities, they are generally tried out as part of a controlled project, or introduced in isolated test locations.

"One of the problems facing the AT movement lies in its 'project' orientation. Pilot projects are very necessary for developing and testing prototypes, and for proving to potential users, producers, donors and governments that small-scale technologies exist and that they are technically feasible and economically viable. They are of little help, however, if the next step is not taken and if the technology fails to disseminate beyond the project boundaries. Successfully introducing an improved plough, mill, oil-press or water or sanitation system to a few villages, or introducing a new construction or industrial process to a few co-operatives or entrepreneurs is all very well. What is needed, however, is that such products and processes should be adopted, and come into use, in thousands, if not millions, of villages throughout the Third World. A handful is not enough, and at the moment, a handful of people is all that is benefitting in many of the examples cited in Chapters III to VII."(Carr 1986)

A number of valuable contributions to small workshops in the form of designs for appropriate technology equipment already exist, most notably through the work of Appropriate Technology Design and Development for the Intermediate Technology Development Group. However, experiences with this equipment illustrate the problems of dissemination. Distribution of construction manuals carries an inherent risk of low quality manufacture, making the equipment dubiously useful and harming its reputation, and therefore its potential for natural dissemination. The alternative approach of having the equipment built commercially by a workshop in the developing country, for normal market distribution at a cost much lower than the imported equivalent, is proving more successful, and has the advantage that where a workshop still cannot afford this less expensive item the design, suitable for non-industrial fabrication, will nonetheless be in evidence in the country and can be copied. Actual equipment is more likely to be copied than published manuals, and does not require literacy on the part of the maker, in addition to which, unlike examples on demonstration tours, the commercially built item remains accessible for reference. Such a method of dissemination to the poorest workshops by means of the purchase of examples of the design by the better-off

workshops has definite attractions, and illustrates the value of such designs, even where they are to be built commercially, being suitable for non-industrial fabrication in small workshops.

The development of appropriate workshop technologies is not therefore the major problem, and can find some limited dissemination through commercial channels. While the need for such designs and equipment is percieved to be immense, it must be accepted that any natural percolation of the technologies will be exceedingly slow. It is the necessity of accelerating the dissemination that presents the major challenge to interested governments and development agencies.

> "Appropriate technologies can be (and have been) introduced and can be proved to be technically and economically viable, but their dissemination throughout a country or region will be severely limited unless the socio-economic climate is such that it will encourage both the manufacture and use of the new technologies."
> (Carr 1985)

The concept of the product-led package has obvious attractions, but the problems of dissemination will remain much the same once the package has been developed, even where the essential ingredient of compatability with socio-economic and cultural contexts exists. The identification of an effective means of dissemination of appropriate technologies on a scale large enough to have a significant effect constitutes the major design problem in the development of rural industries. To achieve a natural dissemination, avoiding astronomical costs and the employment of scarce government resources, must be the ideal, but the scale of the problem and the varying environments within which it must be solved make an effective methodology most elusive.

The development of dissemination techniques in order to identify a widely duplicatable solution and the assembly and organisation of existing knowledge are the principal contributions that an external designer can make at the present time. While the need for the development of specific appropriate technologies do arise, these should be worked on as close as possible to the point or points of application with the maximum involvement of those who will use such a technology and those whom such a technology will affect. On these occasions an external design professional should restrict their role as far as possible to that of an informed catalyst. Such work should therefore be carried out within specific projects, where the identification, or development, and application of

appropriate solutions can be undertaken in context to ensure maximum user input and editorial control. At the same time the relevance and the contribution of such work to similar problems outside the immediate context should be continually examined.

THE COMPARATIVE VIABILITY OF PRIMARY AND SECONDARY WORKSHOPS.

While the encouragement of 'primary' workshops is essential to the blossoming of small enterprise, sufficient primary capability may already exist, as is the case in Zambia, if the use of it were common and information regarding it were available.

Since capital, particularly in foreign exchange, is very limited it is important that it is deployed in the most profitable way for each workshop; in almost every case this would mean 'secondary' workshop activity. However, for a rural manufacturer the available market may be too small to permit specialisation, making Primary manufacture and repair the only possibility, which further restricts the possibility of competition with urban manufacturers. Concentration on Secondary manufacture in this way would directly advance the productivity of the country's existing workshops, and for the individual would avoid the high capital and low productivity of a diversified primary workshop. However, if all workshop owners confined themselves to secondary production the consequent lack of low-level capital equipment and of repair facilities would have a negative affect on the increase of the number of small businesses, which would be detrimental to small-scale industrial expansion as a whole, particularly in rural areas.

In spite of its awareness of the value of diverse primary workshops, the Small Scale Enterprise Promotions Ltd (SEP) of the Development Bank of Zambia is reluctant to lend money to primary workshops since their diversity is unlikely to be profitable, a state which is exacerbated by the difficulties in accurately monitoring costs on each different job.(Schirra,1986) Since the essential requirement for any enterprise that is to endure is that it be profitable, workshops should be encouraged as far as possible to concentrate on complimentary production lines which exploit to the maximum a minimum selection of capital equipment. One option is the manufacture of a number of carefully chosen products which, although

they are all made using the same processes, fall into two or three separate categories of products, each of which is aimed at a different market. In this way total dependence on a single market is avoided, but the time and energy required to market each item is kept to a minimum.

CATEGORISATION OF SMALL WORKSHOP PRODUCTION IN DEVELOPING COUNTRIES.

The principal categories of small workshop output are

Export goods.

Import substitution products.

Products to meet basic or primary needs.

Export goods: The principal manufactured export goods of many developing countries are craft products. For example, 16.2% of India's exports of all kinds in 1983/84 were handicrafts, without including the proportion of cotton goods, leather goods and jute manufactures which could be considered as craft-made. This compares with a 12.5% share for crude oil, 7.0% for engineering goods, and 5.1% for tea, making handicrafts as a group India's most significant export. Of India's defined manufactured exports in that year at least 40.1% were handicrafts. This proportion was expected to rise as the government's recently introduced policy of ending subsidies for industrial cotton weaving and encouraging the hand-loom weavers took effect(Lloyds Bank 1985).

While export crafts can supply a significant amount of foreign exchange, they are frequently the product of those with other options for income generation, and may divert efforts from domestic production more relevant to development. One justification for the development of export crafts is 'in the case of the disadvantaged, such as the handicapped, refugees or socially rejected groups. The principal trade-aid organisations in the UK all stipulate that the producer groups with which they deal should come within these categories and preferably be functioning as a cooperative.(Pirie,1986) Since the annual turnover of Oxfam Trading, the largest of the UK agencies, is around £6 million, the contribution of this self-financing form of aid is significant, but it must be pointed out that in all cases the aid organisations' sales are dependent to a considerable extent upon the charitable appeal that accompanies the merchandise. (There is currently some debate within Oxfam regarding the role of its

trading company, as to whether its primary role is to generate employment among the disadvantaged of the Third World, or to generate funds for the use of the parent organisation in its development projects. At present there are opposing internal pressures on Oxfam Trading because of this conflict of philosophy.(Ballyn,1986)

Many export-craft producer workshops require considerable back-up, and are prone to collapse without external support. In the case of hardship requiring aid this is acceptable, though ultimately undesirable, but in the case of small workshops which are intended as commercial such a requirement is prohibitively expensive, and the workshops therefore unrealistic.

While craft exports do bring foreign exchange into a developing country, they capitalise on cheap labour and existing technologies, with little effect on the development of the local resource base. Trade-aid organisations dealing with export goods invariably concentrate on craftwork; John Ballyn questions the validity of this.(Ballyn,1986) If trade in less trivial products were encouraged the development of the manufacturing capability of small workshops would be enhanced.

In "Towards Village Industry" Krisno Nimpuno points out that:

> "The producer seldom has any realistic ideas about the needs and wishes of his unknown customer. He will therefore have to produce mechanically and cannot design or adapt his products in a creative way to suit the needs of his far away client. It has been argued that UDC's should move away from import and export orientation towards an integrated domestic economy."(Berg,1978)

As with agricultural cash crops, export crafts serve to reinforce the import/export economy, absorbing the time of the skilled makers who might otherwise constitute a basis for more relevant indigenous production. However, the purchase of central African traditional crafts on a large scale by Northern trade-aid organisations has been rare, because of a very poor reputation for quality control and delivery reliability,(Lamont,1986) though the situation currently appears to be improving. John Pirie, of Oxfam trading, makes the point that trading cannot be used constructively in the areas of greatest need, such as sub-Saharan Africa, since the people are generally not in a position to produce goods that are saleable in the developed world.(Pirie 1986)

However, a virtue of the production and sale of handicrafts for external markets is that such markets are at a distance from local economic conditions, and therefore provide a source of income unaffected by them. For example there are about 162 women potters who try to sell their wares to tourists from a lay-by on the Beitbridge road south of Masvingo in Zimbabwe. Their total stock is in the region of 15000 pottery items, the quality of which is poor. Customers are few and sales are low, but in this area of very unreliable rainfall even this meagre income-generation opportunity constitutes an insurance in the face of frequent crop failure. If the pots were being sold within the community sales would cease when agriculture suffers, but the tourists are unaffected by slight variations in rainfall, making the production of pottery a lifebelt in the worst of times. (With the recent establishment of the National Handicraft Development and Marketing Centre in Harare there is greater potential for benefits from this production, but the realisation of this will depend upon a significant improvement in product quality.)

Import substitution products: The manufactured products for which import substitution is sought in developing countries include luxury consumer goods, consumer goods, the means of production and primary needs. Import substitution involves either the aquisition of the technology and raw materials with which to produce indigenously the product that was imported, or the local development of a substitute product which can be manufactured without importing the wherewithal.

Where consumer fashion dictates that products should have the appearance of being industrially produced, as a result of the cachet of the possession of imported goods, it is unlikely that such goods can be manufactured locally without the importation of the necessary technology, expertise and probably materials. This form of import substitution may be regarded as Import Replication. It is also unlikely that such manufacture is possible within the scale and resources of a small workshop. The price of the encouragement of consumer tastes according to the standards of industrialised countries thus extends beyond the diversion of resources from more development orientated production to a perpetual foreign exchange requirement, and in the final analysis may not be cheaper than direct importation of the finished goods.

Where the means of producing a substitute product locally can be found, as opposed to substituting the manufacturing location of the same original

product, the import requirement can be minimised and the development of local technological resources maximised; this form of substitution may be regarded as Import Replacement. Given that the indigenously developed product is unlikely to rely upon capital intensive imported equipment, a far greater proportion of the income generated will pass into the hands of the local population.

While the substitution of imported luxury and consumer items with local equivalents is desirable as a means of reducing the requirement for foreign exchange, the development effect will be limited to any technological advance required for such manufacture.

Where import replacement is concerned with primary need and the means of production the benefit to development is potentially considerable, since every increase in local capability expands the national resource base. The expansion of the productive resource base, in its various forms, is of greater long term development significance than the simple conservation of foreign exchange.

Basic or primary needs: The term basic, or primary, need indicates the priority which should be accorded to products which cater for it. Such products include agricultural tools and implements, tools to make tools with, such as wood and metalworking tools, agricultural product processing equipment and basic domestic, health and educational requirements

Primary need goods include those which may either be currently being imported or locally manufactured, as well as those which are unavailable either nationally or within a locality. The availability of an item from whatever source does not affect its status as a primary need, although provision for a need that is unsatisfied should have a higher priority than the substitution of a primary need import.

The local manufacture of primary need products fulfills two development requirements, since as well as providing the item which enables subsistence activity such as agriculture to take place it also represents an infrastructural resource base for the development of the community.

> "..... at the moment the priority is to produce simple industrial goods for agricultural or household consumption. It is possible to start the basic production of every day consumer goods as

> substitutes for the present imports. Some of these goods can be made with the minimum of tools, skill and raw materials."(Berg, 1978)

The greatest potential for a contribution to development lies in the manufacture of products to meet primary needs and equipment to expand the means of production, whether currently imported or not.

4: RELEVANCE AND IGNORANCE.

The contribution of the small workshop within its social context and its relevance to rural development are assessed in this chapter. The failure of past interventions intended to support the development of rural industry is demonstrated and the reasons identified. A common factor in the majority of failures is shown to be the ignorance and lack of perception of the intervention agents.

THE CONTRIBUTION OF THE SMALL WORKSHOP.

If agriculture is the basis of the rural and national economy, and if agriculture is undertaken by the people using labour intensive methods, the provision, repair and development of appropriate equipment is a fundamental requirement. The existence of rural industry also provides employment when labour is not required on the land, increasing the viability of economic survival in rural areas and therefore countering the tendency towards rural depopulation and the economically damaging growth of urban conglomerations.

> "If the technological levels in the rural and urban informal sectors are to be raised (as is, in fact, called for in the Programme of Action adopted by the ILO World Employment Conference), it is essential to adopt those technologies to which the small farmers, artisans and other small producers have easy access with their limited cash resources. This is not to suggest that modern technological know-how is not relevant or important, but only that a selective approach to the adaptation and adoption of known methods is needed. In fact, the experience of countries which have tried to implement a basic-needs strategy (eg China, Cuba, Tanzania) suggests that the improvement of simple village technologies is the only feasible approach to the gradual modernisation of the rural economy. The experience of Tanzania, which was examined in detail in an ILO/UNDP technical assistance project on appropriate technology, shows that in a subsistence economy the initial cash outlays required for imported equipment are far in excess of what the poor farmers can afford. It is therefore imperative to utilise local resources and skills for the design and development of technologies that are more productive than the traditional ones and yet are within the reach of farmers and other poverty groups."(Singer 1977)

The development of agriculture and of small rural industry are complementary. The improvement of agricultural efficiency depends upon its infrastructure, of which small industry is a part, while the development of such industry depends upon the increase of agricultural prosperity to enable its products to be purchased locally.

> ".....For China, agriculture was not simply the production of crops but also the creation of rural industries integrated into the needs of rural people. The emphasis on rural industry is essential to the eradication of poverty in rural areas."(Berg 1978)

Whatever the initial level of local technology, the development of small workshops has the potential for a considerably greater effect than the simple provision of agricultural equipment. The generation of additional skills and the development of capability encourage innovation and the growth of manufacturing enterprises; the greater the proportion of a

community's requirements that it produces itself, the greater the proportion of its income that is retained, which in turn encourages further growth.

> "Widespread rural industrial strategies can lead to the growth of new skills and therefore initiate the conditions for industrial change; precisely the conditions which foreign capital cannot create. Rural industrialisation would generate a widespread popular knowledge concerned with the material manipulation of the environment. The more industrially backward, which simply means the lower the level of technical skills, the greater the importance of all small industrial projects. Village industrialisation could create the atmosphere for manipulative technical knowledge which is so often lacking at present."(Berg, 1978)

The economic and social importance of rural small-scale manufacturing is such that its development is now a major objective in many African nations, although the difference between understanding the importance of it and discovering the ways in which it can best be encouraged is proving a major problem. In a Tanzanian " Directive on Small Industries" of February 1974 their importance was pointed out in the following way:

> "1 Small scale industries are necessary in a society, long exploited, which does not have much sophisticated know-how or capital. Since many small scale industries do not require much know-how and capital, they can be started and run by the people themselves, expecially if they do so on a socialist basis.
> 2 In Ujamaa and the development villages, agriculture dependent on the rainy seasons does not provide full-time employment in agriculture. Small scale industries can meet some of their employment needs and help to diversify their activities throughout the year.
> 3 Small scale industry is required to help curb high unemployment by engaging the people in productive activities.
> 4 Small scale industry will help Tanzania realise the objective of bringing about the technical revolution in rural areas.
> 5 Small scale industries are essential to the implementation of a policy of self-reliance, and to eliminating some of the disparities which now exist between rural and urban conditions.
> 6 If small scale industries are developed systematically, the cost of production will be reduced."(Hultcrantz 1978)

The development of rural industries generates employment within the community, thus helping to minimise migration to the cities, either of the whole population or of individuals who then remit a proportion of their earnings back to their family in the village. The availability of local employment maintains the social fabric of the community by helping to create an economic environment in which the existence of the community is a viable proposition.

As well as the agricultural infrastructure and employment roles, small workshops also serve the community through the provision of other products by which the standard of living can be improved. The availability of domestic commodities, educational and health-related equipment and the tools and ancillary materials for building all permit the development of the resources and standard of living of the village.

The self-respect generated by small workshops, both for those working in them and for the community as a whole, is significant, since pride in the resources and capability of the village encourages the energy necessary for further development. The example of a successful workshop also helps to persuade other would-be entrepreneurs of the potential viability of such enterprises.

> "Small enterprises are almost always locally owned and controlled, and they can strengthen rather than destroy the extended family and other social systems and cultural traditions that are perceived as valuable in their own right as well as symbols of national identity."(Harper, 1984)

Just as rural industrialisation is interdependent with the development of agriculture, so must it be socially appropriate to the community within which it exists. Large institutions are alien to a society based upon the extended family, and as such are liable to be a disruptive influence which it is beyond the capacity of the community to counter. To attempt to develop society, agriculture or industry in a way that is not in harmony with traditional or existing social patterns threatens to destabilise all aspects of the community concerned, since no change can be affected in isolation.

> ".....appropriate technology or rural industrialisation has to be seen within a total socio/political strategy."(Berg 1978)

Though agriculture is the basis for national development in Africa, primary need exists wherever there are people. The population shift towards the large cities concentrates large numbers of people with little or no resources, for whom there is a minimum of employment or infrastructure. In an urban or semi-urban environment small workshops generate employment, while supplying products and services required by the community.

The activities of small workshops also generate income which remains within the community to improve its situation. In the absence of such

subsistence resources as land or employment, it is only by the generation of self-employment that the urban poor can survive. Self-employment may mean the systematic scavenging of city waste dumps, but this in turn may lead to the processing or use by small workshops of the scrap materials gathered.

It could be argued that the principal resource for the small urban workshop is scrap, such as tyres and metal. The production of shoes and other goods from tyres, of kerosene lamps, cooking utensils and charcoal stoves from old cans and other similar examples provides for the needs of the poor by the poor. The contribution of such recycling activities is significant in an economy where the majority of processed materials require foreign exchange for their production or importation. Direct recycling, without further industrial processing of the material, is only possible in small workshops, where all operations are done individually, by hand. The production organisation necessary in larger units does not permit such flexibility.

All small workshop activity develops the skills possessed by the people, which can be increasingly exploited as small industries are developed. The importance of self-reliance, both within communities and nationally, makes the growth of the small industry sector vital. Small workshops do not require substantial capital or technical expertise to set up, and, within an African context, are frequently more productive and profitable for a given investment, as well as being more labour intensive than larger factories.

> "The inherited colonial structure cannot be eliminated without an industrial strategy which aims at self-reliance instead of reinforcing the foreign ties, which would repeat present exploitations." (Tanzania 1973)

Whether a small workshop is rural or urban, the benefits accompanying employment for the people of the community are similar; self-respect, improvement of living standards through economic improvement and the provision of basic amenities through the developed capability of the community.

In an urban or semi-urban environment, where migration has destabilised social relationships, the growth of infrastructure owned by members of the community themselves is a significant constructive influence.

THE RELEVANCE OF THE SMALL WORKSHOP WITHIN AFRICAN DEVELOPMENT.

While the scale of a small workshop makes its individual economic significance minimal, it is the cumulative effect of all the small workshops within a developing economy that justifies their energetic encouragement. The less developed a country is the more significant the proportion of its industry which is composed of small workshops is likely to be.

The scarcity of capital in developing countries is a major problem, affecting attempts to increase industrial production, at all levels. However, the capital necessary for a small workshop can frequently be raised from within the extended family, tapping resources which would otherwise remain unavailable for national development. Because overheads are minimal compared to a larger unit the capital requirement is further reduced. The majority of small workshops are labour-based, exploiting the skill of the workers and using a minimum of equipment; since labour is very cheap, while equipment, generally imported, is very expensive, a labour intensive small workshop is a more realistic proposition in a context where capital is scarce. Labour intensive small workshops being particularly suitable for the application of appropriate low-cost intermediate technologies, the capital requirement can be further reduced by this means to a level which would be entirely unrealistic for a larger formal enterprise.

A general shortage of the management capability necessary to run larger businesses allows small workshops to compete on a more equal footing, provided that their management is sufficient for their level of operation. Nationally, the growth of the small workshop section of industry provides for the on-the-job training of managers through experience, and the development of productive capability for a minimal investment and a minimal requirement for formally trained personnel.

Since the development of peasant agriculture is essential for the development of the majority of African countries, it follows that the meeting of the material needs of these farmers should have a high priority. If centralised industry, where it exists, or even imports cannot meet the needs of the peasant farmer through the lack of a distribution system, as discussed in Chapter One, then an alternative system of supply is an urgent matter. Goods produced locally by small workshops within the

rural areas have little or no distribution problems, since they are made at or near the point of sale. The general existence of small rural workshops able to supply the equipment necessary for the requirements of the agricultural and related activities in their immediate vicinity diminishes the significance of transport as a barrier to agricultural production and cuts out the cost of middlemen, a commercial distribution system involving considerable cost to the consumer.

If the desire for a materialist lifestyle is one of the attractions of the cities, however unlikely it is to be realised, the local production of domestic and consumer goods can go some way towards the provision of the desired goods. While this does not satisfy the taste for imported goods, and cannot supply the more technologically based items such as radios and watches, local workshops could produce many domestic and income generation requirements, increasing their availability and lessening the export of agriculturally earned cash to pay for them. In turn the partial realisation of consumer expectations may help to retain those in the rural population, particularly the young, who may be tempted to migrate to the cities.

Rural small workshops providing for local needs retain resources within the local community, since agriculturally earned income paid to the small workshop may then be spent again within the community by the artisan.

If workshops begin to develop and flourish, the gradual increase in rural production capability will produce a corresponding increase in local technology skill levels, allowing the exploitation of increased local prosperity by means of further agricultural development involving more developed technologies. If this increased income continues to be spent within the community, rather than outside it, the cycle of increasing prosperity and local development can continue.

The less leakage of income to external suppliers, the greater the population that can be supported. In the vast majority of cases, both nationally, in Africa, and between the global North and South, agricultural products and other raw materials tend to be priced down while manufactured and processed goods tend to be priced up. The resulting inequality of exchange therefore ensures that suppliers of agricultural and other raw materials remain economically disadvantaged, in comparison to those who purchase them for processing purposes, and are therefore in a

weak position when buying manufactured items from the economically more powerful. It therefore follows that the more the dependence on outside sources for manufactured products can be minimised, the less effect the inequality of exchange will have. This applies equally between the economies of developed and developing nations and between rural and urban economies within individual countries. While rural/urban inequalities exist in virtually all national economies, the effects are particularly severe among the less developed countries.

Where urban migration has already taken place, the peasant influx constitutes a large population with few urban or industrial skills, for whom the cities have little to offer. Just as small workshops are a possible means of income generation in the village, so the same is true for the urban poor, with all the advantages of a far larger potential market and a plentiful supply of the commonest category of African raw material, scrap. The principal market for the majority of the informal sector small workshops is the community of which they themselves form a part. All the advantages of low capital requirement for small enterprises hold as true for the urban enterprise as for the rural, offering an avenue of survival to the urbanised peasant. An Oxfam supported aluminium foundry in Kinshasa, making dessert spoons from scrap using an imported cast-iron mould, supports two young men and two boys, giving them something like 4 to 5 times the income they could hope to receive in a factory. Their daily production of up to 700 spoons is all sold direct to the customers at a price of 5 zaires (5 pence) each; the demand is so great that the entire output is sold from the workshop door. It is estimated that unemployment in Kinshasa is around 50%, not including those involved in small-scale informal enterprises.(Sier,1986) In such a context the ability to do something, to make something which others will pay for, is fundamental to survival. In a large population of unskilled unemployed, labour is very cheap, but due to the cost of imports and the shortcomings of the national industrial base, consumer goods are expensive. The ability to produce such goods can therefore elevate the artisan concerned from the penury of the unskilled; development of the business through the demand for its product involves the training of others, enlarging the skill base, a vital resource for local and national development.

The supposition that in the face of shortcomings of all descriptions development can be achieved by general large-scale means involving a high level of technology has been clearly disproved in recent years. In spite

of this, large schemes are still conceived and carried out, for various reasons. Developed nations giving aid which is 'tied' require that such money be spent in the donor country, usually on technologically advanced industrial products, since this has a beneficial effect on employment and industrial profitability, which are desirable political commodities on the domestic scene. Grandiose government-sponsored bureacracies in developed countries appear incapable of supporting development projects which are other than grandiose, and are so far removed from the realities, particularly in the rural Third World, that their perception of the effect of their actions is extremely limited. While the overall scale of the problems is immense the inability of such bodies as the World Bank to finance small-scale projects predisposes them towards the large-scale; given the delicacy of equilibrium inherent in all the constituent systems of developing countries, large scale projects controlled by executives remote from the point of application are potentially extremely harmful to those whom they are designed to help. The officials of developing countries are also prone to seduction by the prestige represented by major schemes. Where corruption is a temptation the opportunities afforded by multi-million dollar schemes are infinitely greater than those inherent in a rural small workshop development project.

In 1986 the Canadian government had recently reached an agreement with Zambia to refurbish and replace as necessary all the heavy road-building equipment. The cost of a new starter-motor for a grader, or a similar piece of equipment, is roughly equivalent to the cost of 80km of hand-built road. The loss of income for the rural people who would have built the road by hand is catastrophic, but, worse, when the machines have again become useless in several years time the belief that roads can only be built by machine will have become firmly fixed(Gibson 1986). It may be that the inability of the bureaucratic mind in both Canada and Zambia to conceive of a good road being built without machines is one of the major barriers to a rational and appropriate development approach. The same minds are likely to find it equally difficult to appreciate the potential capabilities and productivity of small workshops, since all their personal material requirements arrive painlessly, the product of capital-intensive industries.

The actions and decisions which promote economic development must come from within the country concerned if they are to be successful, whether or not some external assistance is made use of. In order to be successful

such actions must be modest in immediate scale but as wide as possible in their application. One small workshop can equip another, and can also equip bigger ones; large industries are unlikely to devote energy to developing small competitors.

THE FAILURE OF INTERVENTIONS.

As the unemployment crisis in Africa has grown, fuelled by recession and the rising population, so governments and non-governmental organisations (NGO's) have increasingly attempted to address the problem. While unemployment in metropolitan and urban areas is uniformly high, it is partly the lack of opportunities for income generation in the rural areas which has generated urban migration, thus re-locating the problem. If jobs and non-agricultural income can be generated in the rural areas the pressure on the urban areas would be considerably less. Recognition of the inability of the formal sector to create sufficient employment in a worsening situation(Van Rensburg 1980, p6) has led to a realisation of the significance of the small-scale and informal industrial sector, which in turn has generated a growing number of interventions aimed at stimulating such enterprises. However, the success of interventions intended to develop rural manufacturing enterprise in central Africa is very limited compared to their cost. Certainly there has been no widespread increase in productivity or generated income among rural enterprises.

There is no basis for assuming that rural manufacturing is being increasingly marginalised or is dying out, since in certain countries there is evidence of artisans choosing to return to their village from an urban area, for a combination of economic, family and quality of life reasons. The frequency of this appears to increase according to the growing poverty of the country concerned. However, there has been no significant improvement in the viability of their activities as a result of the many interventions which have been initiated, although such an improvement is desperately needed.

If there has been minimal success in the development of rural manufacturing industries in spite of widespread intervention this must be because either rural industry is inherently unviable in the context of the modern world or there has been a recurrent fault in the interventions.

> "Many small rural industry programmes fail to integrate into the rural conditions. There are many examples of rural small industry projects, for which the raw material comes from elsewhere, and which are producing goods that are of little use in the village and will have to be marketed elsewhere. Such types of small industry obviously become very vulnerable in a village economy because of their dependence on outside markets and supply." (Berg 1978, p8)

While an enterprise established on the basis described by Berg is unquestionably vulnerable, the integration of a business into rural conditions involves compatability on a far wider basis than this would suggest. The expansion of rural manufacturing industry constitutes a genuine possibility under certain conditions, but the manner of current interventions is broadly faulty and is therefore unlikely to have the desired affect, and may in fact be counter-productive.

Externally-originating actions which have failed to produce the intended benefits may take various forms, but all have in common a failure to identify the true needs, both short and long term, of the consumers and/or the entrepreneurs serving them.

The failure of an intervention does not necessarily involve the demise of the enterprise or enterprises it was intended to foster. The lack of any improvement constitutes a failure of the intervention, though a neutral effect is less common than a negative one. Obviously, some interventions do have a positive effect, though these are uncommon, usually have some side effects, and may end up serving a purpose other than that originally intended, or are less effective than they might have been had they been better considered. However, if rural industrialisation is to thrive it requires consistent success on the part of interventions, on a very wide scale.

One of the most common failures is that projects are designed so that real or perceived dependence upon the external agents is an inevitable part of the package. Even where an intervention does not initially contain the seeds of dependence the inherently directive nature of the culture of the implementing personnel frequently influences the client-agent relationship towards dependence. In this regard ex-patriate personnel are particularly prone to a belief in the superiority of their own knowledge and experience, and are ill-equipped to recognise the value of existing local skills and knowledge. However, the same frequently holds true for development workers within their own country, since Northern-style training and qualification-consciousness generates traits associated with the aquired

values. The arrogance of ex-patriate workers is also frequently encouraged and confirmed by inverted-racist attitudes on the part of recipient agencies and communities, interpreting the colour of a person's skin as indicating the possession of wisdom. Such neo-colonial attitudes to the supposed authority and knowledge of formally educated visitors is highly detrimental to the development process, since it discourages the ex-patriate from questioning and the indigenous person from recognising the validity of their own knowledge.(Katakwe, 1986)

If a rural industry is to thrive it must be fundamentally sustainable. Any intervention which is likely to encourage dependency is therefore by definition unsustainable and unlikely to achieve a positive result. If an intervention is to achieve a significant effect the results of it must be duplicatable. For duplication to be possible the sum total of the inputs must be compatible with the pre-existing context, and must be of a nature and a scale which may be adopted by other interested entrepreneurs or communities without any support from external actors. Given the scale of the requirement for non-agricultural income generation through rural industrialisation it is only by means of such autonomous propagation that innovations originating internally or externally can have a significant effect. Any intervention which is not specifically designed to these ends will therefore fail, every failure further confusing matters and making the chances of eventual success more remote.

While this caveat applies particularly to the design of interventions by ex-patriate agencies, it does also apply to domestic agencies, whether para-statal or NGO's, for as long as their participation remains an esential ingredient in rural industrialisation the extent of such development will continue to be negligible. However appropriate their direct interventions may be in other ways, their resources and size will always be far too limited to have an effect on a significant scale. Only if their interventions are either preparing the entrepreneurial environment, for example through political, social or fiscal measures, or initiating appropriate innovation suitable for subsequent adaptation and autonomous propagation can such agents' activities result in growth on a significant scale.

The compartmentalisation of the majority of external interventions into Projects, neatly packaged for funding purposes, futher promotes the tendency to see each intervention in isolation, and thus as an end in

itself. If the design horizon of each intervention is that of the initial project or projects, no expectation of autonomous propagation is aroused, and no consciousness of its importance as a goal for each project is developed. Projects have a place, as the vehicle for the initial introduction of methods or means for achieving the purpose of the project. But, as already argued, unless the purpose of the project has a far wider application and can be independently adopted by would-be practitioners its achievements will be insignificant and, by raising expectations and encouraging dependency, are likely to be counter-productive in the longer term.

The confusion between qualifications and capabilities is a common impediment to interventions concerning artisans. It should be recognised that the perception of the decision makers is affected by the limitations of their own experience and training. Thus a university-trained administrator within an NGO will value similarly trained engineers with whom he can communicate and identify, his (or her) respect for his own worth dictating his respect for his peers rather than for, perhaps, an artisan. Thus the Zambian Small Industries Development Organisation (SIDO) employs graduate engineers who have never worked at a bench to advise practising metalworkers on production methods. As a result, when Mr Mulenga, whose light metalwork fabrication business Mesco Products Ltd is located in the SIDO compound at Kitwe, requested assistance in the design of appropriate jigs, he was sent an engineer advisor almost totally lacking in practical experience.(Mulenga, 1986) The misapprehension that education equates with training ability exacerbates this. For instance, regulations in Malawi concerning the educational qualifications necessary for employment at a training institution meant that it was not possible for the Youth Rural Trades School at Salima to recruit an experienced blacksmith for a programme concerned with the training of rural smiths. Instead a metalwork instructor had to be recruited, to whom rudimentary smithing techniques were then taught(ITDG,1988). The inappropriate weighting of particular attributes or qualifications over others imposes a difference between the perceptions and experiences of the instructor or agent and those whom he or she is intended to assist.

Almost all interventions contain a difference in perception and experience between the agent and the recipient. If this is not to entirely negate the intervention it must be clearly recognised and minimised. More than this, it must be acknowledged that the perceptions and experience of the

practitioner are more directly valid in relation to his or her context than those of any external agent no matter how well qualified, since they are dictated by the environment in which the enterprise will subsequently exist. Even where the practitioner's perception may be limited and their experience may lead them to questionable conclusions, this constitutes the starting point of any development of their capability and must therefore be clearly recognised and respected. Northern ex-patriates appear to experience particular difficulty in genuinely respecting the value of the knowledge of those who have a different background. One Norwegian volunteer, an ex-headmaster, working as an 'Appropriate Technologist' in Kitwe, Zambia, in 1986 designed a full set of European-style gardening tools which he then fabricated out of locally available light scrap metal.(Torp,1986) He was totally unaware of the inappropriateness of his endless energetic village lectures and demonstrations, which required the use of an expensive vehicle, and was at a total loss to explain the almost total lack of take-up of the solutions which he was offering. His inability to recognise the worth and appropriateness of the traditional tools already in use prevented his perception of his own need to substitute tools which were normal to him for those that are normal in Africa. While this volunteer did no good at considerable expense, he also further handicapped any eventual development of appropriate technologies from within the villages themselves, by encouraging a healthy disrespect for change, having characterised it as ill-founded.(Von Krogh,1986)

To avoid such situations it is obviously important that only intervention agents with a high level of expertise and a flexible attitude towards their speciality, whose perceptions and training permit them to act as a catalytic resource to the indigenous subjects of intervention, should be employed. However, the level of expertise and understanding of a high proportion of intervention agents, particularly expatriate ones, is highly questionable, which severely damages the credibility of development agencies. The level of professionalism among agencies varies enormously, but in many cases the degree to which the problems the activities are intended to address are adequately considered is questionable. The ex-patriate volunteer system is an obvious target for accusations of amateurism, varying enormously in quality and approach as it does among the various donor-nations, but there is nothing to indicate that, given the difference of level, the quality of input is significantly lower among volunteers of a particular nation than among its professional development workers.

The most common form of incompatible and unduplicatable intervention intended to further rural industrialisation is the introduction, particularly as a context for training, of a workshop conforming to the Northern pattern, equipped with electrically-powered plant and tools. In a metal workshop these might include a lathe, a pedestal drill and a welding machine, while in a wood workshop there might be a circular saw, a band saw, a planer and a lathe. Several aspects of such an intervention are immediately questionable. The market in a rural area is most unlikely to be sufficient to sustain such a workshop, making it dependent upon continued external support. It is most unlikely that the capital would be available locally to duplicate such an installation. Those trained in such a workshop will not be fitted for local employment in the absence of similar workshops, and are therefore likely to migrate to an urban area where their skills may be in demand. Where such a workshop produces commercially its impact on the local market is likely to be enormous, either driving existing practitioners out of business or restricting their market opportunities to the extreme lower end of the scale in terms of quality and price, so diminishing local employment opportunities rather than enhancing them according to their declared intention. The existence of a workshop in this form will also condition local decision makers and all those trained there that this is what a workshop should or must be; anything else is an inadequate compromise, backward and unviable.

Liv Berg refers to the Kisarawe Street Project in Dar es Salaam which, although it is an urban workshop, illustrates many of these points.

> "There is almost no use made of common facilities by the metal workers, since the machines supplied free from India proved to be of wrong type."(Livingstone 1978)

Berg catalogues the problems, which include breaking machinery which relies upon ex-patriate skills temporarily available locally for its repair, under-use of machinery and inadequate training of artisans in the equipment's operation. In terms of the development of the capability of local artisans;

> "...92.5% of the artisans declared that they had learned nothing from the management of NSIC (the implementing agency). No-one claimed to have learned 'quite a lot'".(Berg,1978 p43)

Training workshops established by Roman Catholic missionaries at Driefontein, Mvuma, Zimbabwe, (wood and metal) and at Kikwit, Zaïre,

(metal) share similar problems. Both have excellently established conventional workshops, with a high quality of training carried out by local instructors, graduates of the courses, under the guidance of expatriate technicians. However, at Driefontein the Brothers are painfully aware that almost all of their very capable and well-trained graduates depart immediately for the cities, since their training is appropriate to the formal urban sector. In order to try to further their rural development goals considerable effort has been made to assist suitable graduates to set up service workshops in townships in rural areas , but of these only one currently survives(Bruno, 1989). Thus, out of many years effort and with an excellent reputation, almost no rural industrialisation has resulted. Some of the production unit's output has benefitted local farmers, but if the mission were to withdraw it is unlikely that any significant manufacturing activity would remain after them as a result of their intervention. In the case of the Institute Technique Professionel de Kikwit a very large workshop is equipped with 12 lathes (3 inoperative), 5 shapers (3 inoperative), 2 unused nibblers, bench shears, 3 drill presses, 3 milling machines (1 inoperative) and about 50 bench vices. The inoperative machines were largely the result of vandalism by the students, the lack of identification suggested by this causing the instructor considerable concern(Jacob,1986). There is no other workshop offering employment in Kikwit equipped with machinery of a similar level; the town's electricity supply is extremely unreliable, and would make the profitable use of such equipment unlikely. During this researcher's stay in the area, when the training of others by the blacksmiths of Manie had begun, a graduate of the Kikwit course applied via the researcher to be trained at Manie. Although there was no smithing component in the Kikwit course he had attempted to teach himself how to forge, since he felt that there was no application of what he had learned there without migrating, which he had previously had to do, working in Kinshasa. Of his three years at the Institute, two had been spent learning to use machine tools.(Mudikosi,1988)

The creation of training workshops which conform to the Northern concept of a workshop is the norm. Conditions in rural Africa dictate that the conditions of subsequent practice cannot resemble those of such training, rendering the training inappropriate.

In other cases the establishment of manufacturing forms a component of a project with another specific purpose in mind. Oxfam have supported a

series of ox-traction projects in the Kasai, in Zaïre, which include the manufacture of ox-traction equipment. Much about these projects is excellent. However, each associated central manufacturing unit was established with a set of equipment imported from the UK at a 1986 cost of about £600 plus £300 shipping.(Taylor,1986) No attempt had been made to find a way to equip the workshops from local sources or to relate the style of working to that in local use, which would have increased the possibility of their being imitated. At each of the workshops there are UK manufactured forge tools which have not been used, since the training of the smiths has not covered these techniques. Such tools constitute a radical departure from local traditional practices, so the degree of duplicability is questionable. In the Project Rural workshop at Mbuji-Mayi, for example, the quality of the work was very poor, and would clearly not have been viable without subsidy.

The most remarkable of the Oxfam ox-traction workshops in Zaïre was at Project Nkata, Mazuika, where a Belgian volunteer blacksmith had worked for ten years under impressively committed local project leadership. In a well-equipped replica of a European forge he had successfully taught the workshop staff to make European-style wooden cart-wheels, only to be frustrated by local consumer tastes for less suitable wheels made from more prestigious materials. A further virtue of the project was that the manufacture of some components was being sub-contracted to local traditional smiths. The project had given small London-pattern anvils to the traditional smiths, and given them some training to ensure work of the necessary quality. However, the degree to which the project was dependent upon its centralised workshop and the ex-patriate volunteer suggested that insufficient thought had been given to the long-term future of manufacture and repair. It was clear that manufacture was seen as incidental rather than central to the whole project(Taylor, 1986).

There are many instances where the need to have particular services or facilities available for a particular project lead to the establishment of workshops which cannot be duplicated, and which appear to demonstrate that this is the only way in which the products can be manufactured. The conditioning of communities to a narrow Northern view of what constitutes a viable manufacturing enterprise is very negative; each component of any project should be carefully considered in the light of its long-term effect. The organisation of narrow projects with particular aims by specialists inevitably leads to complementary components, particularly

technical ones, being treated superficially with unconsidered, and often unrecognised, side effects.

PERCEPTIONS OF SUCCESS.

If the perceptions of external development agents, ex-patriate or trained according to Northern values, do not encourage the recognition of the value of local knowledge, skill and experience, so in the same way the value judgements by which rural enterprises are measured are questionable.

The most obvious indicator of the the bias of Northern perceptions in this area concerns assumptions of enterprise size. For example, the standard measure for 'small' business used in Britain by the Council for Small Industries in Rural Areas (CoSIRA), now the Rural Development Commission, was that there should not be more than ten skilled workers. In certain exceptional cases this led to clients with up to four hundred workers being eligible for the definition of 'small'. Even by British standards such a definition places the limit well above a large number of businesses which produce a significant proportion of GDP, which recently have come to be referred to as 'micro' enterprises.

In the African context a business employing ten skilled men is likely to be well into the formal sector and to be modelled on Northern patterns. In terms of rural manufacturing enterprises such a scale is very unusual and, where it exists, is likely to be externally owned. The vast majority of rural manufacturing enterprises are single artisan activities, at the most employing a handful of assistants. Where groups of producers work together, as the smiths at Manie, Zaire, or at Phalula, Malawi, they cannot be regarded as one business but as several working in unison, possibly on an informal cooperative basis. In each 'cell' business of such an association there are unlikely to be more than four people including the boys working as assistants to pump the bellows, in the case of smithing. Even in cell groups of this size the nature of employment is frequently not according to the conventional Northern waged pattern, but may involve unpaid apprenticeships and extended family economic exchanges.

In addition to the tendency to single or very few worker enterprises the fixed and working capital of such businesses is far less than would be

experienced in the North, even when compared as a proportion of the cost of labour.

It may appear pedantic to suggest that the far smaller scale of rural enterprises in Africa compared to the North is an important factor in the development interventions to which they are subjected. However, the judgement of what scale of business is 'worth' supporting is crucial, since the distribution and nature of rural enterprises is a reflection of the social structure of which they form a part.

Where the social pattern of non-agricultural work has been informal, activity taking place in or around the village, the centralisation of activity through encouragements or inducements on the part of an external agent disturbs this pattern. For example, where production becomes centralised in a particular village those previously involved in the activity elsewhere in the area either become marginalised economically or begin a regime of travelling to work at the central location. 'Centralised' still applies as a description even where only a few kilometres walk is involved. This immediately removes the worker from participation in family communication for a large proportion of the active day. For example, in Manie, Zaire, the blacksmiths normally work near or next to their own huts, so their contribution to the family group is continuous. This is particularly significant in regard to the supervision of children, since if the men go out to work the whole burden rests on the women, who are already under considerable strain, and to participation in village decision making. Economic activity and travel outside the village also greatly encourages the diversion of the cash generated away from domestic needs, thus further accelerating the social change likely to result.

The Northern concept of a viable workshop involves a designated building, properly built by Northern standards. Breeze block walls and tin roofs create an initial capital cost far in excess of that which an indigenous rural workshop would ever be likely to meet (except through external loans). Such a workshop needs to broaden its market in order to be able to justify and cope with its high capital cost, which normally means a higher level of technology, for example welding, leading in turn to a still higher level of capitalisation. A seasonal market is inadequate to sustain such an enterprise, yet the rural market is largely post-harvest in the early dry season, even where some access to work from large-scale farming

is possible. Apart from the marginalisation of other producers, for example of blacksmiths by the advent of welders, the social change and the capital debt incurred by the community, such a workshop requires industrially manufactured consumables which, when available, constitute a demand upon the village's cash earnings. Although the workshop's income may be far higher than that of a more traditional rural enterprise the amount of cash flowing out of the community for consumables and debt repayment will be far higher. If the activities of the workshop significantly improve the earning capacity of the community it serves, which bears its costs, then such outgoings can be justified. However, if community earnings do not improve commensurately the apparently constructive workshop will become a drain on the community's cash resources. In addition to this it is likely to have succeeded in changing the communal view of what is required to manufacture and repair basic needs consumer items and agricultural equipment.

An example of this can be seen beside the market place at Mpika boma, in Zambia. A workshop compound containing a metalworking shop and a carpenters' workshop was built by missionaries in 1973. Subsequently the complex was passed to 'The Self-Help Cooperative', formed for the purpose within the community. Visited in 1986 the enterprise was continuing to try to follow the training-by-production approach of the donors, with a full-time instructor employed for each discipline, both graduates of the workshops' three-year training programmes. Furniture-making was continuing, products being reasonable in spite of poor work practices, such as cutting sawn timber to length with a bush saw. Workshop cleanliness and safety were very poor. The metal workshop was effectively inactive. There were no welding rods, the pedestal drill was inoperative due to a motor burned out for the second time in a year, while the vice was drilled to bits and the anvil was totally deformed by weld-spatter from use as a welding table. The only remaining hacksaw blade was brightly burnished with just one third of its teeth remaining. Not suprisingly, there was currently only one metalwork trainee, of whom there was no sign, while it was necessary to make two appointments before it was possible to meet the metalwork instructor, Mr Mulenga. The manager, Mr Mwansa, was absent on both occasions. While the workshops were continuing to exist they were entirely dependent upon both the income generated from their local clients and a further subsidy by the community. Their principal product, furniture, made no difference to the productivity of the community, while their greatest potential contribution, via metalwork and welding, remained

unfulfilled due to lack of consumables and expertise. Even had these ingredients been present there is a limit to the extent to which the client community possesses sufficient earning power to sustain such a workshop in appropriate productivity, even though the need exists.

By contrast, a traditional blacksmith working in the village was making a considerable contribution to the productivity of the community, particularly agricultural, through his production of axes, adzes, hoes and carving tools. In addition to blacksmithing, 47 year-old Mr Kabuswe made drums and wove mats. All these activities were concentrated in the dry season, since most of his time during the rains was taken up with farming. The capital level this one-man enterprise required was perfectly in proportion to its market and the resources of its clients. The concentration of his manufacturing activities during the dry season coincided with the short post-harvest period when his subsistence-farming clientele have disposable income for the renewal of their tools and such-like. His principal constraint was raw material, requiring clients to locate and bring their own scrap metal for him to work, which restricted the resulting profits.

The tendency to judge effectiveness according to size is very common and, as suggested above, particularly inappropriate in a seasonal economy. In many cases those involved in the development of rural industry are ignorant of the existence of part-time blacksmiths similar to Mr Kabuswe, and firmly declare that traditional blacksmithing has effectively died out, as Jens Müller describes(Müller,1980p123), but he goes further to suggest that another explanation could be "lack of interest to bother about 'backward' craftsmen".

> "At present there is no worthwhile village/small scale industry which can undertake manufacture of hand tools and manually operated machinery in appreciable numbers. Due to the conspicuous absence of the traditional artisans and basic workshop tools, with the existing skills and resources, only very limited quantities of crude hand tools of poor quality can be manufactured."(Rao,1978)

Such ignorance and attitudes are very common among those involved in development throughout central and southern Africa. A formal resources survey of Luapula Province, Zambia in 1987 declared that there were 72 metalworkers in the whole province. A superficial examination of the status quo by this researcher in 1988 identified a total of 57 informal sector metalworkshops, 45 being blacksmiths, 24 being visited. Taken the

length and breadth of the province in only four days, this sample was perforce concentrated near the main roads, where competition from urban manufacture and distribution was likely to be greatest. The smiths visited were discovered by choosing a pedestrian carrying an axe and asking where it was purchased. Doing this, in no case was it necessary to travel further than a kilometre from the point of contact in order to visit the maker, while in many cases it was only a matter of a few hundred metres or less(Poston,1988). The impression was of a startling density of part-time smiths. The same general pattern also appears to exist in Tanzania, according to Müller, and in rural Zimbabwe in the communal and resettlement areas(Harries 1989), while in Zaire there are substantial tribal smithing groups at intervals across the country, the inheritors of degraded ancestral smithing traditions(Poston,1988). Other evidence points to this being the case in most sub-Saharan countries.

Nonetheless, the small contribution of the individual, as opposed to the contribution of this group of producers as a whole, leads them to be generally ignored. Where notice is taken of them the immediate tendency is to attempt to translate their activity into a more formalised Northern version of smithing, requiring more capital and greater output to justify it. An example of this occurred in Malawi, where an engineer proposing a training course for existing practitioners was adamant that it was only worth working with full-time smiths, due to the limited production of the part-timers. With one stroke a group of producers of enormous significance to subsistence agriculture activities were rejected in favour of full-timers more conventional to the Northern eye. In order that such full-time activity can be viable it must be located in a market town, where greater purchasing power can sustain it and extend the season, thus removing the service and the income it generates from the rural area where it is most needed. The same project involved the introduction of locally-made equipment which, while effective and well appreciated by the participating smiths to whom it was given, has never been duplicated by other smiths because the cost was out of all proportion to the earning power of the activity.(ITDG 1988). The subsequent exercise in Malawi has successfully trained thirty part-time practitioners, most of whom have continued to practice their enhanced skills within their communities. The problems of higher capital requirements remains, though the adaptation of relevant technology from elsewhere in the developing world has considerably reduced this. One factor which discourages development work with rural part-time artisans who work within their communities is the

fact that they are widely scattered and unrecorded and therefore require energy and commitment to identify and work with. This difficulty, coupled with their low profile, may suit the perception of the development worker and allow the justification of working in more centralised, convenient, and apparently productive locations.

Even where a successful full-time workshop has been established, it may remain under threat from well-intentioned influence and assistance. Mr Mazambani, formerly a grocer, had been retrained as a blacksmith as part of the pilot work for the project described above. Although the quality of his products was not exceptional, sharing with most others a shortcoming in hardening and tempering, he had developed within one year to the point where all debts were paid, he was employing four men and was handling regular orders for substantial quantities of tools from his workshop in the market town of Dedza. His quality was rapidly improving, with occasional visits and advice from the agency concerned, and he was spontaneously expanding his product line to include such products as metal shears and pick-axes, which he had worked out how to make for himself. A well-intentioned but uncoordinated initiative by another agency then persuaded Mr Mazambani to take on a loan, with which he purchased an arc welder, an angle grinder and another item of equipment. Examination of his books within a month of these purchases showed that this side of the business was turning over just enough to repay the loan when repayments started, probably without paying his wages. Not only was the owner drawn off from the forge, but his assistants' activities there would be required to pay for his time, unless there should be a considerable increase in the trade with the new tools. Finally, if any of the new equipment, being used in far from ideal conditions, should fail, the forge would have to carry the debt, possibly of the complete loan, bearing in mind that the repair of such equipment can pose major problems in such a context. It is therefore reasonable to argue that a well-meaning attempt to assist this workshop by means of the provision of credit, frequently cited as a major restraint, may yet lead to the demise of an energetic, useful and finacially sound tool-making enterprise. Even if the business survives experience suggests that the new equipment will eventually dominate the business, due both to the prestige of modern equipment and the greater purchasing power of those who operate vehicles, the principal market for welding. This is likely to take place without knowledge on the part of Mr Mazambani regarding the comparative profitability of the two activities, since, though he is exceptional in carefully keeping books, accurate costing is

unlikely. The far-reaching effect of such a shift in the dominant activity of the business may therefore be that the rural population presently supplied with tools by him will have less access to his services, while the urban-penetration related motor vehicle trade will be better served. However, the agency which made this loan will certainly mark Mr Mazambani's case down as a successful intervention, provided his business survives long enough for the loan to be repaid.

Jens Müller(Müller,1980) gives a clear example of the illogicality of the recommendations of ex-patriate development agents in his examination of the Keinbaum report and its proposal for the development of village workshops, which has already been referred to in Chapter 2. A similar approach can be seen at the Green Market, Mutare in Zimbabwe, where a large group of metalworkers and other trades are working seven days a week servicing the needs of consumers from the surrounding rural areas as well as the town. Innovation is clearly in evidence, particularly through the presence of a number of items of home-made capital equipment. In order to assist these producers, the stated motive being to improve their circumstances and earnings, an agency has built a major modern workshop inside a fenced compound on the edge of the market. The initial activity has involved the introduction of an impressive project manager, Mr Chitsunge, a social organiser who has been instrumental in forming a group of artisans to advise the project. He has also organised the beginnings of a raw material supply service, to be run on an economically sound basis, which addresses the most urgent need of the artisans, although this was handicapped by an initial inappropriate purchase recommended by an external 'expert'. However, the next phase of the project is the employment of a technician and the installation of the already-delivered capital equipment in the workshop, which includes a lathe, pedestal drill, welding machine, grinders and other items, gifts of a foreign donor agency. The technician is then expected to train the market artisans in this workshop, and to service their needs using the equipment. The lathe is particularly questionable in this context. At the moment, none of the basic needs products being made by the artisans requires the use of a lathe, so if they are trained to use one it is either a waste of time or they will subsequently take a loan to purchase one and change the nature of their business away from the provision of basic needs goods. Similarly, the existence of the lathe will encourage its use when solutions to process requirements are being devised by the technician, where

otherwise solutions possible within the artisans' own resources could be developed.

The change of product due to the introduction of a new process (the lathe) may well enhance the income of the artisan concerned, though the debt incurred may also make him more vulnerable. Similarly the use of the lathe to produce low-cost capital equipment may also boost the income of the producers in the market, so the aim of the project are fulfilled through both uses. But it is arguable that the perception which has given rise to the project aims are limited, and are concerned with the wrong target group. In other words, if the aim is wrong then the measure of success is irrelevant, since achieving the target will not achieve the desired result.

What is the purpose of artisanal development? To achieve an improved income for individual producers, irrespective of what they make or who their customers are? If this is the case then the inference is that any incidental disadvantage to particular consumer groups is of no significance.

If the purpose of development is to benefit the maximum number of people, particularly in those areas socially and economically most crucial to the country's overall development, then any development intervention must first look to those areas and the needs of the groups involved. Assisting one artisan is very expensive, and if it has little effect beyond his own raised income is likely to have cost more than the resulting rise in earnings will amount to in a lifetime. If rural development is the key to national economic development then the needs of the rural population must be the primary concern of development agents. The Green Market artisans currently make scotch carts, windows, doors, hoes, and other welded and fabricated goods, as well as tinsmiths' domestic products, carpentry and so on, and have sufficient demand for these principally primary needs goods to work seven days per week. The diversion of even a part of this production into other goods, too expensive or not basically required by rural consumers, limits their access to the goods which are needed. So, the training of practising artisans to work a lathe may weaken the product support to the rural population.

Pursuing this argument, the purpose of providing improved technology and introducing new skills is to improve the service to the rural, principally

subsistence farming, population. One way this is brought about is through the direct improvement of the artisans' products and productivity, as is the intention at Green Market. But the benefits of this are limited to the consumers who use this one market. Wider benefit will arise only if the skills and knowledge diffuse further, both by artisans leaving the market and setting up elsewhere and by artisans who visit the market recognising the advantages of what they have see and translating it back to their own location. But in the case of Green Market it is probable that artisans will become dependent to a certain degree upon the services of such equipment as the lathe, and will therefore need to retain access to this technical resource, which means staying in or near Green Market. In the same way the technology developed by the project at Green Market cannot be taken from there by other artisans and translated to their villages because it would be remote from the lathe necessary for maintenance and repair.

The appropriateness of training artisans in a context different from that in which they will practice has already been raised in this thesis. In the case of Green Market the usual geographical argument does not exist, since the artisans will be trained in a modern workshop just next door to their own. However, they could as easily be trained in their own workshops, improving their own conditions, without the cost of the workshop and without the expectations it gives rise to.

In the same way the development of technical solutions in the modern workshop rather than in the artisans' workshops greatly increases the risk that the solutions will not be appropriate to their workshops. This risk is greatly increased when the workshop's resources so far exceed those of the artisans.

The Green Market project will probably be able to claim success in a few years time, pointing to how the income of the market's artisans has improved. No measurement of negative effects is planned, because the possibility of there being any has not been perceived. The question will remain, however, as to whether the project will have been a constructive step in the development of Zimbabwe, or, in aggregate, a negative one.

It is possible to dismiss the significance of one project, particularly where the effects are debatable, but not only is the Green Market project likely to confirm the same assumptions and approach to other development

agents, but, since it is intended as a pilot project, it is planned to have its success replicated at as many rural centres as possible.

The limited perceptions which require indicators of success to be tangible and as physically evident as possible are reinforced by the tendency for Northern-conditioned agents to recreate their own environment in Africa. Rural industrial development is too often measured in terms of buildings, machinery, loans repaid and immediate turnover, things donors and agents may point to. Projects are conceived around superficial producer benefits rather than targetted consumers' needs for products. Many projects which have been considered a success by the agents involved are failures in real terms.

5: ARTISAN ORIENTATED INTERVENTION.

In this chapter it is shown that the greater the influence and the control of the target and client groups over an intervention, and the more that existing local resources are recognised, respected and taken advantage of, the greater the likelihood that it will be appropriate and successful. This conclusion leads to a further analysis of the part played by external agents in the recurrent failure of interventions, followed by an examination of what indicators show an intervention to be successful.

THE RECOGNITION OF INDIGENOUS TECHNICAL KNOWLEDGE.

"The Gourma of Upper Volta have a highly developed world view that incorporates specific concepts and perceptions on human beings, souls, God and destiny. The Gourma are a pragmatic people, and are prepared to be innovative: but new developments must be based on Gourma perceptions, not on foreign concepts, if they are to succeed. Development agents need to consult the people, and to understand their views and their culturally recognized categories of labor; programs should not include elements of risk or experimentation, as failure would encourage people to believe their destiny was against such activities.

Substantial and effective improvement in the material well-being of any group of people presupposes that their own perceived needs and desires as well as means of attaining such needs and desires be taken into consideration. Any development intervention by definition implies change in old ways of doing things, change in ways of thinking. It seems to be true that such change can only have lasting and psychologically satisfying results for the people concerned if it comes from within the culture itself.
Anthropologists recognise that every culture is dynamic in that it is always in a process of change, always in a process of self-redefinition. Such change, though seemingly slow and difficult at times to recognise, involves various members meeting and resolving material and psychological innovations and constraints on their lives." (Swanson 1980)

There is no question that the interventions which have been made in the past with the purpose of developing small-scale rural manufacture have had recurrent faults. That the intervention agents have arrived from an alien context with misconceptions is understandable, but the recurrence of the same faults should not be acceptable.

While there are a series of identifiable faults which recur in rural industrialisation projects, it is possible to ascribe the failures to one common factor. Interventions, by definition, come from outside the community, often from outside the country, through the agency of outsiders. Not only are these agents normally of a different culture, but, with rare exceptions, their education, training and experience are different from those who are the subjects of their attention. It is these very differences which qualify the agents in the eyes of those who authorise them, coming from the same background, since the power lies with Northern systems and alliances, partly due to the domination of the Northern donors in the development arena. The attitude which has prevailed, and generally continues to do so, is that knowledge gained through the Northern form of academically-based training is superior to knowledge gained in any other manner. This conviction on the part of the intervening agents leads to

assumptions, conscious and subconscious, that the recipients are less knowledgable and less intelligent that they themselves.

This arrogance on the part of external agents leads them to confuse the ability of people to help themselves with the ability of people to think for themselves. The resource poor generally do not have access to the means to solve their problems, and thus appear incapable. Those with the resources assume that their possession of the resources is a result of their greater knowledge and capability, and therefore tend to a presumption that the recipients require their direction.

> "At the root of the problem lies the fact that officials - agricultural extension staff, planners, research workers, 'experts' and others - depend on scientific knowledge to legitimize their superior status. They thus have a vested interest in devaluing Indigenous Technical Knowledge and in imposing a sense of dependence on the part of their rural clients. This suggests that change may only be brought about through an assault at the level of ideology, and through a reorientation of reward systems."
>
> (Howes1980)

The development of particular forms of knowledge and skill is a response to the social, cultural and environmental pressures on the society concerned. The development of Northern forms of knowledge has depended upon wealth to provide the means, and has in turn created further wealth. Knowledge fluctuates in all societies according to the prevailing conditions, leading to the domination of particular types of knowledge at particular times.

The economic domination of the North has therefore lead to an extended domination by Northern forms of academic and industrially based education, training and practice. Evolved specifically for the development and support of an industrial society, these forms fulfill that function. In the context of a developing country they will also serve the same purpose, supporting formal industrialisation and the functioning of a modern state. However, the relevance of such a purpose depends not only upon the state's wish to become a modern industrial nation but also upon the realisable possibility of the formal industrial sector dominating and controlling its economy, as it does in the North.

Given colonial influences and the direction that national development has taken in most African countries until the present time, the attempted progress towards formal large-scale industrialisation is likely to continue

for the forseeable future, and will continue to exert political and economic pressure upon the policy and decision makers. Northern training systems are reasonably appropriate to this process, and will therefore continue to be imitated and strengthened by those promoting it.

If formal industrialisation was rapidly becoming the norm in developing countries these formal training systems would be appropriate, but this is not the case. In all the developing countries in Africa a substantial majority of the population live in rural areas, dependent upon subsistence agriculture for their survival. Even in urban areas formal industry is increasingly unable to provide employment for the rapidly growing numbers of unemployed people. Northern knowledge systems, developed for Northern industrialisation, only marginally relate to these people and their needs; the use or imposition of them in this context is therefore entirely inappropriate and counterproductive.

Traditional knowledge systems and social structures relate to the environments in which they were developed. Other than the incursion of the influences of the Northern-orientated systems and the environmental degradation they have suffered, the context has remained broadly similar, which means that traditional knowledge and knowledge systems remain relevant to the activities carried out and the problems which have arisen. Thus the knowledge of the people themselves is the most relevant to their situation.

This does not mean that knowledge aquired through Northern systems is irrelevant to subsistence agriculture and rural communities, but rather that it must be offered as a resource to be used in conjunction with indigenous technical knowledge at the discretion of the community, rather than imposed as a replacement.

> "Respect for the poor and what they want offsets paternalism. The reversal this implies is that outsiders should start not with their own priorities but with those of the poor, although however much self-insight they have, outsiders will still project their own values and priorities." (Chambers 1983)

The failure of external development agents to recognise the need for the recipients and their traditional knowledge and social forms to dominate the development process is the fundamental cause of the recurrent failure of development interventions, particularly in the artisanal context.

"One basis upon which a culture may be judged to be evolving in a healthy way, with a minimum of cultural alienation and disorientation, with a minimum of breakdown in family solidarity and continuity, is the extent to which change is permitted to develop from within the culture itself. As long as change and change agents work from within particular cultures and existing frameworks of ideas, a culture may be said to have maintained its traditional nature - in spite of the fact that it may be evolving into a modern, self-determining society. Unfortunately such change is more often from the outside. Development programs are often designed upon the basis of foreign concepts which in the end either fail or become a form of ideological domination of various peoples. The consequences of disruptions in traditional authority lines, of the raising of new needs which may not be consistently met, of changes in the accepted division of labor and labor organisation, and new means of manipulating power and available resources may destroy the initial advantages an aid program in development might have. It has recently become popular to speak of involving target groups in the identification and solution of their own problems. Yet in practice, for lack of relevant sociological and anthropological data (which often results in the assumption that one already knows all one needs to know about a particular group or that the target group would not be capable of suggesting real solutions to their real problems), projects are still often set up without true consultation with the comunities concerned, without understanding of the various constraints and incentives placed upon them by their culture and environment."
(Swanson 1980)

In the context of rural manufacturing, therefore, all inputs should be orientated to the recipient society, particularly the consumers and artisans, and directed by them. While the agents' expertise may be very extensive there is no way to guarantee its relevance and therefore its constructive nature within context. The external agents do not take the risks, are not the victims in the case of failure. Not only does the knowledge and culture of the recipient community form the medium in which all development takes place, but since it is the survival of their society and they themselves that are at stake it is they who should control changes within that context. Therefore all developmental action must be informed by and start from the existing technological, social, cultural and economic situation. That this is not normally the case accounts for the rarity of success in the development of small-scale rural manufacturing.

"Traditional cultures and value systems are to be respected rather than demolished. Development is not a matter of modern Western standards and attitudes bringing about the expected social change from traditional to modern society. Transfer of technology is not always beneficial. It can lead to social dualism and other forms of maldevelopment." (Dr Kinhide Mushakoji, Vice-Rector of the UN University's human and social development program.)(Moore 1979)

THE CONTROL OF INTERVENTIONS.

It is only by means of artisan orientated intervention that the possibility exists for the development of the artisans' innovative capacity and therefore their adaptability, an essential ingredient if their activity is to be sustained in the longer term.

By definition an intervention comes from outside the situation which it is intended to affect, and is therefore likely to be controlled by outside forces. In the context of development it is from the lack of power which exists at every level, from National to the poorest individual, that the need for assistance and development arises. The economic position of the less developed countries leaves them with little power to affect their own situation which, forming part of the World economy, is effectively controlled to their disadvantage by the Northern countries. The resource-poor individual similarly has very little control over his or her situation, being subjugated to all the levels of power and authority within the country and, ultimately, to the external economic forces which control the national situation.

The fundamental control over interventions therefore resides in the Northern countries, the "donor" nations. This is true in every sense, since trading and political interventions constitute even greater influences than donor interventions, but for the purpose of this thesis the term "intervention" will be taken to mean an intervention which is intended to have a beneficial developmental effect.

The individual, supposedly the ultimate beneficiary of any development, has no control over an intervention.

A local grouping, whether a village, an association, a cooperative or whatever, may be able to influence those who control an intervention in the best cases, but if their wishes do not coincide with the views of whoever is in control there is a risk that no intervention will take place. For people who realise their own need for support and development the refusal of an intervention because the terms are not right is extremely difficult, on the basis that any help is better than none. The conviction that an intervention may actually be damaging is particularly difficult to sustain in the face of the insistent expert opinion of well-educated outsiders and foreigners, particularly when self-interest may affect the

reasoning of some of those within the group. However, a group remains in a much stronger position than an individual, since those who control interventions cannot work with individuals and, by their nature, understand groups better. In certain cases a group existing within a particular social context may use this power against the interests of individuals within the same context.

The next level of participants in an intervention are formalised local organisations, institutions and functionaries. Local organisations may have a strong influence upon interventions, but are generally dependent upon external funding for their ability to act, and do not therefore have the ultimate control. While such organisations may be regarded as being close to those whom they wish to assist, keeping the control of the organisation in the hands of the people it is intended to serve is extremely difficult and assumes perfect altruism on the part of all of those who are involved, particularly in the management of the organisation. There are examples of local groups retaining a high level of control, for example the Organisation of Rural Associations for Progress, based in Bulawayo, Zimbabwe, but this is achieved by a high level of exclusion of other agencies, since experience has taught that external participants seek to control.(Hussey 1989).

Institutions normally see themselves as existing to benefit those whom they apparently serve. In the context of development the principal institutional activity is training, usually patterned upon a Northern model and therefore relating to the needs of a Northern industrial society. Within the confines of government policies, the institutions do possess an element of control over what is taught and how it is taught and take their responsibility for directing this seriously. However, those working in institutions have a degree of insulation from the conditions which they wish to affect, and, being fully employed, are not in a position to maintain an intimacy with the conditions of those they train. When change is seen as desirable institutions by their nature cannot adapt quickly and are therefore likely to have to struggle to remain relevant to real needs. Institutions have a vested interest in their own existence, which severely limits their ability to recognise the limitations of their effectiveness, particularly in a context which is evolving rapidly. Thus the control which they do possess is liable to be a confining one, while remaining dependent upon external sources for funding, the ultimate control.

The functionaries of state or parastatal organisations may perform an editing function, but have little real control. The nature of their intervention is defined at higher levels, from where financial resources are controlled and to which they are responsible.

Control begins to exist above this level, whether in National government offices, in National or International Non-Government Organisations (NGOs) or in ex-patriate donor agencies, charitable or statal. The source of money is where control ultimately lies, whether National or foreign. No funds are disbursed without some degree of accountability in the form of monitoring, which carries with it a directive element, influencing and controlling policy. The governments of developing countries and NGOs within those countries do have choices of where they try to obtain funding from, but this only varies the level and nature of controls. There is no source of funding without control.

The control of an intervention normally lies far from the hands of those most affected by it who are also, in many cases, those whom it was intended to benefit, the target group. As long as external funding is required to fuel an intervention it will not be controlled by members of the target group. However, accepting that control remains with the paymasters for as long as external funding is required, which means at least the formative stages of the initiative, it is nonetheless possible for the responsibility for the direction of the intervention to reside with the target group to a major extent which should increase as the initiative progresses. In this way the control which continues to be exercised externally will only be that of a funding veto, rather than an ongoing control over content.

The practice of an agency measuring opinion, assessing it and acting accordingly is not giving over the direction, but rather acknowledging the direction indicated. While this approach may appear to reach the immediate desired end, it fails to build up the group's ability to direct its own future, which is necessary if further development is to be carried out autonomously or with minimal external participation. Where the intention is for the responsibility for the direction of the intervention to reside with the target group, the way to work with the most needy nonetheless remains elusive. It is difficult for the poorest people to organise themselves to work together to influence or direct an intervention, due to the extreme nature of their situation. Where

organisation takes place it is frequently among those in a very slightly better position, though still falling well within what is considered to be the target group of the intervention. In such cases there is a serious risk that those poorer than the organised group will ultimately suffer losses due to the intervention. Within different social groups certain classes are better able to organise, are in positions of greater power or form part of alliances based upon self-interest. The most general example of such groupings is gender, males retaining most of the control in the majority of societies, to the detriment of females.

In the same way as other interests will influence decisions, the National policy environment will always have a significant effect upon any intervention, controlling its existence, its immediate effects and the duration of them. All interventions within any country should be carried out, if not by the government itself, then with their knowledge, support and approval. While a government is a power grouping which can never represent the interests of all of the people, it remains the immediate controlling force within its territory, even if all governments are not moral and universally well-intentioned. In such cases there may be a conflict between the view of the government and that of the agency wishing to sponsor and undertake an intervention, at which point the ownership of control and its manipulation may be of great significance. Such situations are not infrequent, the only constant being that, whether the control is National or external, those who will be most affected will not have it.

The significance of the control of the pay-masters, therefore, is that it includes the choice of who will represent the target group, who will be allowed to direct the form and content of an intervention. Given a willingness to divest the responsibility for the direction to such representatives, this choice remains crucial to the effects of the intervention, who are the winners and losers and what is the extent to which the results will endure.

The significance of the lack of control of the poorest people over interventions made on their behalf is that such interventions are always at risk of being misconceived, misdirected and inappropriate. While there is a risk of this whoever controls the intervention, the further the control lies from the point of impact the less likely it is that the intervention will be appropriate. It is therefore necessary to invest as

much of the direction of an intervention as possible in the hands of those nearest the point of impact. Who these people are, and how close they are to the point of impact, will inevitably vary.

RESPECTFUL COLLABORATION.

Precisely because the normal approach to the development of small-scale rural manufacturing has not been oriented around the consumers and practitioners themselves it is difficult to illustrate the approach proposed within this thesis. However, there are a few incidents of this approach which suggest its viability, including an example which took place as part of this research. This technical development input was made under the direction of the recipients and emerged naturally out of the circumstances which arose. The possibilities and the direction in which the dialogue developed were clearly indicated by the people themselves recognising and responding to their own situation and requirements.

The Blacksmiths of Manie, Zaïre. Manie is a village in the Zone of Bulungu, Bandundu Region, Zaire with a population of about 650 people of the Bangongo tribe, who speak Kingongo, about 20 miles from the agricultural training centre of Lusekele. Two other nearby villages of the same tribe, Kingangu and Bangongo, also have a number of forges, but fewer than Manie's 12. Besides the smiths there are also basket makers, potters and a carpenter in Manie. The surrounding country is open bush, agriculturally very poor. There is visible evidence of malnutrition among the children of the village, and a high mortality rate. The Bangongo are known to have been smiths for hundreds of years; there are examples of the work of the Bangongo ancestors of the Manie smiths in the National Museum in Kinshasa.

This project arose out of a brief visit paid to Manie in December 1986 by the researcher and Gary Selig, Director of the Centre Agricole de Lusekele. The blacksmiths made it clear that their principal problems were the lack of smithing tools, particularly tongs, and raw materials. The researcher asked the smiths why they did not make their own tools, to which they replied that this was not possible, since such tools as tongs must be industrially produced. Although the smiths were asking for access to imported tools, most of those required could be made in the village forges

but for the lack of technical knowledge, while imported tools are forbiddingly expensive and are anyway largely unavailable even in Kinshasa. The introduction of the necessary techniques, which would be far more beneficial and have a longer effect than the supplying of a consignment of tools, was not suggested at this time, since there was no way of knowing whether the finance could be found with which to meet any expectations raised.

When the necessary funding had been made available by the Beatrice Laing Trust, accomodation, support and transport being provided by the Communauté Baptiste de Zaire Ouest mission at Vanga and the Centre Agricole at Lusekele, a proposal was sent via Gary Selig and the Lusekele Pastor, Tata Wanga, requesting that the researcher should be permitted to come from the UK to work with the smiths in the village. The approach made to the village was definitely not in the role of a teacher, but of a fellow artisan who would be willing to trade technical knowledge. This emphasised the respect with which the visitor wished to make it clear he regarded the indigenous smiths, although it made the visit harder to explain and aroused certain suspicions that their wisdom would be stolen.

These doubts were particularly encouraged by one older smith, Noël Mutapa, who later turned out to be the principal sorcerer of the village. There had previously been tension between the smiths of the area and the missionaries, since smithing is central to fetishism, which had culminated in over-zealous Zaïrie catechists persecuting the traditional smiths and driving them out of the area within ten miles of the mission in 1973. Noël therefore saw the researcher as a spy from the missionaries, whose intention would be to discover fetishistic practices and recommence the persecution. Consensus opinion among the smiths and the support of the area Chef de Groupement overcame these doubts, so a message was sent back to say that the visit could take place, though Noël's feelings were only gradually mollified as the visit progressed.

On arrival in the area two meetings were held and, with the strong support of the Chef de Groupement, it was agreed that the visitor would work in a particular forge on a daily basis for a period of five weeks with whoever wished to work with him.

The only tools which the researcher brought into the village were two German pattern forging hammers, two files, chalk and, in reserve, an oil

stone, dividers and a rule. There was much heart-searching about the hammers, but since the Bangongo only used traditional un-shafted pounding hammers the researcher was nervous of his ability to communicate techniques without his normal hammer form. There was no intention to change the type of hammer they used, but this did in fact happen with some of the smiths who decided to experiment with the different type and now use either, according to what they are doing. Files are anyway purchased from Kinshasa by the smiths, so the motive was not to use up their resource, while chalk was carried as a communication medium.

The working relationship was very successful, a group of about six blacksmiths choosing to work regularly with the visitor, while others were occasional participants and observers. Principal among the cadre was Waka Ngai, the master-smith who, directly or indirectly, had taught every other smith in the village. Communication was in French, a number of the younger smiths speaking it fluently; one in particular was invaluable as a consistent interpreter, a role he played well. Working in two languages had a suprising benefit, since everything that was said would be repeated, giving all those with both languages a chance to examine their comprehension and discuss it. An unexpected initiative was the appointment by the cadre of a "secretary", Manwanna, who proceeded to record notes on all technical matters throughout the researcher's visit.

The researcher worked only in the mornings, since he was concerned to minimise the disruption his presence would cause to the normal commercial activity of the smiths, both for the sake of their limited incomes and the supply of agricultural tools to the local population. In the event the smiths frequently continued to work on the tools that they were making after his departure each day, and astonished the Agriculture Centre staff by continuing such work over the weekend in order to show the result to the visitor on the Monday. This was considered to be completely out of character, and was dismissed as an impossibility prior to its occurring.

During the twenty days actually spent working together in the forge, the Manie smiths made the following new products, chosen and prioritized by them:

Headed nails (and associated anvil tools).

Rivets (and associated anvil tools).

Drifts.

Punches.

Chisels.
Tongs.
Pincers ('tenailles').
Hammer head (approx 1500gms).
Pruning shears.

They also learned how to upset, anneal, harden and temper steel, and, through the agency of the visitor but from a smith at Bangongo, how to fire-weld, a traditional technique which had been lost to the Manie smiths. It should be stressed that the ground covered was entirely directed by the smiths, the visitor's input to the curriculum being to arrange the order in which tools were learned in order to make the progression logical.

There was much discussion regarding the relative desirability of re-acquiring the knowledge of fire-welding from the researcher or from within their own tribe, since discussion and enquiry had revealed that the knowledge had been retained in the neighbouring village of Bangongo, though it was now only used for making traditional hammers. With the researcher's full support it was decided to take the risk of it not coming about and to try to re-aquire the knowledge from their own people, since this would also involve the retention of the customs and beliefs attached to the technique, rather than a sterile technical version from the visitor. This had the added benefit of providing an opportunity to demonstrate the respect in which the visitor held traditional beliefs. The process also developed the working relationship, since the disclosure of the hidden significance within hammer-making, and therefore fire-welding, was a considerable display of trust in the visitor on the part of the smiths. To the researcher's delight he was present when fire-welding was demonstrated to five of the Manie smiths by a member of their tribe in the next village on the last day of his stay.

In addition to the Manie smiths a gunsmith from Kilusu, Thomas Ngangu, also became aware of the visitor's presence and participated upon a number of occasions at Manie, principally benefiting from learning how to temper the springs of his guns. Thomas requested permission from the Manie cadre to make his own copy of their technical notes, which was granted, and then copied them out by hand. The smiths of Kingangu and Bangongo did not send delegates to participate during the first visit. There was some uncertainty as to whether they did receive the invitation that was extended to them, or whether the question of the prestige of which was the

host village interfered with their participation, but ruffled feelings were largely calmed by the end of the visit.

As the collaboration progressed the question of how things might go forward, and how the wider community might benefit, were discussed at length. The concept was developed that Manie might become a 'Technical Centre' for the blacksmiths of the surrounding area, passing on the knowledge that they had gained. The idea was not a dream of donor money, of concrete block buildings with tin roofs, but the idea that the centre was constituted by the availability of knowledge there. It was clearly understood that the only input that Manie would receive would be knowledge. The concept was that the smiths would instruct any blacksmith from elsewhere in the making of a particular tool for a fee, which was to be twice the selling price of the tool in question, the instructor keeping the tool made in the demonstration. This form of teaching transaction does bear some resemblance to the traditional systems and constituted a culturally acceptable response to the situation for the smiths. The benefits to the Manie smiths would be the prestige, some income, and the hope that if more input were available to further develop their knowledge that Manie would have first access, since they would have been prepared to share their knowledge. There was considerable enthusiasm on the part of the blacksmiths, to the extent of asking publicly for help to bring this about, at the Open Day feast which was held to mark the end of the researcher's visit. Both Pastor Pambi, the region's senior pastor, and Gary Selig promised to commit their efforts to support the idea.

The development of this idea, and the willingness of the smiths to undertake its implementation, was a remarkable departure from normal development experience with traditional smiths, since other examples of smiths willing to share their knowledge with practitioners from outside their own group or tribe are most unusual. Lars Ove Jonsson reports that even Jens Müller(Müller 1980) took three years to find one such smith in Tanzania, the man in question being an old man whose sons were all dead, so the knowledge would retain no family value after his death(Jonsson 1986).

The researcher left Manie after five weeks. (A full account of this period has been written(Poston 1987).) The length of time was appropriate, since while working with him the smiths were not earning their normal income, and the time was short enough for concentration and commitment to be maintained at a high level. As masters in their own right, the amount

they can learn in a short time is considerable; the techniques covered on this occasion were probably as many as could be easily assimilated at one time. It was agreed between the smiths, the researcher and Gary Selig that, should it be possible, a further visit by the researcher would allow a 'Technical Centre' based on Manie to be set up. His presence was desirable since a considerable amount of travelling would be necessary to identify and visit all the practicing blacksmiths within the proposed 20 to 30 kms radius of the village, and transport would be available from the mission for the researcher to use. The smiths also felt that his support was desirable in other ways, not least because he represented an interest outside any tribal rivalry which might otherwise confuse the issue.

As a consequence of the success of the five weeks spent working with the blacksmiths of Manie on tool-making in July and August 1987, the researcher spent a further five weeks in the area during February and March 1988 in order to help establish a self-contained system for local technical transfer, at the invitation of the blacksmiths and the Communauté Baptiste de Zaïre Ouest. Accomodation, support and transport were again provided by the Centre Agricole at Lusekele, a CBZO mission, while the project continued to be financed by the Beatrice Laing Trust, a British charity.

Six months after the initial input almost all of the transferred knowledge had been retained and exploited. The cadre of Manie smiths were still eager to participate in the further dissemination of their new knowledge among the smiths of neighbouring tribes, which would constitute a radical departure from normal local practice. Having therefore secured the formal approval of the blacksmiths of Manie, the researcher carried out a programme of visits to all the identifiable practicing smiths within about 30kms of Manie, between the rivers Kwilu and Gobari, accompanied by a delegate of the Manie cadre, Mafuta Mopati, who also acted as guide and interpreter. The response of all the blacksmiths who were visited, whether located in groups or in isolation, was overwhelmingly positive. Where smiths had been absent from their forges, this being the agriculturally demanding rainy season, they generally turned up at Manie within a few days in response to the information left with their families or neighbours. In addition to the enthusiasm of the blacksmiths the market response to the sample tools which were carried was most encouraging.

Over seventy blacksmiths practising within the catchment area were identified and visited, including those of the Bangongo living in Manie, Bangongo and Kingangu. They included traditionally trained smiths and those who have received a formal technical training or an apprenticeship in metalwork or mechanics. A significant number had established their workshops comparatively recently, while there was frequent evidence of others wishing to do so.

Training by the Manie cadre began almost immediately, the visitor being careful to absent himself on the designated days, Mondays and Fridays. The first trainees were of the same Bangongo tribe as the Manie smiths, but arrangements for the training of those from other tribes was well in hand before the visitor's departure. The standing joke was that the Manie cadre was now prepared to teach absolutely anyone, even a mundele, a white man. Significantly the first tools made by those trained by the Manie smiths were generally of a standard similar to those made by the instructors themselves and were immediately usable; there was not much degradation in the skills at second hand. The trainee smiths appeared to find the instruction acceptable and beneficial, once some teething troubles and the greed of one instructor had been dealt with, by the smiths themselves.

Further concentrations of blacksmiths in other areas were also identified, for example over sixty around Due III, 100kms from Manie, who indicated considerable interest in a similar dialogue. The potential and the demand for the duplication of the technical transfer system elsewhere appears to be most promising. To this end Gary Selig, the director of the Agricultural Centre at Lusekele, did subsequently apply to relevant donor agencies to finance the appointment of a resident tutor-smith for an initial period of two years, who would encourage the establishment of additional centres and further advance the existing pilot one, while training two local counterparts to continue the programme after his departure. Unfortunately it has not yet proved possible to locate the funds for this.

While it was not the intention to make additional technical input on the second visit, apart from any necessary consolidation of the previous contribution, some further work was done, though more by stimulation than by workshop participation on the the visitor's part. The most significant advance was the successful adoption of fire-welding as a technique; while

it had been demonstrated to the Manie smiths by one of their kinsmen at the end of the previous visit, a lack of confidence had prevented serious experimentation with it. However the proposal of its use for the hard-facing of hammers made of vehicle half-shaft steel with leaf-spring steel motivated an attempt which was resoundingly successful. The resulting boost to their confidence produced a new willingness to experiment with other products, and quality articles such as carpenters' hammers and plane and spokeshave blades began to appear. Various hammer forms quickly came to be regarded as routine products, with fire-welding being taken for granted.

In addition to this new confidence a very significant increase in the quality of their workmanship occurred during the period of this second visit. As an experiment, two sets of letter stamps to spell the village name MANIE had been brought out from England, as well as a small branding iron with the complete name on it, as a gift paid for by the congregation of St James' Church, Friern Barnet. These could have been made in the village, but constructive gifts to the whole group are not easy to identify. The purpose of the gift was to investigate the marketing effect of identifying the provenance of a product, which is not normal locally, and in this way to imitate some of the outward conventions of the industrially produced competition, and to bring the pride of the craftsmen into play in order to interest them in raising the quality of their output. The initial presentation of the punches occasioned great excitement and amazement, tempered by the warning that while a good marked tool would attract customers, a poor identifiable tool would have a powerful opposite effect. For about three weeks the punches were not used, even on long established product lines such as hoes; the first time they were used it was only at the visitor's insistence that a hammer head he was buying should be marked. In the meantime the quality of all the new products being made improved dramatically, the connection between quality, reputation, market and income having been clearly understood. Given the considerable poverty of the people and the consequently desperate need for cash, the most astonishing change in attitude was demonstrated when the prices which the Lusekele Centre would pay for hammers was being discussed; the visitor was told that the price received was currently seen as being of less importance than getting the product right.

In Manie the initiative is now predominantly being taken by the younger and more motivated smiths, particularly Mafuta, Makay and Mikibu. The

inventiveness of their work clearly improved in line with their confidence, particularly during the period of the second visit.

During the second visit there was a great deal of discussion about commercial matters, particularly concerning costing and working capital. The smiths were very concerned by their vulnerability in these areas. Further progress was also made towards establishing an improved supply of raw materials through Lusekele, which is vital if the progress which the smiths have made is to be sustained(Poston 1989).

Since the second visit the situation at Manie has continued to be monitored by Gary Selig, until his departure on leave in early 1989. At that time he reported that the Manie smiths were continuing to make the tools they had learned and to sell them as products into the local community, including the agricultural centre's shop. It also appears that they are continuing to teach the techniques to others when they are requested to do so though sadly, as mentioned earlier, Waka Ngai died in 1989, probably from poisoning. The most recent news in November 1990 confirms that the products are still being made and sold to the agricultural centre, particularly by Makay, but greater detail than this requires a visit to Manie, which since Gary Selig's return has not yet been possible.

The essence of this experience is that at all times the ownership of the dialogue and the technical transfer remained with the smiths, and the process was controlled by them. The relationship was not confused by hopes of material gifts, since only knowledge was on offer. The speed of advance and the level of input was always directly related to their existing knowledge. Incremental technical transfer means that each aquisition of knowledge is assimilated into their own traditionally gained repertoire before the next input is received, so that the new knowledge never appears disproportionately large in comparison to their existing understanding, which is therefore not denegrated as being insignificant. Since confidence is the key to artisanal learning and development, this is a fundamentally important point.

The Spoon Foundry of Limete, Kinshasa, Zaïre. Four young men live by means of selling the cooking spoons which they cast from scrap aluminium. With the support of Jack Sier, the Roman Catholic priest who runs the OXFAM programme in Kinshasa, the workshop had been established at an

appropriate level, as has already been referred to. The furnace for melting the aluminium is a truck wheel hub buried in the sand, the air supply coming from a common version of a hand-driven fan. The fuel is hardwood charcoal, the raw material scrap aluminium. The only unduplicatable item of equipment is a cast-iron two-spoon mould imported by OXFAM from Europe, but although this means that the workshop cannot be imitated by others the nature and quality of the mould means that it is likely to last an extremely long time. The workshop is in the open air, behind palm frond screens, outside the house of two of the young men. The spoons are sold for 5 zaires each, about five pence at 1986 exchange rates, direct from the workshop, the demand is so great. If conditions are favourable and there is sufficient raw material the four men can cast up to 700 spoons per day, which allows their income to be about five times what they would earn in a factory, in the unlikely event that such a job were available. Unfortunately the supply of scrap metal fluctuates, since an increasing number of small foundries have been set up to cast cooking pots, so their productivity and income are now restricted, but even with only one day's production per week they are still as well-off as they would be working full-time in a factory, were they able to do so.

This workshop was established at a minimal level in terms of both technology and capital, and remains sustainable for this reason. The young men are in total control of the business, having received technical support and limited original financial help from Jack Sier. The support given by OXFAM was concerned with the needs of the consumers and considered the options open to the operators, particularly their need for sustainable employment. The goods it produces are in very strong demand from the local population, who cannot afford the industrially produced spoons that are sometimes available in the city. The direct OXFAM involvement was brief and is now ended, leaving a productive workshop which is likely to continue to produce useful goods.

Metalwork in Zimbabwe. A frequently heard suggestion is that the development of rural manufacturing enterprises requires the introduction of new products. Since this idea normally originates with external experts, the identification of new products tends to be led by their own idea of what might sell. As has been discussed and emphasised earlier in this thesis, the underlying purpose of rural industrialisation is the support of agriculture, the provision of consumer requirements and the generation of non-agricultural income. Since the primary market for

rurally-produced goods is a local one, income generation will depend upon the relevance of the goods to local consumers, domestic and agricultural. The people who can identify the needs of the people precisely are the people themselves. However, because the normal concept is that producers require assistance, rather than that the consumers require assistance, the dialogue is normally with the producers, which inevitably shifts the focus.

Possessing specialist capacity in metalworking, the Intermediate Technology Development Group wished to examine ways in which this might be employed to assist the rural poor in Zimbabwe, in common with their other programmes. The approach taken to establish the nature of an appropriate intervention was to conduct a survey of the relevant rural areas to establish the goods currently available and unavailable yet required, and to identify where these were currently being supplied from. By then comparing these findings with the manufacturing resources existing in the rural areas it was possible to ascertain where the shortcomings in supply lay, both in terms of availability and quality. The detailed analysis of the preferences of the consumers was of particular significance, since these are based on a very intimate knowledge of the employment of the articles in question.

Having established the needs of the target group, the rural poor, and the existing capability of the artisans it was then possible to identify the particular areas where some support to the artisans would increase their ability to serve their communities. The only interest in the artisans was to enable them to support rural development better. As a by-product the individual artisans will also benefit, since their prosperity is a vital component in encouraging the support activity, but it is important that such benefits are not permitted to be the primary aim, since this lessens the emphasis on overall rural development, whereby the greatest number of people benefit, and is also likely to put the artisan in a weaker position because the thrust of his or her business is less likely to be appropriate which therefore makes it less likely to sustain.(Crowell 1989)

This carefully oriented study forms the basis of interventions in partnership with local institutions who share the same goals, and who are concerned that the subject communities should retain control of their own development. The resulting work by ITDG is concentrating upon the development of the instructional base and the training methodology of a number of institutions. The approach is centered upon training artisans

in an environment similar to that in which they do or will practice, and on decentralisation, as proposed in this thesis. After one year the project is clearly beginning to produce results which confirm the validity of the methodology and the contribution it will make to the communities in which the blacksmiths work(ITDG NO9 1990). The adoption of the same approach on another blacksmith training project, in Malawi, has also produced a significant improvement in the results from the earlier, less sympathetic, approach(ITDG NO6 1990).

Fish Hooks in Uganda. A Euro-Action Accord project to support rural inland fishermen in Uganda has resulted in a very simple but effective development which places one aspect of the means of production firmly in the hands of the communities themselves. Fish hooks were rarely available in Uganda since they were all externally produced, requiring unavailable foreign currency to import them. The Accord project worker, Derek Wright, working with the local blacksmiths, introduced the making of hooks by entirely artisanal methods, using the simplest of jigs and tools which can be made by the smiths themselves. In this way the supply of the means of catching fish is no longer dependent upon external agents, being localised by the involvement of the skills and perceptions that existed locally. A subtler virtue of the aquisition of such skills was demonstrated when Derek noticed that the fish hook makers were making their tools rather smaller than the ones they had originally been shown. On being asked the reason one maker patted his pocket, into which all the tools now fitted, and explained that when the security of the area next broke down he would be off over the border into Zaïre, his fish hook factory in his pocket, his means of survival secure.

The matter of respect for religious beliefs and traditions was discussed above in relation to fire welding in Manie; Derek's experience and actions echo this experience. Starting to work with the blacksmiths, he became aware that they were reluctant to work in front of him, particularly where the setting up of a new forge was involved. Suspecting that the existence of traditional religious observances was inhibiting them, Derek unobtrusively laid a coin and some bones under the hearth of the forge. Being questioned about this, he explained the traditional practice of British blacksmiths. This led naturally to a discussion of similar local practices, permitting an expression of respect for them and thus a mutual acceptance and an equal dialogue. A partnership which allows the local participants control, and the knowledge that they have it, is not possible

without confidence on their part that all of the elements of which their culture and practices consist are recognised and respected, whether disclosed or not.(Wright 1988)

EXTERNAL AGENTS.

Since virtually all development initiatives involve external agents, usually as the instigators, the way in which they approach their work is highly significant and has frequently been inappropriate. This section examines some of the faulty perceptions of external agents and the actions to which they give rise, and contrasts these with an alternative approach. While the points made are widely demonstrated in Africa they are inevitably generalisations, and it should be stressed that exceptions which demonstrate the value of a more perceptive and respectful approach do exist, though they remain very much in the minority.

The nature of externally-led change promotes the tendency for the leadership to be directive, and to use a set of priorities which relate to external values. Not only does this lead to inappropriate change, but it does nothing to enhance the capacity of the community to initiate and lead its own development, so creating and reinforcing dependency. However, where development is a collaborative dialogue the direction of the development can reside within the community, directed according to its social system and checks, prioritised according to the community's perception of its needs and desired direction. The community's ability and willingness to initiate and direct its own development is thereby enhanced, making it increasingly reluctant to be directed or imposed upon by outsiders.

The basis upon which external agents consider themselves qualified encourages the denigration of existing indigenous knowledge since they are conditioned by their Northern orientation and are qualified in their own eyes by their academic training and the professional experience based upon it. As a result, knowledge which is not considered to be qualified in a similar way is not given equal respect. In contrast to this, when agents start from a position which recognises the accuracy of indigenous knowledge the resulting respect for it and its possessors promotes its dominance in the development initiatives in which they are involved.

Since the qualification of such knowledge is diametrically opposite to that of the agents' it can then be recognised that the usefulness of the Northern orientated knowledge and experience resides in its ability to support and extend the indigenous knowledge, rather than to supplant it.

In a similar way, most external inputs concerned with enterprise development are orientated according to Northern conventions, failing to recognise local social and economic conditions and requirements. For example, Northern-orientated agents tend to assume that the rural economy is totally integrated with the cash economy, even with the formal economy, and to ignore any unquantifiable social relationships and exchanges which may form part of a rural trading relationship. The result is that either the social fabric is impinged upon by their actions or the entrepreneurial input is only partly relevant, making sustainable development unlikely. Agents also frequently miss the significance of local consumer needs and preferences, which are directed by the environment in which they occur and therefore possess a high degree of appropriateness to that environment. Again, where credit is made available to small-scale rural entrepreneurs the system is chosen by the external agents and directed by them, often without relating it to the cultural context, rather than making it a mechanism which permits the subjects of credit to control its use and so to change the pattern of paternalistic donor control and subservient dependence.

Northern-orientated external agents are conditioned to achieve tangible results and are encouraged to do so by project-related funding structures. Since agents' contracts frequently have a short time-scale and contain a specific intention the tendency is to attempt to change the conditions to favour the planned end result, often by introducing artificial supports and the means of sustaining change in the short term. Where an agent allows him or herself to be an active part of the development initiative and introduces resources only available through her or him, rather than being a catalyst, sustainability is unlikely due to the dependence thus created. Such inappropriate actions relate to the target rather than the community, whereas if the development is internally directed the limited experience of the community controls the rate of change and the components within it, making each step more appropriate to existing conditions and experience and therefore more likely to be sustainable.

The two most significant external inputs intended to promote rural industrialisation are credit and training. The use of alien training systems which are not culturally, technically or economically relevant is a major problem, though their inappropriateness generally goes unrecognised. Training systems originating in industrial societies have evolved for the purpose of supporting large-scale formal sector industry and its attendant bureaucracy. Where people being trained by systems relating to Northern conditions are unlikely to be employed in a compatible context the training is inappropriate to their needs. In Africa all small-scale rural manufacturing is essentially pre-industrial, in the Northern sense.

In order to be appropriate the content and context of training must relate as closely as possible to the subsequent professional practice of the trainee. As well as course content, the type of workshop accomodation used and the way in which it is equipped, location can also be inappropriate. Northern centralised training systems remove future practitioners from the context in which they will work and do nothing to build up the self-regenerating training capacity of the community itself. Any specialised formal training location will inevitably possess or aquire more sophisticated equipment than the trainee will be likely to require or be able to afford, even with credit, partly due to the perception of training efficiency held by the institution. Not only does this create expectations and dissatisfaction with their immediate prospects, but it also leads to misconceptions regarding the function and value of capital equipment. Even where the intention is that graduating trainees will work in a rural context such inappropriate training leads them towards the urban formal sector instead.

In contrast to centralised formal training, contextual training allows for the continuing development of skills by both direct transfer and empirical development and facilitates the acquisition of vocational skills by continually illustrating the relevance of the content, encouraging trainees to judge the validity of what is being transferred, particularly where the training capacity of the community itself has been developed.

CLIENTS AND TARGETS.

There are two reasons for assisting the development of rural manufacturing, which should be seen as separate issues but which do overlap. One reason is to give the rural poor access to non-agricultural income-generating opportunities. The other is to give rural consumers access to the goods and services which they require, which is of particular importance where these goods will be used for productive purposes, for example agriculture. Both contribute to the development of rural areas.

In both cases the rural poor usually constitute the target group whom the intervention is intended to assist. In the case of interventions concerned directly with income-generation this group are also the client group, being those to whom input is made.

However, where the purpose is the provision of goods or services to support the rural poor and their activities, the client group may not be the rural poor themselves, but whoever produces or will be able to produce the requisite goods or services. For example, an intervention concerned with rural blacksmithing in Zimbabwe is primarily concerned with the provision of goods and repair services to the rural poor. In order to improve this provision a project was initiated to develop the capacity and abilities of the rural smiths, the client group, by which means their service to their communities would be improved, to the benefit of the consumers, the target group(ITDG 1989). Such a distinction is significant, since it focuses the purpose of the intervention and makes it more likely that it will be achieved.

One of the indicators by which the successful development of the artisanal client group may be measured is by their increased income resulting from their improved capability. This is where the two reasons overlap and where the underlying purpose can be confused, leading the client group to be seen as the target. If a client artisanal micro-enterprise is to be able to serve its community it must be economically viable, so one of the aims of an intervention will be to place the artisan in a good position to generate income. However, the purpose of this is to ensure the provision of goods to the community, rather than to improve the financial position of the artisan, which is an incidental benefit. Where the two separate purposes are not understood the agents may consider direct income-

generation as being the sole reason for the action.«ITDG 1988» Considering the artisans as their target group the agents may carefully consult over the direction of the intervention, but the result, giving income generating opportunities to the artisans, may not benefit the rural poor, who might have been the target group in a clearer analysis.

The involvement which arises from working with any particular group or class tends to emphasise the problems of that group and therefore to make their solution an objective. An agency working with one client group with the intention of benefitting a separate target group will always find it difficult to be objective.

This risk of misdirection becomes greater where the target and client groups are distinct, and where the client group are being influenced at one remove, for example through input to a training institution. In this case the needs of the artisans and the needs and interests of the institution combine to obscure the best interests of the intended beneficiaries, those whose needs the artisans will service. The very widespread assistance which is given to training institutions very easily becomes inappropriate and even counter-productive.

Just as the appropriateness of an intervention is in inverse proportion to the distance between the control and the target group, the same is true of the distance between the target group and the point at which the intervention is made. If external agents work with centralised institutions, well removed from the target group, there are many opportunities for inappropriate directions to be taken. If the input is made as close as possible in the chain to the point of impact, the target group, the room for misdirection is minimised, while the opportunities for target group influence over direction are increased. The closer to the target group, the greater the relevance of all participants' contributions.

SUCCESS INDICATORS.

The most direct indicator of success in the development of rural manufacturing is the survival of a new enterprise, the strengthening of a particular activity which was previously marginal, or the sustaining of productive change.

If a rural producer is able to successfully sustain his or her activity it means that the output is being sold, and therefore has sufficient usefulness to the community to justify the cost and provide an income for the producer. In the case of the blacksmiths of Manie in Zaïre, for example, the continued manufacture of the new products introduced by the researcher demonstrates the demand for them and therefore their relevance.(Poston,1988) When the choice of input and the selection of products has been made by the practitioners the chances of the development being maintained are far higher than when they lack the control. Although they might be prepared to undertake initial experiments to please the external agent, blacksmiths would not continue to make a product for which there was no demand. By the same token, customers in the penurious village context do not buy products for which they have no need, so the continued production indicates that the community has benefitted from the input. In this way a simple indicator is the successful generation of additional income. The significantly increased income enjoyed by the blacksmith Mr Mazambani of Dedza in Malawi arose directly from the training which he had received and the subsequent use which he had made of it, and indicates that it was successful in his case.(ITDG 1988)

Where the products are primarily useful for other productive purposes, as is particularly the case with blacksmithing, the widespread use of locally produced tools is an indicator of their value and the contribution made by their producers to the local economy. Following the successful introduction of the Manie smiths to the making of hammer heads, correctly hardened and tempered chisels, plane blades and other tools, the immediate demand for these products by consumers and the interest from other practitioners in acquiring the new skills indicated success in meeting a local need and in exploiting a market opportunity (to the financial benefit pf the smiths).(Poston,1989) The UNDP/ILO blacksmithing project near Dacca in Bangladesh is a good example of a project where the primary purpose and therefore also the main indicator was the improvement of the smiths' income, though other producers also benefitted through improved access to tools. Handmade tools are successfully selling both locally and to the urban formal sector market in competition with imported industrially-made Chinese tools, the price of which they are undercutting by over 50%. In this case technical and marketing improvements were reinforced by the introduction through credit facilities of grinding machines which

permitted a great improvement in the quality of finish given to the tools.(Uddin 1989)

As in the case of the Bangladesh blacksmiths, a discernable improvement in the quality of the product is measurable, and has several benefits including increased suitability for function, increased artisan confidence, greater competitiveness with industrially produced items and an increased income for the maker, and results in less outflow of cash from the village, a possible nett cash gain and sometimes even a saving of foreign exchange, all of which are indicators of success, though some are difficult to measure..

If a development initiative is truly successful and has become an established part of local practice requiring no further support or participation from the external agent, there will be indications of certain other qualities relevant to the sustenance of the activity. Skills will be developed beyond those which originally existed and those which have been transferred, showing that the activity has developed its own dynamism, the practitioners responding to the situation as it evolves. As part of this process some product development may be looked for, both in terms of existing process or product improvement and of the introduction of new products by the artisans themselves. Evidence of such innovation is a crucial indicator of the potential of the activity to prosper and develop, since it can only do so if it is not confined by the status quo of the practitioners' existing capacity. A prerequisite for innovation is confidence, since it involves the risk of failure. With successful innovation and subsequent consumer response comes a level of pride in the maker's ability. If an initiative is to be considered successful there must be no dependence upon any external agent or artificially sustained condition; self-confidence, pride and the ability to use the existing capacity as a basis for innovation indicate this state.

Where sufficient market and raw materials are accessible, the dynamic independence described above will demonstrate itself through the duplication of the activity, either through the training and subsequent release of apprentices, or through imitators. While imitation may result in a faster spread of the activity, apprenticeship will bring about a surer dissemination of the skills involved, and therefore of the requisite quality. Imitation without training does carry a risk of a degradation of the skills and of product quality, which is eventually likely to damage all

those involved in the activity. An indicator of success, therefore, is not only the extent to which the capacity has spread, but the degree to which quality has been maintained through this process. Where it has been possible to develop a self-sustaining mechanism to maintain the quality of any duplication the long-term health of the activity will be more assured.

An ultimate indicator of the success of a development initiative is the subsequent autonomous development of local systems concerned with particular aspects of the activity. Such systems might include group action to improve access to raw materials, credit or markets, the growth of sub-contracting or the development of some form of professional association. An example of the last point arose at Manie, where the group of smiths evolved into the "Comité du Cadre", concerned with the further development of the group and the improvement of standards and trading relationships. Such actions demonstrate the changed manner in which the practitioners have come to view themselves and the possibility of affecting their own situation. This change in their attitude also manifests itself through a healthier relationship with external agents, who come to be regarded as supportive colleagues or associates with whom issues are discussed, as opposed to donors on whom the responsibility for change is seen to rest. A further indicator of the changes in the self-image of the participants and the manner in which they conduct themselves and their business is the change in the way in which they have come to be regarded by people outside their immediate activity, particularly those in authority or controlling resources.

While some indicators are more precise than others, and the occurrence of them will depend upon the circumstances and degree of success, it should be stressed that all are inter-related. Excessive reliance should not be placed solely upon quantifiable indicators, since these can be misleading. Fundamental success is demonstrated by the growth in self-esteem resulting from the growth of capability.

6: THE WAY FORWARD.

This thesis has essentially proposed a new methodology for artisan-orientated intervention. This final chapter summarises the implications and recommendations for implementing agents.

THE MANNER OF INTERVENTIONS.

The easy assumption by external agents of the responsibility for making an intervention is a matter for grave concern, since in many cases the comparative ability of the agent and the client to be making appropriate decisions lie clearly in favour of the client. However, since the resources and therefore the control lie with the agent, who is unlikely to recognise his or her lack of qualification, the client is likely to remain marginalised. Interventions which follow this pattern are likely to create minimal benefits, particularly in the long term, and are also likely to have negative effects. If the role of the agent is that of a conduit for the needs, wishes and intentions of the target group the responsibility is not assumed in the same way, but remains as far as possible with those who will benefit or suffer from the effects of any consequent change. The key players must be the target group, not the external agents, and any intervention must be justified solely in terms of the needs of the target group.

The results of any intervention need to have two key characteristics, sustainability and duplicability.

The need for sustainability is obvious, since a beneficial development which does not endure is a waste of everybody's effort, time and money, and will be a negative experience for those whom it was intended to benefit. In the case of entrepreneurial activities profit is a necessary component of sustainability, since without it the business will fail. Romantic or doctrinaire attitudes imposed upon the realities of a commercial activity in a marginal economy are an indulgence on the part of those concerned and will not contribute to the continuation of the enterprise. Sustainability is even more frequently undermined by the selection of inappropriate components for an enterprise which are either financially unsound or which cannot be sustained without continued external support.

The extent of the problems facing rural Africa and the scale on which they exist make projects which only affect small groups quite inadequate. Since a depressingly high number of interventions have no lasting benefit the need to maximise the impact of those interventions which are beneficial is extremely urgent. As has been discussed earlier, large scale interventions are generally inappropriate, particularly in the context of

small and micro enterprise. In order to have a significant impact any intervention should be specifically designed for duplication without the need for additional external input.

Given the significance of the activity of part-time blacksmiths in rural Africa, if the consolidation of each workshop requires individual external support they will remain marginalised, in spite of their growing relevance in a changing economic environment. If such workshops require some input in order to survive, let alone to improve their service to the community, but individual attention is impractical, then this vital resource will be lost unless the mass of workshops can be affected without being contacted directly by external agents. The concept of entrepreneurial 'packages' created by external agents is not sufficient, since by their nature each 'package' is likely to require individual installation and support.

Where an intervention and its component parts are entirely appropriate the potential exists for autonomous propagation, the input being adopted and spread by practitioners and would-be entrepreneurs without any further reference to outside influence, to an extent where the original input may be judged to have had a significant effect in relation to the scale of the problem. The carrying out of interventions which have this specific goal in mind has the great virtue that the input is immediately subject to choice, editing and adaptation by those who will use it and be included among its beneficiaries. If the original intervention was inappropriate it will not propagate in this manner, automatically limiting any damage it might otherwise do if it were artificially spread by continued external support. A good example of such propagation exists in many of the projects which have developed and promoted fuel-efficient cooking stoves such as the Jiko stove in Kenya. Following seminal work by the Intermediate Technology Development Group and other organisations these stoves are now the province of the commercial sector, enjoying huge success due to their economical peformance and the associated improvement of the domestic environment. It is worth pointing out that the styling and working of the stoves relates closely to the far less efficient stoves that were previously in local use; the changes were kept within the limits of what people were accustomed to, and were therefore more readily acceptable.

Unless an intervention has clearly defined objectives which can be fully justified and correspond with the needs of the target group it is likely

to be unfocussed, ineffective and potentially harmful. Every component proposed as part of the intervention must be carefully examined to check that it does indeed serve the objectives. It is very easy for the immediate strategy to dominate and redirect an intervention, particularly where the orientation of those making an input leads to an obscuring of the objectives.

In a paper-making project run by a missionary organisation near Feni in Bangladesh, which was intended to generate income for destitute women, the concern of the external agents to produce desirable products gradually dominated the decision-making process. The choice of capital equipment was influenced primarily by the product quality which would result rather than by the employment created, where a poorer but more labour-intensive product might still have been saleable and have met the income-generating objective more fully. In the same way processes were subcontracted to urban commercial firms for the manufacturing of more sophisticated products where the externally added value was far greater than the value of the paper material made by the women. Rather than analysing what skills the women could aquire and what processes could be carried out in-house and then designing around them, knowing what the threshold of quality was in the market place, the agents had become excessively concerned with the quality of the products which could be produced, for their own sake. If the objective of the project was to generate as much income as possible, every production decision should have been taken with that as the only yardstick. While a few employment opportunities were lost by the installation of powered pulping equipment the more serious impact was that the whole operation could not be duplicated by those requiring an income at this level; if a group of women left the project after a couple of years it would not be possible for them to viably reproduce the activity.

The Target Group of an intervention are those whom it is the objective to benefit. This group and the manner in which they are to be benefitted should be clearly defined. The Client Group are those with whom the intervention will be made, in order to achieve the objective. These two groups are not always the same people, as has been discussed earlier. Confusion between the two is likely to produce results which were not intended and may negatively affect the relationship between the two groups when their identity does not coincide. On other occasions the client group themselves constitute part of the target group. An example of this

is in a current ITDG project concerning Bangladesh (N10) where the principal target group is the rural poor consumers served by the blacksmiths, the client group, who, being landless poor themselves and large in number, also constitute a target group for whom the objective is income generation.(ITDG 1990)

Given the disadvantages under which women in developing countries suffer their needs should be prioritised whenever possible, giving them special status within any broader target group.

If any development is to be sustainable it must be based upon a thorough understanding of the context in which it will occur. In almost every case where inappropriate inputs are made it is due to assumptions arising from a lack of understanding of the context.

It is therefore necessary to respect the knowledge of both target and client groups, and to work as closely as possible with them in order that their knowledge guides the intervention and maximises its appropriateness. The norm within donor-dominated projects in the past has been to rate the expertise of the expatriate highly and to give less credence even to equivalently qualified nationals, while local people without formal qualifications were largely dismissed as having almost nothing of significance to offer. As has been discussed earlier, such judgements arise out of the prejudice of those in control who value their own form of knowledge most highly and are frequently incapable of recognising the validity of different forms, particularly when these are unmeasured. The example from Malawi of the regulation whereby a qualified technical instructor with no blacksmithing experience had to be recruited to work with traditional smiths in spite of the existence of unqualified but more suitable practitioners exemplifies this.(ITDG 1988)

Since an intimate understanding of the context of an intervention is essential it is desirable that project staff should be nationals wherever possible. More than this, they should be chosen for the genuine relevance of their knowledge and their ability to communicate with the target group, rather than solely upon any formal qualifications. Additional training can be given to project staff if there are specific deficiencies. In the case of interventions in such activities as blacksmithing this means that project staff should include traditional blacksmiths in preference to formally trained instructors. The experience and understanding of an

instructor used to teaching young men in a technical institution may be a disadvantage when working with mature practising skilled smiths. Institutional attitudes can also be inappropriate in this context. On an ITDG-organised training course for Malawian institutional instructors at the Glen Forest Training Centre, Harare, in 1989 one trainee instructor objected very strongly to eating the same food as ordinary trainees at the centre in their company, since he felt this to be demeaning.(ITDG 1989) Such an attitude of superiority is totally irreconcilable with a respect for the existing knowledge of those with whom one is working.

While subconscious prejudices may lead those controlling interventions to feel confidence in formal qualifications, a goal should be the use and development of existing practitioners to carry out any direct training work. For example, an intelligent and skilled practising traditional blacksmith can be taught new technical and didactic skills. His experience makes his perceptions extremely valuable, and he will be able to communicate with the client group on an equal and unequivocal footing. The training of such a local instructor has the additional benefits of developing a training capacity which it may subsequently be possible to retain within the community and of validating the knowledge of all the local smiths rather than denigrating it by importing the resource. A similar approach should also be taken to other functions within an intervention.

Since the aim in this case would be to train practising rural smiths, one of their number should be able to fully absorb all that it is necessary for them to be taught, and how to teach it. If it is felt that a more knowledgeable or skilled instructor is needed it is likely that the knowledge which it is intended to transfer is excessive and inappropriate. Discussing business training for micro-entrepreneurs, Mark Havers of the Durham University Business School pointed out that if one needed three different specialists for the purpose then obviously too much was being taught for one entrepreneur to absorb. Clearly one instructor should be able to convey the knowledge which must be retained and used by an entrepreneur carrying out all the business functions himself.(Havers 1990) Extending this argument, it should be possible for one instructor to transfer all the different technical and entrepreneurial skills and knowledge required by a self-employed artisan; if it is not, then clearly too much is being required of the artisan on the receiving end. When the blacksmiths of Manie decided to pass on the knowledge which they had

acquired to other smiths within their area they were very effective, imitating the instructional methods with which they had themselves been taught. Although they enjoyed the prestige, the gaining of which encouraged them to share their knowledge, their social relationships did not permit them to patronise their peers.

Since a detailed understanding of the context is essential the first action which must be taken prior to an intervention being initiated is a thorough base-line study of the status quo, particularly of the target group, including social and economic factors and related existing practices. This study should form the basis for the establishment of objectives and be the yardstick against which all the effects of the intervention should be measured. Without such a yardstick it is impossible to gauge the effects of an intervention, and thus to estimate their appropriateness or to subsequently tune the intervention accordingly.

Interventions concerned with the development of manufacturing enterprises, whether for their own sake or for the benefit of a third party, should be guided by careful research of both the markets for the goods and the artisans' access to those markets. Whether the target group is the artisans or the consumers, it is the existence and scale of the market which governs the limits of success for an intervention. Even if markets do exist it is of no use to the artisans if they cannot get reliable and independent access to them.

A project run in Bangladesh by the Bangladesh Small and Cottage Industries Corporation and the International Labour Organisation(Uddin 1990) helped highly skilled rural blacksmiths to develop alternative products such as Northern-style carpentry tools with a ground finish. However, there proved to be a limited market for these tools which were of a pattern not normally used in Bangladesh and for which the principal market is urban, in addition to which the limited working capital of the smiths meant that they had difficulty reaching these urban markets and were very much at the mercy of local merchants, who bargained accordingly. Appropriate market and market access research would have allowed the project to better fulfill its objectives.

Opportunities which exist for the penetration of markets outside the community offer the benefit of inward cashflow and should therefore be exploited. However if a local demand for the skills exists this should be

given priority, since the direct support of the rural community is most important. Assisting the development of access to services for the community and to income for the artisans is more useful than only the latter, unless there is a particular need for the community to have varied sources of cash income. Where the local economy is very vulnerable to natural disasters such as floods or droughts which can destroy the agricultural basis of the community's economy, a source of income which is independent of agriculture and the consumers of the local community whom it supports offers some protection against destitution. An example of this is the more than 150 women who sell poor quality pottery to tourists on the Beitbridge road south of Masvingo in Zimbabwe. Though they make few sales and little money it is a totally different source of income from their land, which only receives sufficient rainfall for a crop every three or four years, so the pottery justifies the considerable effort necessary for such small returns.

An important element of understanding the market is a knowledge of acceptable and desirable quality in comparison to price. There is invariably considerable knowledge regarding these factors among target and client groups, as well as among any remote consumers who are not target or client, which should be tapped. This also applies to the processes of manufacture. Normally the closer that any transferred technique lies to existing local practice and skills the higher the quality of the product will be, since this minimises the proportion of new skill required. The opinions and perceptions of both producers and consumers regarding process analysis and selection will offer a valuable guide to the process likely to be the most appropriate, even when a new product requiring unfamiliar techniques is being considered

All technical interventions should make the local technical status quo their starting point and then work to find the means by which the product can be made with the least input and change. Although this is an obvious point to repeat, the majority of external agents approach interventions with an image of the point, familiar to them, which they wish the artisans to arrive at. The two are not normally compatible. In addition to the other arguments against traumatic change from the familiar to the transferred, there is also the risk that the recipients of a transfer which is significantly alien may subsequently perceive technology as something which can only come from outside the community. Enterprise development which reinforces attitudes of dependency is self-defeating.

This researcher is convinced that the first priority for intervention is to work with existing artisans in order to consolidate the existing base of appropriate skills, on which subsequent rural manufacturing development can be based. However, this does not preclude the training of initiates, for whom the appropriateness of inputs is quite as important as it is for their practitioner elders.

APPROACH TO TRAINING.

The majority of skills training in Africa is carried out in technical institutions modelled upon their Northern equivalents and is principally concerned with Northern qualifications. Blantyre Polytechnic in Malawi, for example, has a significant complement of British lecturers carrying out their tasks in the same way that they would in the UK. The Northern pattern of technical education is designed to provide appropriately trained labour for modern industry, which it does moderately well, and fulfills the same purpose in Africa to a certain extent. However, the general application of this type of training fails to recognise that for many trainees it is inappropriate, particularly where they will pursue artisanal trades. The majority of artisans in most of Africa will work in the informal sector, both rural and urban. In the rural context particularly they will be working in a pre-industrial context for which industrially-orientated training is of minimal use. An example of this is Mudikosi of Vanga, Zaïre, who spent three years learning metalwork at the Institut Technique de Kikwit, two years being entirely concerned with machine tools. There was subsequently no work for him unless he migrated to Kinshasa, where prospects would be very uncertain, so he chose to retrain as a blacksmith under the tutelage of the traditional smiths at Manie. Not only are many of the curricula inappropriate but even when the subject matter could be of vocational use the equipment of the institution is normally of a type which any trainee going to work in the informal sector is never likely to see again. Many graduates have considerable problems adjusting to this extreme difference in resources.

This now even applies to hand tools. In many institutions graduates would once have been presented with a tool kit, but this is now an almost universal impossibility for financial reasons. Aaron Moore's work with ITDG has successfully introduced the making of their own tools to many

carpentry students, but is hampered by students' perception that wooden carpentry tools are second-rate, since they were trained originally on imported steel tools. Where institutions understand the significance of these factors and alter their policy concerning workshop equipment the benefits for trainees are considerable. At Silveira House, an independent training centre near Harare, the woodworking and blacksmithing instructors are now adamant in their refusal to have any purchased tools among the equipment, since they believe that it would undermine the appropriate self-sufficiency to which their trainees become accustomed.

Any intervention concerned with artisanal training for rural manufacturing is likely to recruit formally qualified instructors who will come conditioned by their training and understandably proud of their professional knowledge. Faced with the needs of practising or would-be rural artisans they will apply to the problem that which they have learned in their institutions, perpetuating the inappropriateness of input and guaranteeing the inefficacy of the intervention, to the detriment of those whom it was intended to benefit. The decisions which lead to this situation are made by others trained by Northern standards whose judgement has been similarly misdirected. Frequently there is donor influence from ex-patriates who are not only qualified in the North but whose experience in an industrial society has convinced them of the value of their training and knowledge, allowing them to insist upon the virtue of their conventional wisdom. In all of this, reality remains unnoticed and unacknowledged as the underlying bias that White is Right persists.

If adherence to Northern training systems is inappropriate for both practitioners and future instructors, the training in the North of technical instructors and decision-makers is even more inappropriate and unhelpful. Northern institutions have a very limited knowledge of the conditions to which their African graduates will return and are likely to reinforce the credibility of Northern solutions. The expectations raised by such a period of study also encourage understandable ambitions which can only be met by finding more elevated employment than working as an artisanal instructor. There are certain professional areas and certain levels at which foreign study becomes desirable, but for those who are being trained as artisanal instructors it is inappropriate and distracting. If the necessary training resource only exists outside the country it is better to use the funds to develop it in-country so that it then becomes a local resource from which far larger numbers can benefit, rather than for

counter-productive foreign study for the few. Where training cannot be accomplished within the same country the use of a compatible context elsewhere within the region is highly preferable to training in the North.

Within any intervention there should not only be the immediate objective but also the intention to support and build the local capacity to achieve such objectives without ex-patriate assistance. It is therefore important that local institutions should be fully involved in all interventions, assisted by any external agents who may be necessary (or whose presence is an obligatory condition made by the funders). However, since many training institutions may adhere to the pattern outlined above, it should not be automatically assumed that they are the most suitable collaborators on interventions concerned with the sustenance of rural manufacturing. It is important to consider the possibility of working with institutions who are closest to the need or the client group rather than with institutions who appear to fulfill the right function. In the case of the work done with the smiths of Manie it was facilitated and supported by the Lusekele Agricultural Centre which had never previously concerned itself with artisans, but recognised their significance to the Centre's target group. This concern with the objective, without prejudice about the best manner in which it might be reached, allowed the intervention to develop naturally under the direction of the blacksmiths themselves.

The further training is removed from the context in which it will subsequently be applied the greater is the risk of acting upon mistaken assumptions, and the more likely it is to raise unrealistic expectations.

If an instructor works with a group of trainees under a tree or a thatch similar to the workshops which they can aspire to he is less likely to introduce equipment or techniques which are inappropriate. If the same instructor is equipping a centralised training workshop he will install whatever convenience equipment he is able to, which he will then teach the trainees to use. If the employment outlook for a trainee is as a village artisan with minimal equipment, training him in a conventionally equipped workshop with basic power tools places him at a disadvantage when he tries to work under his tree without those facilities. A frequently heard argument against in-context training is that it is logistically too difficult to carry all the equipment necessary for training into the field. This is true if a conventional training workshop is to be transported. However if the in-context training is to be appropriate there will be a

minimal amount of equipment to carry. In the village context each trainee should be taught to make as much of their own equipment as possible, since they are otherwise likely to lack access in the future. All that is therefore required initially is the most basic set of tools with which each trainee can, from the beginning, create the workshop equipment and tools with which they will subsequently be able to start their professional life. In order that the trainees confidence in the tools they make should not be undermined it is essential that the tools with which the training course is initiated should be identical to those which they will learn to make.

Just as the introduction of any development must be self-sustaining if it is to have a significant effect, so the support of rural manufacturing requires the development of an appropriate training capacity as close to the location of need as possible. If training is centralised it will inevitably be remote from the needs to which it relates, the training skills not belonging to or under the control of the communities which they should serve. Since some degree of grouping of training resources is inevitable, care should be taken that such centres are kept as close to their clients as possible, certainly being located in rural areas, and that the various tiers of training structure reach right down to the village level. Dependency upon remote institutions, particularly foreign ones, weakens the community's ability to develop itself.

Devices whereby trainers at all levels remain in close touch with the communities they serve by spending time working there rather than merely paying occasional formal visits are highly desirable. The work for which people are being trained is dirty-handed; it is important therefore that the instructors are seen to be dirty-handed also. One considerable barrier to adopting this approach is the lack of motivation of many instructors. Since these instructors are the products of formal education, with expectations to match, a clearer understanding is necessary of what constitutes fitness for purpose in a trainer.

Traditional artisan training, both in Africa and the North, is by apprenticeship. Among the advantages of this system are the perpetuation of specialised local knowledge, the development of relevant practical skills, the ability to solve problems in relation to their context and social appropriateness; the apprentice becomes fully integrated with his or her context. Among the disadvantages are the difficulty with which

developments of knowledge or skill will enter the system and the restriction of knowledge within social groupings. A training system exploiting the virtues of the traditional while improving access to knowledge originating externally would therefore be appropriate.

Extension training is well-established in the agricultural context in various forms, and is equally relevant to rural manufacturing. In the context of artisans occasional visits by a peripatetic extension agent are not likely to prove sufficient. A more appropriate means is to make inputs to a number of selected and motivated practitioners who are clearly identified locally as the "masters". Extension input and specific training is then provided to these masters who in turn support and train practitioners in their locality in an extended form of informal apprenticeship. This constitutes the establishment of a local training capacity and has the advantage that, although new knowledge is entering the community, the majority of basic training will be done by locals rather than by external agents. In this way the ground covered and the number of people affected by the peripatetic trainers is far greater than for a similar amount of money spent on centralised training, even allowing for payment to the masters, should this be desirable. In addition, the closer to the practitioner level that training skills are developed, the more likely they are to remain within the community. The initiation of the concept of the "Centre Technique de la Forge Traditionelle" at Manie was based upon this approach, as is the proposal for artisan training in Luapula Province, Zambia by the Development Technology Unit of Warwick University.

The practising or intended rural artisans are the consumers of the training, so it is logical that all inputs should be accurately tailored to their needs in both nature and manner of delivery. In addition to the need for technical training there is a need for knowledge in related areas, particularly entrepreneurial. However, the enthusiasm of specialists in particular subjects tends to inflate the amount and type of information considered necessary for the practitioner. It must never be forgotten that all the knowledge necessary to manufacture products and conduct the enterprise will be the responsibility of just one person, the artisan. One way of restricting the overload which training may attempt to place upon the practitioner is to use only one instructor for all training inputs relating to the enterprise. If one instructor is not able to retain all

the relevant information, the artisan trainee will certainly not be able to.

To assist the absorption of appropriate entrepreneurial knowledge and to ensure its relevance to subsequent practice the teaching of it should be integrated with the technical subject to which it relates. In this way when a piece of raw material is picked up in the workshop its value is automatically mentioned and seen as an integral part of its recognition. Time spent on work should also be recognised, so that at the end of any manufacturing training exercise there exists both an artifact and an awareness of its cost and commercial value. If (minimal) records are also kept during the training period, and the tangible products of the training are marketed as an integral part of the exercise then all the necessary inputs can be covered as an organic whole. This approach has been successfully used in Zimbabwe and Malawi by ITDG in the training of both rural practitioners and instructors. Among other measures the curriculum of the short courses run by ITDG's local partners includes a couple of "Production Days" whose results are measured, different practices and products are quantified and compared, the results of the two days, one at the start and one near the end of the course, also being compared. Additional working in spare time in the evenings or at week-ends is also encouraged, and the proceeds of the trainees' industry belongs to them.(ITDG NOV 1990)

Autonomous propagation requires knowledge and the means of its independent communication. This must be the object of all training and training systems if significant development of rural manufacturing industry is to occur.

IMPLICATIONS FOR INTERVENTION AGENTS.

Development is a process of gradual growth, as opposed to the introduction of sudden change. Where specific targets exist, progress towards them should be incremental, evolving from small changes. However, because the majority of interventions and projects are concerned with a specified end result the design of the intervention is worked back from that point, so achieving the target inevitably dominates the thinking of the external agents. The process by which the target is reached is therefore given

less importance, and is likely to suffer from pragmatic action taken to promote the achievement of the target. This tendency is exacerbated by the common use of short-term contracts, particularly for managerial and specialist ex-patriates, whose cultural conditioning is that of tangible achievement and whose future careers depend upon measurable successes achieved within limited time-frames. Short-term contracts not only affect the approach of the staff concerned, but, where project duration is longer, cause considerable disruption through change-overs and the consequent re-evaluations and re-ordering of priorities. It is significant that, among ex-patriates, missionaries are much more likely to be involved in long-term evolutionary development work than their Northern NGO colleagues, since their time horizon is far longer and there is not usually the same career pressure. They also have a greater opportunity to understand the needs and priorities of those with whom they are working.

If rural manufacturing is to develop in a sustainable manner the time-frame of interventions must be longer than the short projects and contracts which are currently the norm in order that the process of development can be given the care and attention that is necessary if any target achievement is to be sustained in the long term.

Because donor control and influence is powerful among the partner NGOs who are the intermediaries of a great deal of financial aid, the target orientation of the North is frequently imposed within and through them. In many cases ex-patriate 'advisors' dominate and emasculate the local director, driving forward for short-term achievement. While local staff are also likely to be conditioned to achieve by their Northern-style education they are at least likely to be involved for a longer period, though the frequent professional musical chairs due to shortages of skilled personnel and political shifts commonly negate this advantage. Ex-patriates whose professional experience, cultural conditioning and need to achieve leads them to be directive within a development context are counter-productive, since the results of their influence are not sustainable. Intervention agents should avoid the directive attitudes which characterise the North's patronising contribution to development, and should avoid placing ex-patriate personnel in positions where they will be able to undermine sustainability.

Within projects the use of artificial components which cannot be sustained socially or commercially must be avoided at all costs, since unsustainable

external support within commercial mechanisms distorts the results and leads to the collapse of the system when the support is withdrawn. The avoidance of non-sustainable inputs is likely to frustrate those who measure success over the project period rather than waiting for at least five years after the end of the project to measure its success, but will lead to far less frustration on the part of the subjects of the interventions.

Access to credit is frequently presented as a major constraint upon the development of small enterprises, including rural manufacturing. While the unavailability of cash resources, particularly for working capital, is a barely surmountable problem for many artisans, the careless provision of credit can be every bit as damaging as the lack of it. Where excessive loans are made available the economic balance of an enterprise can be threatened and the capacity of the artisan to manage resources exceeded. In addition to this, conditioned attitudes of dependency can promote non-repayment and the diversion of funds, exacerbated by the pressures of the extended family. The availability of credit is essential to the development of rural manufacturing, but the scale of the credit must be strictly realistic, in proportion to the enterprise concerned and its ability to sustain the loan. Also loans must be only a component within a more complete support, ensuring that technical, entrepreneurial and marketing skills are also sufficient for the purpose for which the loan is given. The provision of credit must be sympathetic and careful, serving the purpose of development without being a non-commercial and therefore non-duplicatable intervention. Carelessness and a lack of attention to the context on the part of the provider of credit risks the destruction of the enterprise.

Since existing practices and practitioners exist within the contextural status quo, they also define it. It is therefore essential that the nature of and reasons for the practices are well-understood by any external agent. This understanding must also extend to the social, technical, environmental and economic constraints which have determined the limits to the growth of the activity. A clear recognition of the resources, pressures and constraints encourages respect for the practitioner and his or her capabilities, which forms a sound basis for future collaboration leading to sustainable growth. Compared to the external agent the practitioner is in an incredibly weak and vulnerable position, and is painfully aware of the fact. The basis of any partnership is respect;

without partnership there will be no sustainable development. It is therefore vital that the external agent respects the practitioners, and shows it clearly, in order that the partnership may be one of equals. It is equally important that the external agent approaches existing practices with respect and in a spirit of learning, since the practices are often in balance with the other components of the enterprise. An example of this was an early blacksmithing pilot project supported by ITDG in which the problem of soft-wood charcoal requiring more air in order to burn sufficiently hot for forging was responded to by the development of an inappropriate turbine forge fan which was never subsequently imitated, because of capital cost and complexity. It then took two years to prove clearly that a well-constructed pair of traditional goat-skin bellows was quite sufficient for the task, and therefore to be able to discard the engineered design.(ITDG,NOG,1988)

A lack of respect indicates a conviction on the part of the external agent that he or she possesses knowledge superior to that of the practitioner. Being an assumption, this will lead to errors of judgement which the agent is in a position to impose. These errors are most likely to involve the agent's perception of what is appropriate.

Given that an artisan's ability to innovate is fundamental to the survival of a rural manufacturing enterprise, and that innovation requires risk-taking, which requires self-confidence, the development of the confidence of practitioners is fundamental to any attempt to develop their activity. Confidence involves self-respect, which is most easily damaged by a lack of respect on the part of others. The simplest and most basic attitude of the external agent therefore enables or undermines the potential for sustainable benefit from the whole intervention.

The clear establishment of what practice or hardware is or is not appropriate in a particular situation would appear to be straightforward, but is rarely achieved. There are many ways in which input or suggested practices may be inappropriate, involving cultural, social, gender, environmental or other factors, but the most frequent error lies in the relationship between the capital cost of an input and the income-generating potential of the market for which it will be producing. If the cost of capital equipment is disproportionate to the income which it will generate the business will not be sustainable and, if credit is involved, is likely to saddle the entrepreneur with unredeemable debts. Since the

markets accessible to rural manufacturers are normally rural themselves and therefore extremely limited in cash terms, their ability to support the capital investments of enterprises is correspondingly limited.

External agents whose short-term goals are to create business start-ups frequently start from a product idea. While the product might be useful and desirable to the market, if it is not within the means or of a high enough priority of sufficient people its production will not be viable. While this is obvious, encouragement to enter production which is not market-led is commonplace.

In order to counter the entrepreneurs' recognition of economic reality capital investment is often heavily subsidised or even provided free. While this enables the external agent to "score" by creating or developing an enterprise the achievement is extremely limited, since it cannot be duplicated without similar subsidy. It is also not uncommon in such cases that the business turnover is not sufficient to meet the costs of consumables or maintenance, should spares even be available, resulting in the subsequent abandonment of the equipment in question.

Even more frequent are attempts to improve the quality of an existing product through the introduction of improved capital equipment or the use of additional techniques and artisan time. Although the practitioner and his or her customers are likely to be fully aware of the virtue of the improvement it is often the case that the resources of the customer do not permit the option of buying the better quality item, because of its higher cost. Practitioners are therefore left with the option of continuing to manufacture at the lower quality which customers can afford or improving their quality but continuing to sell at the lower price. The latter option subsidises the customers' access to better quality, but has the compensation that the better quality goods will sell more quickly than the lower quality competition. Therefore practitioners who are in a position to vary the quality of their output according to market demand sometimes do so, improving product quality as the competition increases. This is particularly evident among the better tinsmiths around Harare. The departure point for the assessment of the economic appropriateness of a product or process is the market demand and purchasing power.

Whether or not entrepreneurs are in a better position than external agents to judge what is appropriate it is important that they should be allowed

and encouraged to make the decisions, since the the making of comparative choices, Analytical Decision Making, is an essential entrepreneurial ability. External agents should minimise the number of choices which they make on the entrepreneurs behalf, since decisions involve risk and it is the entrepreneur who will be taking the risk. Where technical input is involved it is highly desirable that the presentation of a single possibility is avoided, since this gives the practitioner no choice of appropriateness. One design of equipment or a single method of process suggests that, backed by the authority of the external agent, this is the only way in which the thing can be done. By contrast, if several options are presented to the artisan with the appropriate back-up information, he or she will be in a position to make an informed choice which will minimise the risk of an inappropriate solution based on false assumptions being imposed by the agent. This approach encourages an understanding of the fact that there is no single way to reach a desired end and that technical solutions can therefore be adapted or developed locally by the practitioners themselves.

There are inumerable examples of the "Good Ideas" of external agents which, being introduced, have turned out to be disasters for those they were intended to assist. It is easy to ascribe such failures to the inadequacy of the agents concerned and to continue in the belief that one's own projects are sound, based on reason and target group input rather than inspired assumption. "Good Ideas" are easy to identify in others but very difficult to recognise when they are your own. For this reason accurate base-line studies and subsequent careful broad-reaching monitoring are essential in every case. Although monitoring and evaluation are expensive they are cheaper than continually repeating the same errors, and are some small protection for the intended beneficiaries. In most projects the monitoring ends with a final evaluation at the end of the active project period. If monitoring is to have real value, showing whether interventions have truly worked, it is important that subsequent follow-up monitoring be carried out, perhaps two and five years after the active project has ended. Africa is full of the shadows of development projects which were counted as successes when the agents departed at their completion.

If development interventions are to have any value their effect must be indefinitely sustainable. Since the problems which interventions are designed to meet recur so frequently, a development which is individually sustainable but which cannot be duplicated is insignificant. If the

duplication of a development depends upon the provision of the same inputs by an external agent each time, the change which can be achieved is also insignificant in the face of the scale of the problems. If significant change is to result from an intervention the development itself must become the agent for change. It must be sustainable and, more than duplicatable, once established it must be capable of autonomous propagation. If the development is not sufficiently appropriate and beneficial, to the extent that people will take it for themselves, it is unlikely to prove significant in the long term. If the change is too sudden, too expensive or inappropriate in other ways people will not adopt it even for the time required to test it, so it will fail. All the parts of an intervention should be designed from the start with the purpose of enabling and encouraging autonomous propagation.

To permit sustainability and autonomous propagation rural manufacturing developments must be incremental, must not demand great change or significant risk on the part of the practitioners, and must involve a cost low enough to make them widely accessible and viable.

CONCLUSION.

In this thesis I demonstrate that there is considerable potential for the development of rural manufacturing in central Africa, but that it lies within the existing structures of practice rather than in the introduction of Northern systems and practices which normally involve radical change and the inappropriate use of capital.

The fundamental purpose of consolidating and developing rural manufacturing is shown to be the support of agriculture and the agricultural community. This thesis has taken metalworking as its particular focus because the role of rural blacksmiths in providing capital equipment for local agriculture and income-generating activities is of vital significance, particularly in poorer economies. I show that, contrary to popular opinion, traditional blacksmithing is still common in central Africa and constitutes an important resource for rural development and industrialisation.

I demonstrate that the commonly assumed dominance of imports and large-scale manufacturing is undermined by the lack of foreign exchange, standardised production inappropriate to local conditions, distribution difficulties and the need for repairs which can be carried out locally. The contribution of the two systems for the production of metal goods to rural income generation and development is also compared. Rural industrialisation is shown to be the most beneficial.

Examining the viability of rural manufacturing, I point out that the existing structures of rural manufacturing practice reflect the prevailing conditions under which production takes place and that they therefore contain features which are fundamentally appropriate to their context. This thesis therefore proposes an approach to intervention which capitalises upon existing skills, practices and social relationships rather than requiring the development of new practitioners, skills and social relationships and shows that by working with existing structures and skills rather than undermining them the sustainability of the enterprises which are developed is greatly enhanced.

It is shown in the thesis that the majority of traditional blacksmithing is carried out by farmers who are part-time smiths, some of whom are more active than others. A part of the communities they serve, they take advantage of scrap material, respond to local conditions and preferences and conserve resources by their important repair activities. Money spent

on their products remains within the community. The evidence shows that external agents concerned with rural industrialisation generally dismiss the significance of the activity due to it being part-time and having a very low profile, and instead attempt to create full-time enterprises which are unlikely to be viable in rural areas and which ignore existing cultural patterns. Northern entrepreneurial attitudes and an assumption that rural communities are fully integrated with the cash economy further decrease the penetration and sustainability of external efforts.

An important proposition of the thesis is that the extent of the problems involved in rural development in Africa makes it essential that developments in rural activities are able to spread of their own accord, being adopted and adapted by the people without any further external assistance. Unless an intervention is designed in all aspects from the beginning for the results to be free-standing and appropriate for autonomous propagation the effort, in comparison to the cost and the scale of the problem, will be wasted. Duplication is frequently referred to as the desirable end, but any duplication which requires the support of an external agent in order to occur each time is unrealistic in terms of improving the situation of the rural population on a significant scale.

Pursuing this proposition I establish that autonomous propagation can only occur if the development takes advantage of the existing resources of rural people and is of a sufficiently small order of magnitude that it constitutes an acceptable level of risk in their economically marginal situation. Such change should be incremental and needs to involve a cost low enough to make it widely accessible and viable, at the same time making sufficient difference to justify the effort. If an intervention seeks to create an activity which requires a substantially new set of skills the development is unlikely to propagate autonomously since it is unlikely to find existing fertile ground in which to grow and is therefore an excessive risk.

Having demonstrated that an opportunity exists for the development of sustainable rural industrialisation which can spread, I examine in detail the existing practices of intervention agents and propose an alternative strategy, showing examples of its success. The principles of the methodology are described below.

In order to work with existing human resources external agents must recognise their value and understand the nature of existing capability. Technical interventions should not contain an assumed technological goal but, starting from existing resources, should be concerned with finding the most accessible way to meet the given need. Using the status quo as the departure point for interventions minimises the distorting assumptions and external values which the agent will bring to the problem and the degree of change to which the participants will be subjected. Since considerable change is inevitable, unnecessary change should be avoided. Agents must respect indigenous knowledge and the appropriateness of it in context.

Even where an enterprise has received external support to develop there invariably comes a time when it is left to its own devices. Since the environment within which rural enterprises exist in Africa is changing very rapidly the ability of the enterprise to change and adapt in relation to circumstances is essential to its survival. Rural artisans therefore need to be flexible problem-solvers, rather than information-based workers. I therefore show how Design and Analytical Decision Making play a significant part in the activities of a small workshop and make an essential contribution to its development.

Adaptation and innovation involve experimentation and risk, for which self-confidence is essential. The thesis examines how the respect with which practitioners are regarded by themselves, their community and any external agents with whom they are working significantly affects their confidence. Thus, again, external agents must respect existing practices and what has been achieved with minimal resources in order to develop the confidence of those whom they seek to assist, rather than impatiently promote the superiority of their Northern knowledge.

Northern formal education systems are prevalent in Africa, and have goals and produce results appropriate to the requirements of Northern industrial and post-industrial societies. I argue that Northern education systems condition graduates to Northern values and systems and therefore affect the attitudes of external agents whether they are Northern or African. Since Northern vocational training systems are designed to provide workers for large-scale modern industry they are therefore inappropriate to the needs of existing or would-be rural practitioners. Small-scale rural manufacturing in Africa is essentially pre-industrial; training for it which forms part of an intervention must recognise this and should be

undertaken in an environment which resembles that of subsequent practice as closely as possible. I demonstrate that established training workshops in institutions bear minimal resemblance to the environment in which rural artisans will work, and should therefore not be used. Training systems which develop the local sharing of knowledge and which relate to the traditional apprenticeship system are more appropriate and contribute to a community's ability to train and develop itself.

The target-orientation of most Northern-conditioned external agents and development interventions is examined, and it is shown that it results in a tendency to be concerned with the achievement of short-term goals at the expense of incremental development which can be sustained and which can subsequently propagate unassisted. The repeated failure of development interventions which succumb to the introduction of unsustainable elements, often minor, is used to demonstrate that actions prompted by short-term expediency result in long-term failure.

This thesis establishes that the human resources necessary for the development of rural manufacturing already exist widely in Africa but that a failure to recognise them has led to attempts to recreate them in inappropriate ways which have failed to produce sustainable results. It is not the resources which are lacking, but an understanding of the ways in which they can be fruitfully supported and developed.

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