

## Problems and Prospects of Technology Transfer in Developing Economies: A Review

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**Abstract:** Large-scale industrialization policies and programs have proved themselves impractical to developing economies due largely to resource constraints. Small and Medium Industries (SMIs hereafter) play an important role in the transformation of developing economies. The globalization of competition and the world economy have direct relation with the ever-increasing rate of technological changes, which in turn affect the competitive position of SMIs. Investment in technology is becoming an important weapon not only to achieve competitive advantage and profitability but also to survive in this turbulent and dog-eat dog global markets. As Developing countries lack the necessary resources, expertise, skills and infrastructure, it is unthinkable for them to come up with new ways of producing goods or providing services. It is therefore wise and advisable to adopt the appropriate technology and management know-how that has been innovated and tested in the developed world. The purpose of this paper is to throw some light on the prospects and problems of technology transfer in developing economies with a special reference to Botswana.

**Key Words:** Technology Transfer, Small and Medium Industries, Developing Economies, Technology Adaptation, Technology Dissemination

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### Introduction

The importance of technology for achieving sustainable socio-economic development is evident. The present high level technological development and rapid globalization in all aspects of life has considerably pressed industrial ventures in African countries to look forward to benefit from the current overwhelming innovations and technological resources. Firms should be able to produce quality products that meet the requirements of customers and in accordance with the current competitive environment. Above all development of indigenous technological capacity is vital. Unfortunately, in their current position, most African countries are not in a position to develop competitive, viable and locally based technological capacity. As an alternative, it may therefore be important to initially go with the adaptation of imported technologies with the notion of developing modified versions suited to local conditions. Thus, the transfer of appropriate technology is a pivotal strategy for achieving competitive advantages. Technology transfer should be appropriate enough and take into account the objective realities of the local culture, level of development, resource endowments and constraints, skill availability, environmental concern and events of the international environment.

Botswana is a developing middle-income country looking forward to achieve sustainable and diversified national economy through developing competitive and dynamic industrial capacity. Small and Medium Industries (SMIs) currently dominate the industrial sector. Therefore, the transfer and adoption of appropriate technology as a supportive measure towards the country's industrialization endeavors is cardinal. It is also an important contribution to the development of indigenous technological foundations. However, the current technology base of most SMIs in Botswana is virtually unviable. Unfortunately, most of them do not have the desired capacity to absorb acquired appropriate technology that is undoubtedly helpful to maintain sustained growth and survival. This

weakness has so far thwarted the growth of many firms. This is more visible especially in those locally owned firms, which do not bother about improving their technology. They still use very old and out-dated technology in their operational activities. The result is just further loss of both local and foreign market shares. On the other hand, some other SMIs have equipped themselves with state-of-the-art technologies acquired with unreasonably huge investment, which is far beyond their normal capacity and market opportunity. This has created a fertile ground for non-growth and bankruptcy. The absence of suitable means of diffusing and disseminating technological information that can help to transfer and adopt appropriate and cost effective technology has also aggravated this problem.

The purpose of this paper is therefore to identify and discuss those factors impeding the smooth transfer and adoption of appropriate, cost effective and competitive technological know-hows and know-whys for SMIs. Hopefully, this will serve as an impetus for the long-term agenda of building indigenous based technological infrastructure. The paper is limited in its scope. It intends to give generic but constructive concepts and recommendations about this important issue. The paper will specifically focus on discussing why the transfer of appropriate technology is helpful for SMIs' development and competitiveness and which infra structural and institutional capacities are determining factors for this scenario.

### Materials and Methods

**The Concept of Technology Transfer :** Technology transfer can be defined in different approaches based on its adaptability and utilization for specific purposes. Before we define the concept of technology transfer, it is necessary to briefly discuss about the term "Technology" from its broader spectrum. Technology is indeed an interdisciplinary area covering the broader (comprehensive) conceptual framework of scientific, managerial and engineering aspects of

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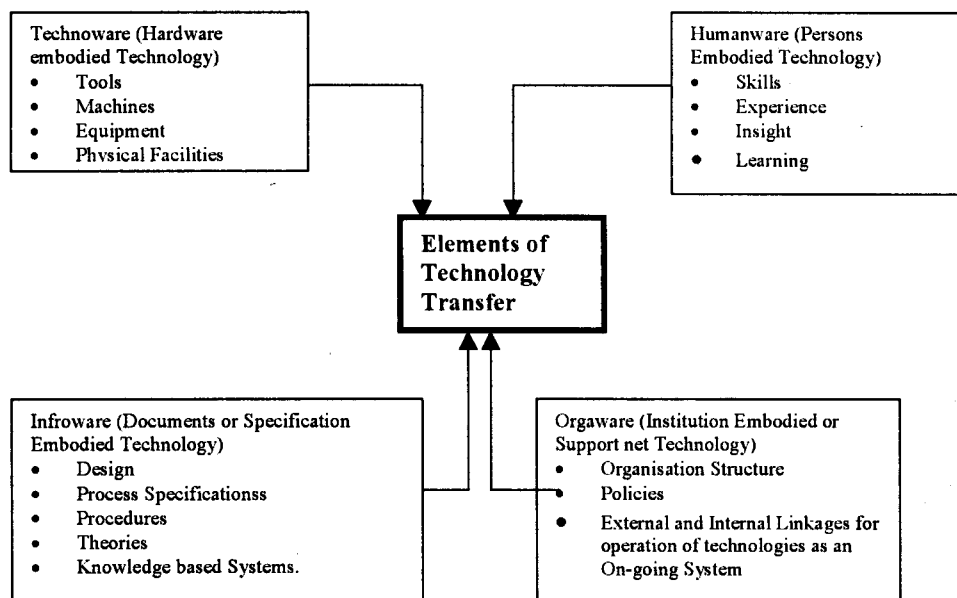


Fig. 1: Transferable Elements of Technology

Source: Adapted from Huria, V. K (2000) and Reformulated by Tesfayohannes, M.,

Scheme or Action Programmes	Objective
Plant and Machinery Procurement Assistance Scheme	To assist SMIs to modernize their operational activities by equipping themselves with modern and efficient operational facilities.
Technological Standards and Improvements Scheme	To help SMIs to enhance their overall technological standard or position
Technical Training and Advisory Services Scheme	To support SMIs to produce quality products at affordable cost by providing training and technical advisory services in the areas of: Industrial promotion and technical competence, Product and process design and control, quality control and production planning systems Technological innovations and R&D promotion
Rural SMIs Promotional Scheme	To enhance, strengthen and expand the operational activities of rural industries by upgrading their technological capacity.
Managerial and Entrepreneurial Development Scheme	To help SMIs by providing professional and technical services which include: Marketing and product Promotion Human resources and organizational set-up Business expansion policies and strategies Entrepreneurial skill and small business management
Joint Venture and Business Linkages Promotional Services Scheme	To support SMIs to establish alliance and linkages with suitable local and foreign business establishments

Fig. 2: Proposed Government Sponsored Technology Transfer Schemes and Action Programmes

Source: Formulated by Tesfayohannes M, 2000

knowledge. Therefore, technology can be defined as a study of how humans use the environment to meet their needs. This brief definition emphasizes that technology is the reflection of human ability to use resources and acquired knowledge of nature through

accurate observation and thinking. Technology incorporates, among other things, research and development, design, process and production engineering, maintenance, management and entrepreneurship, marketing, investment and finance, human resources, information technology, and many others (Huria, 2000). Technology is always the means of creating new tools serving humans and their environment. The currently rapidly advancing technological capacity is stretching beyond the geographical, political, cultural and economic boundaries in our planet. The various needs of the society and the complexity of the global market have become the fundamental driving force of further innovations and technological development. The term Technology Transfer means the transit of a technological device or system from one place to another. Therefore, it can be conveniently defined as acquiring and absorbing information about physical phenomena, equipment, machines, analytical concepts and operating techniques associated with technology. This pragmatic definition shows that technology transfer is mostly concerned with replication of technological ideas and skill in terms of their Hardware, Orgaware, Humanware and Inforware elements (Huria, 2000). This classification helps to identify the type of technology that should be transferred and to sort out the needed abilities, innovative results, techniques and working methods that a country needs to adopt. The above-mentioned elements of Technology transfer systems point of view as shown in Fig. 1. The above Fig. shows the transferable elements of technology that ranged from physically embodied technological endowments like equipment and physical facilities to knowledge based professional skills and organisational and operational systems. The process of technology transfer is multi-fold in its coverage and complex in its character. The real challenge is to carry out the transfer process in its suitable and feasible manner.

### **Technology Transfer and Economic Development:**

Appropriate technology transfer is one of the major contributors of enhanced economic development. It is also instrumental for breaking the typical vicious cycle factors comprising of low-level income, saving, investment and productivity, and acute shortages of capital (Lado and Vozikis, 1996). Technology transfer substantially contributes towards promoting entrepreneurship and upgrading the quality of human resources necessary for effective utilisation of available physical and capital resources (Baranson, 1969). Developing countries, especially those in Africa, can benefit considerably by transferring Technological know-hows and know-whys and by adapting them to local conditions. This has been proved in many East Asian countries. They have successfully transferred technologies from all corners and with a relatively short period of time they have transformed themselves into competitive economies (Yong, 1992).

Economic development of a given country depends on the advancement of its economic infrastructures at both mezzo and micro level that includes all socio-economic establishments. If a nation needs to develop a stable and competitive economic infrastructure in the midst of the current complex

global economic environment, it has to equip itself with the necessary technological capacity, as this is one of the major prerequisites for this endeavour. This can be done either by acquiring technology through technological innovation or technological acquisition (Osman-Gani, 1999). Technological acquisition through technological transfer in its appropriate form is the most desired one for developing countries like Botswana.

It should however be emphasised that developing the capacity to transfer appropriate and affordable technology is essential towards accelerating the process of economic development (Lincoln, 1987). Firms can play a catalyst role in promoting and defusing technology transfer as a means of stimulating the overall economic performance of a country. Nowadays, the technological advance is dramatic and defusing and transferring many of the technological innovations stimulate not only specific sector but also the overall national economic performance.

Most SMIs in African countries are equipped with outdated technology and engaged in producing mostly second-rate products. However they should reverse their present unviable position and improve their business activities if they are to survive and grow. Thus, empowerment of SMIs through transferring appropriate technological know-how is vital. In the world market dominated by giant multinational and transnational companies, the hope of the struggling nations like those in Africa for industrialisation is through promoting SMIs in all available and viable means. In fact, SMIs do have advantages for innovation and flexibility in satisfying customers' specific needs. They are regarded as more receptive for technology transfer because of their convenience for adopting appropriate and demand-based technology. The current epoch is known by the steady decline of mass production and upsurge of customised and flexible production. This is definitely a potential advantage for SMIs. In general technology transfer help SMIs to build-up their technological and managerial capacity without which they cannot achieve competitiveness in their operational activities. The present trend of downsizing big firms in the manufacturing sector of the developed countries is a clear indication that the diffusion of flexible modes of production in SMIs is apparent (Acs, 1992).

SMIs have tremendous opportunities to acquire affordable technologies. SMIs have already demonstrated their quick receptiveness for incoming technology (The European Network for SMEs Research, 1995). Generally an appropriate technology transfer program is essential for enhancing the capacity of SMIs to successfully meet the challenges of the current dynamic and ever-changing market environment.

### **The Need for and Importance of Technology**

**Transfer in Botswana:** Although the discovery of abundant mineral wealth (particularly Diamond) has propelled Botswana into the middle-income category, the country still faces the problem of economic diversification, employment creation, income distribution and poverty alleviation. The country's economy is highly dependent on the mining and beef sector for its income and on foreign markets for the import of basic goods and services. The main strategy employed by the government to diversify the economy has been the promotion of the development of Small and Medium Industries (hereafter SMIs).

The major and immediate challenge for Botswana is

providing employment for low-and semi-skilled labour. The declining job opportunities in the South African mines for Botswana, the prevalence of low-skill and unskilled labour force in the economy, and the tendency of the government to reduce its role as primary employer made the promotion of SMIs a primary source of employment creation. As most SMI use labour-intensive technologies, they have the potential to create more jobs than do larger firms.

The majority of Botswana are living in rural areas. The promotion of the development of SMI continued to be a policy priority to narrow the gap between metropolitan and rural development and to monitor social inequities and rural migration. Enhancing the import substitution and poverty alleviation potential of SMIs through financial, regulatory and managerial assistance will eventually reduce dependency on foreign markets. This will not only save foreign exchange but also reduce the impact, which fluctuations of foreign exchange receipts will have domestically. The promotion of the development of SMIs will, therefore, have a long run effect of economic independence, and sustained sovereignty and autonomous development.

The experience of Botswana in promoting SMIs toward this end is as old as the country itself as an independent state. Since the creation of the Ministry of commerce and Industry (MCI) in 1973 and the Botswana Entrepreneurs Development Unit (BEDU) in the Ministry in 1974, the government has been promoting SMIs by formulating sound policies and programs that create favourable investment conditions. Government policies were accompanied by appropriate fiscal, monetary and employment policies, which are implemented by statutory promotional institutions such as the National Development Bank, (NDB), Botswana Development Corporation [BDC], the Ministry of Commerce and Industry (MCI) and private sector promotional institutions (Confederation of Commerce, Industry and Manpower, (BOCCIM), Tswelelo, and Small Enterprise Promotion Trust (SEPROT). The major policies and programs of the Government to promote the development of SMIs include the Financial Assistance Policy (FAP), the Local Preference Scheme (LPS), and The Slebi-Phikwe Regional Development Programme (SPRDP). The FAP provides direct financial support to citizens; the LPS provide grants to local manufacturers and the SPRDP was aimed at attracting medium and large manufacturing firms rather than small and micro firms. These policies and programs are currently being reviewed in order to enhance their role in the promotion of SMIs. Moreover, the socio-economic importance of SMIs as industrial development strategy is explicitly stated and documented in the National Development Plan 8 (1998/2003) and in the long-term vision of the country (Towards Prosperity for All: Vision 2016). In sum, SMIs are well recognized in Botswana as an engine of sustainable economic growth.

**The Position of The Industrial Sector in Botswana:** The number of SMIs in Botswana is steadily growing and manufacturing occupies a central place in the strategy for national development. A very attractive industrial incentive has been offered by the Government in order to encourage its development. However, the rate of development of SMIs toward achieving economic diversification, employment creation, income distribution and poverty alleviation is very slow. Their contribution to the gross domestic product

(GDP) for the years between 1994/95 and 1995/96 is not significant (Table 1). Its contribution has not been improving since 1995/96. In addition to the high failure rate (over 80 percent) among new start-ups, most SMIs are at their survival/existence stage of development.

This very slow and discouraging rate of development and contribution to national development could be attributed to the prevalence of financing problems, lack of managerial capabilities, entrepreneurial orientations, technology transfer and the like. The government has long established a financial assistance policy (FAP) to address the financing problems of SMIs. Although the FAP has some coordination and implementation problems, it has stimulated some indigenous investments. In its attempt to promote SMIs, the government also designed such policies as the reservation policy for citizen entrepreneurs, the licensing exemption for small manufacturers and a very attractive tax regime-threshold.

The attractiveness of the macroeconomic policies and incentives offered by the government can be seen in the number of manufacturing companies registered to date and approved for licences. As shown in Table 2, more than 2000 manufacturing companies are licensed.

Although different institutions like the Botswana Technology Center have made great efforts, the improvement made during the past two decades is insignificant. Government and other supports must be supported by firm level capabilities. Technological knowledge is not shared equally among firms, nor is it easily imitated by or transferred across firms. Transfer necessarily requires learning because technologies are tacit, and their underlying principles are not always clearly understood. Thus, simply to gain mastery of a new technology requires skills, effort and investment by the company. In other words, SMIs should be assisted to develop these skills and motivations before they embark on Technology transfer tasks. Thus, technological transfer advances as a result of the interplay of incentives and capabilities. The capabilities if SMIs define the best that can be achieved; while the incentives guide the use of the capabilities and in deed stimulate their expansion. Firm level capabilities include physical investment, human capital and technological effort. These three are strongly interlinked. It is their compounded effort that brings technological development. The incentives include macroeconomic incentives, incentives from competition and incentives from factors market. In the case of Botswana, the macroeconomic incentives are very strong. But, the incentives from competition and factor markets are very minimal as there is strong economic neighbor-south Africa., and weak domestic supply market.

Some preliminary observations indicate that many SMIs do not have strategic orientation and long-term vision. They tend to give very little importance to planning for technology transfer. SMIs prefer to focus on only short-term survival issues. They seem to be convinced that technology transfer is appropriate for only large, multi-product, multi-divisional and multi-national corporations. The technology base of SMIs in Botswana is very weak due to the absence of long-term vision and formal planning which directly affects technology transfer. Although the government has approved licences for more than 2000 companies most of them are micro village firms while the others are small and medium

size. Observations indicate that less than 40 percent of these companies are currently operational in Botswana. Most of them have closed down their doors due to the stiff competition coming from South Africa and other managerial related problems. Technology transfer is a continuous process and selecting technology is part of the strategic planning process. It seems that for SMIs to start practicing planned technology transfer, they must develop their strategic orientation and visionary leadership.

**Critical Issues in Technology Transfer :** Although the importance of technology transfer has been highlighted, the process of transferring technology is complex and demanding. At least at conceptual level, there are important factors that should be considered if Botswana is to successfully promote its SMIs through transfer and dissemination of appropriate technology. Technology transfer can be expensive if critical factors are not properly considered during technology transfer decision-making process. Overlooking the critical factors may create the opportunity for impeding the development of local entrepreneurs (Samli, 1985). They can also distort the patterns of socio-economic development and exploiting the natural and human resources of developing countries like Botswana. Another important point is whether SMIs' organizational, operational, financial, entrepreneurial and technical capabilities are able to utilize imported technology effectively. In other words if SMIs in Botswana possess the necessary skills to make transferred technology operational, the result is improved productivity. The speed and mode of transfer of technological capabilities are vital. A technology that is easily communicated and understood by the recipient firms tend to diffuse faster and be viably transferred through hybrid or market-mediated modes (such as licensing, franchising, and strategic alliance). However, if the technology to be transferred is holistic and intact as usually demonstrated by large companies in the developed countries its supportive role might not reach the desired stage.

Direct technology transplantation refers to the practice of direct transfer of technology in its originality without any modification to adapt the local situation and to fit the specific capabilities of SMIs in host countries. We have to emphasise that transferred technologies are designed to meet special conditions in the place where they intend to fit in. Therefore, they may not be effective (in fact they can be counter productive to development) when they just being transferred and directly implemented without acceptable justification from one country to another. Lastly, it is also important to consider technology as a systems concept that comprises hardware and software related to commercial-scale production and knowledge generated through incremental innovations for efficiency and improvement of technology. Therefore, it needs to be viewed as a system of interrelated elements rather than as a set of a discreet items (Huria, 2000).

**Impeding Factors:** As we have indicated appropriate technology transfer promotes balanced industrial development, which is vital for achieving higher standard of living. Empowered SMIs are therefore the main catalyst forces for achieving this objective. However, the current weak capacity

of SMIs in accommodating transferred technological capabilities has become the major impediment to successful transfer of appropriate technology in Botswana. It is important to systematically identify those externally imposed and internally generated impeding factors for transferring technology to SMIs in Botswana. Basically, these are the results of infra structural and organizational problems. Seven important factors are discussed hereunder.

**Choice of Technology:** In many cases, SMIs are eager to import very advanced technological know-hows, which are beyond their effective utilization for operational advancement and performance improvement.

**Absorption Capacity:** most SMIs lack infra structural and organizational capacity to absorb the transferred technological capabilities. Absorption capacity is the ability of a firm to recognize the value of new external technology, assimilate it, and apply it to commercial ends (Kedia, B.L., and Bhatgat, R.S., 1990).

**Conflict of Interest:** Both internal and external technology transferors may want to transfer technology that can give them financial benefit. On the contrary recipient SMIs wish to receive technology that will promote their industrial experience: improve their operational facilities, enhance their marketing capabilities and extend business networks.

**Incompatibility:** External and internal transferors of technology tend to transfer technological capability that cannot be easily communicated, understood and implemented by the recipient SMIs.

**Technology Transplantation:** Many technology transferors particularly those from the developed countries would like to direct transplant technology (i.e. the whole operation) rather than complementary technology that will help SMIs foster internally motivated technological capacity and entrepreneurship.

**Management of Technology Transfer:** Technology transfer will be less effective unless it is properly managed. The precarious position, lacks of strategic orientation, visioning, and poor organizational set-up of SMIs are the main causes of poor absorption of technology. Technology management is the major variable that affects the technology transfer process both negatively and positively (Osman-Gani, 1999). Management of technology transfer includes planning, scheduling, programming, training, and making the operational environment ready for the newly obtained technology.

**Technology Transfer Risks:** Another issue that deserve critical consideration is the feeling of insecurity on the side of the technology transferor if the mode of technology transfer is in the form of joint venture and partnership. Many potential partners do have fear to form an alliance with their counter parts in the developing countries. The fear stems from facing risks associated with the fragile socio-economic structures and stagnant government regulations of these countries.

As the above impeding factors floating over them, it is of course a formidable challenge for SMIs in Botswana to be ready to benefit from the appropriate technology transfer.

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**Table 1: The Contribution of Manufacturing to the Botswana Economy**

Economic Activities	1994/95	1995/96	1996/97	1997/98	1998/99
	%	%	%	%	%
Agriculture	4.1	3.9	3.4	3.1	2.8
Mining	33.3	31.4	37.0	37.7	35.0
Manufacturing	4.9	5.0	5.0	4.9	4.7
Water and Electricity	2.2	1.9	1.8	1.8	1.9
Construction	6.0	6.2	5.8	5.7	5.9
Trade, Hotel, and Restaurants	11.0	11.6	11.7	11.4	11.8
Transport	4.0	4.0	3.9	3.9	4.1
Banks, Insurance and bus. Services	11.0	10.9	10.4	10.2	10.5
General Government	15.3	14.9	14.1	14.3	16.0
Social and Personal services	4.4	4.3	3.9	3.9	3.9
Adjustments	3.4	3.3	3.0	3.3	3.4
GDP at market prices	100	100	100	100	100

Source: Central Statistics Office, Gaborone, 1999

**Table 2: Approved Manufacturing Licences by Size and by Products**

No	Major Products/Product areas	Small	Medium	Large	Total
1	Meat Products	16	8	1	25
2	Dairy Products	6	8	0	14
3	Beverages/Drinks all type	33	8	5	46
4	Bakery products	57	30	0	87
5	Textile/Clothing apparel/Fabrics	274	119	80	473
6	Chemical Products	87	44	9	140
7	Metal Products	197	100	18	315
8	Paper products	22	13	3	38
9	Wood products	87	44	12	143
10	Assembly of motors/bicycles	31	18	6	55
11	Building material	101	112	17	230
12	Electrical Products	42	29	2	73
13	Food Products	40	18	6	64
14	Plastic products	52	29	10	91
15	Printing and Publishing	47	9	2	58
16	Leather Products	22	20	11	53
17	Handicraft Products	25	12	2	39
18	Others	67	49	7	123
Total		1206	670	191	2067

Source: Department of Industrial Affairs, Ministry of Trade, Industry, Tourism and Wildlife, 2001

### Recommendations For Promoting Appropriate Technology Transfer

: As stated above SMIs in Botswana are very weak in all yardsticks. Their sombre situation can be visibly observed by their uncompetitive and unsatisfactory performances. They should be assisted to: manage their operational activities efficiently; modernise their technical and managerial capacity; expand their marketing horizons and produce competitive and customer receptive outputs.

To achieve these multi word goals, the role of appropriate technology in its broader sense is vital. Therefore, from the authors' point of view the following constructive recommendations are given.

- SMIs and their supportive institutions in Botswana should change their attitude and understanding about the concept of appropriate technology transfer. Technology transfer is not a mere acquisition of physical assets like machinery, equipment, and so on. Managerial skills, organisational capability, information,

entrepreneurial skills and investment skills are also part of technology to be transferred. The technology transfer paradigms and the mode of technology transfer for SMIs in Botswana should therefore be comprehensive. The four elements of technology transfer namely: Technoware, Orgaware, Humanware and Infoware are helpful in identifying and selecting what elements of technology can be transferred and successfully complemented in business operations in SMIs.

- Knowledge and training on how to use, how to get and where to get the technology is also very important. The majority of SMIs in Botswana have this problem. SMIs' owners usually talk loudly about the need of up-grading their business operations by acquiring new and appropriate technology but many of them lack the necessary skill and readiness. It is therefore necessary to acquire the necessary information and skill as a prerequisite for transferring technology. On the other hand organizational

capacity to absorb and utilize transferred technology is vital. This may lead us to consider the determinants of the efficacy of technology transfer and utilization.

- Technology transfer cannot be simply transferred without strong institutional support. The necessary institutional framework should be set-up to support the process of: identification, communication, acquiring, testing, evaluation, modification, absorption, development, utilization, assessment, promotion and forecasting of technology. The institutional support for SMIs that boost their absorbing capacity should concentrate on facilitating the availability of: Information, finance and credit, raw materials, reliable infrastructure, marketing facilities, legal aid and training opportunities. The government and other stakeholders can play a pivotal role in this respect.
- Government has an important role to play in promoting technology transfer particularly to SMIs. For example, Singapore has successfully designed a system, which provides comprehensive and viable assistance ranging from product development to ultimate stage of marketing. (Yong and Wee, 1992). Government, through its relevant agencies, can design and implement realisable schemes specifically promoting technology transfer to SMIs in Botswana. The Fig. 1 shows some proposed schemes that can be designed and implemented by the government.

### Conclusion

The globalisation of business and economy is currently enhancing the importance of technology transfer at any level to speed-up development and eradicate poverty. Scientific findings, innovations, and discoveries and new technical skills should be transferred from one corner to another at faster rate to make the global economic interaction much more socially, economically and environmentally viable and sustainable. Technological change and improvement of business activity have become the principal concern of managers and industrial entrepreneurs. Appropriate technology transfer has become instrumental to the fast economic growth of many countries. The East Asian countries have become successful because of technology adaptation and imitation and transplant in its appropriate mode. It has become now evident that industrial establishments of any size should critically consider that without awareness of technology it will be very difficult to remain competitive in business.

In accordance with the sustainable economic development paradigms, developing countries like Botswana have given cardinal attention for SMIs in recognising their important role in the overall socio-economic development. However, SMIs should be also promoted to surmount their expected role. The role of technology is fundamental to achieve this goal. Technology choice has an impact on all decisions within operations and on all of the functions of a business. Therefore, SMIs should be supported through appropriate technology transfer.

This paper has given a theoretically based analysis focusing on the *hows* and the *whys* of technology transfer for SMIs in Botswana. This may help to enhance the understanding of the importance and effectiveness of technology transfer. It should however be clear that the process is an intricate one and

demands the overall efforts of all concerned parties. Above all, firms should make all efforts to enhance their absorption capacity in its appropriate form. The authors hope that future research will address specific aspects of technology transfer and investigate its specific and targeted applicability. The main actors for this endeavor should of course be SMIs themselves. But the prudent support and motivation from the government and other concerned institutional capacities is also substantial.

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